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Health and Wellbeing in Elite Female Ballet Dancers: Implications of Maturity Timing

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Health and Wellbeing in Elite Female Ballet Dancers: Implications of Maturity Timing

Siobhan Brittany Mitchell

A thesis submitted for the degree of Doctor of Philosophy

University of Bath

Department for Health

January 2018

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Signed on behalf of the Faculty of Humanities & Social Sciences.....

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Abstract

Puberty presents an interesting paradox for young dancers. While improvements in strength and power can be advantageous, changes in body size, shape, and composition may adversely affect performance and wellbeing. To understand how young dancers successfully negotiate puberty, a biocultural approach is required, considering the interactions between biological, psychological and sociocultural factors.

The six studies included in this thesis investigate how existing biocultural models of adolescent adaptation can be applied in the context of ballet. Quantitative and qualitative approaches are used to explore how sociocultural, psychological and biological factors interact to determine adaptive responses during puberty. Although early maturing dancers were less likely to be represented at the adult level (study one), they did not differ physically or psychologically from their later developing peers. This suggested only those early developers with the requisite physical and psychological attributes are retained within professional ballet. This hypothesis was validated in a subsequent retrospective study exploring the developmental pathways and experiences of early, on time and late maturing ballet dancers (study two). In adolescent ballet dancers (study three) differences were found in the physical characteristics of dancers of differing maturity timing, with a bias toward late developers which increased with age/level of training. Adolescent dancers' experiences of growing up in the context of vocational ballet training (study four to six) varied by maturity timing. Early, on time and late maturing ballet dancers described differences in psychosocial adaptation at puberty, mechanisms for coping, and in their learning experiences.

Findings from this thesis point toward a unique and complex interaction among biological, psychological and sociocultural factors in ballet, not accounted for in existing biocultural models of adolescent adaptation. In order for a model to fully account for the implications of maturity timing in the context of ballet, a more complex model is required.

List of abbreviations

BD	Body Dissatisfaction
BMI	Body Mass Index
CPD	Continuing Professional Development
DBS	Disclosure and Barring Service
DEQ	Dance Experience Questionnaire
EDE-Q	Eating Disorder Examination Questionnaire
EDI	Eating Disorder Inventory
EDNOS	Eating Disorder Not Otherwise Specified
EM	Early Maturation
HDP	Healthier Dancer Programme
IADMS	International Association of Dance Medicine and Science
IPA	Interpretative Phenomenological Analysis
LM	Late Maturation
OT	On time Maturation
PDS	Pubertal Development Scale
PHV	Peak Height Velocity
PWB	Psychological Wellbeing Scale
RAE	Relative Age Effect
RSE	Rosenberg Self-Esteem Scale
SMS	Sexual Maturation Scale
TRI	Thinness and Restricting Inventory
TRL	Thinness Related Learning

Introduction

i. The Ballet Environment: An Overview

Dance is a visual art and as such there is a focus on the aesthetic, size and shape of the body. While dancers of different genres are likely to train across dance styles, aesthetic requirements vary between dance genres, within contemporary dance, for example, the demands on the dancer are quite different to that of ballet. Therefore, a distinction will be made throughout this thesis between dance styles, with a particular focus on ballet. The social world of ballet is based on a uniformity of body shape and size, with a growing preference amongst ballet audiences for ephemeral, 'other-worldly' bodies which are hyper-flexible and often skeletal (Bronhorst et al., 2001; Foster, 2003; Pickard, 2013; Wainwright, 2004).

With few exceptions, the ballet world has historically prescribed to a particular body; sylphlike bodies which can effortlessly portray the characters of the classic romantic ballets (Vincent, 1981). Change in this aesthetic has been seen over time, in tandem with wider cultural ideals and attitudes pertaining to the attractiveness of the female body (Pickard, 2015; Saltzberg & Chrisler, 1995). From the 1920s to the 1950s, when a more 'womanly' physique was fashionable, ballerinas such as Anna Pavlova and Margot Fonteyn were at the top of the profession. Influential figures such as George Balanchine (1904-1983), a widely known choreographer, artistic director and co-founder of the New York City Ballet, have forged changes relating to aesthetic in the ballet world (Vincent, 1981). In 1960s America, Balanchine popularised a new extreme for the female ballet dancer. In addition to the prerequisite characteristics of a pre-pubescent slender figure and long limbs, a more skeletal frame designed to accentuate the collar bones and the neck was now sought after. This androgynous look had an enduring and international influence (Kirkland & Lawrence, 1986; Pickard, 2015; Vincent, 1981). In the 21st century these perceptions and expectations of a ballet dancer's body are still prevalent (Mitchell, Haase, Malina, & Cumming, 2016; Pickard, 2012, 2013; Pickard, 2015; Pickard & Bailey, 2009).

The prescribed norms and expectations of the body in ballet are defined by 'ballet sub-culture' (Pickard, 2015). This ballet sub-culture has been described by various researchers to encompass the ideas, customs, and social behaviour of those involved the ballet world (Pickard, 2012, 2013, 2015; Benn & Walters, 2001; Wainwright, Williams & Turner, 2006). For example, ballet dancers are aware from a very young age of the expectations of this sub-culture and the particular characteristics (physical or otherwise) associated with cultural

(physical and/or artistic) 'capital' (Pickard, 2012, 2013, 2015; Benn & Walters, 2001; Wainwright, Williams & Turner, 2006). Ballet sub-culture will be referred to throughout this thesis with the social context of ballet also used to refer to ballet sub-culture.

Training in ballet can take place at many levels though there are two broad categories: recreational and vocational (also known as full-time or pre-professional) (Mitchell et al., 2016). Recreational dance can be described as having the goal of participation oriented around the enjoyment and fun of dance as an activity. Vocational or full-time training pertains to a more serious involvement with dance whereby those who participate at this level undertake highly specialised, intensive training designed to prepare them for a professional career in the dance industry (CDET, 2011; Mitchell et al., 2016). In vocational ballet training, full-time commitment can begin as early as ten years of age; in boarding schools children selected at this age study dance alongside their basic schooling (Buckroyd, 2000; Pickard, 2015).

In the context of intensive, vocational ballet training, the age of puberty coincides with increased intensity of training and increased pressure for improvement (Buckroyd, 2000; Pickard, 2015). Young dancers have to contend with physical, psychological and social changes, physical changes in particular, likely to have a direct impact upon performance and technique (Beunen, Ostyn, Renson, Simons, & Van Gerven, 1976; Bowerman, Whatman, Harris, & Bradshaw, 2015; Daniels, Rist, & Rijven, 2001). Concurrently, expectation for a continued rate of improvement remains and the intensity of training increases (Buckroyd, 2000). A young dancer's personal experience and feelings about these changes are also being negotiated at this time, setting the stage for a multitude of challenges when combined with the pressures of the dance training environment.

There are many challenging aspects of the ballet training environment which young dancers have to negotiate at the same time as adjusting to pubertal changes. In this thesis the ballet training environment is considered to be encompassed within ballet sub-culture and refers to both physical and social aspects of the environment, including mirrors, attire and the learning environment created by the dance teacher. Many of these factors have been associated with maladaptive health outcomes. Features of the environment such as the use of mirrors and the requirement to wear form-fitting attire have been associated with issues of low self-esteem and body perceptions (Price & Pettijohn, 2006), poor body image and body objectification (Oliver, 2008; Radell, Adame, & Cole, 2002; Radell, Adame, Cole, & Blumenkehl, 2011; Radell, Keneman, Adame, & Cole, 2014).

The teacher-student relationship in dance is also a prominent factor both in terms of student experience and adaptation to change during training (Mitchell et al., 2016; Stark & Newton, 2014). Moreover, the environment created by the teacher has the potential to influence psychological wellbeing in dance (Annus & Smith, 2009; de Bruin, Bakker, & Oudejans, 2009; Nordin-Bates et al., 2012; Penniment & Egan, 2012; Stark & Newton, 2014).

While the teacher-student relationship can play an important role, the interaction between students may also be an important factor. Although there is little research specific to young dancers, existing research holds that the interaction between peers becomes especially significant for wellbeing, behaviour and adaptive responses during the adolescent stages of development (Brinthaupt & Lipka, 2002; Pindus et al., 2014; Raja, McGee, & Stanton, 1992; Sebastian, Burnett, & Blakemore, 2008). Findings suggest that higher feelings of attachment to peers are related to positive psychosocial outcomes such as lower anxiety, lower depression and higher reported psychological strengths (Raja et al., 1992), higher self-esteem, greater life satisfaction (Armsden & Greenberg, 1987), and better self-image (Koon, 1997).

In a study with young female dancers (n=83) participating in a range of dance styles, positive climate, characterised by low perceptions of ego-involving climate and high perceptions of caring and task-involving climates, corresponded to more positive and less negative affect (Stark & Newton, 2014). In this positive climate, dancers reported better quality attachment to teachers and peers, and more friends at their dance studio in comparison to dancers in the mixed climate group, characterised by high perceptions of an ego-involving climate and low perceptions of task-involving and caring climates (Stark & Newton, 2014). A positive climate provided more opportunities for collaboration and was associated with dancers having a greater ability to connect with their peers. In contrast, teacher tendency toward critical feedback and the promotion of an antagonistic climate were associated with a reduced likelihood of forming positive and meaningful attachments with peers; a climate where dancers are more likely to be in competition with peers than they are to trust, bond and communicate with them (Stark & Newton, 2014).

ii. Popularity and Health Benefits of Dance

With a high number of individuals participating in dance, ensuring that participation is safe and conducive to wellbeing at all levels is of increasing importance. Dance is a popular activity, statistics from the Central Council for Physical Recreation illustrate its popularity, with five million participants (eight percent of the UK population), taking part in dance each year (One Dance UK, 2015; Stenton, 2011). A government report suggests that 89% of schools now offer

dance as part of their programme within the physical education curriculum (either on-site or through links to clubs) and that it continues to be one of the most popular activities on offer (Quick, Aline, & Thornton, 2010). In addition to this, there are around 22 dance colleges offering professional dance training and over 292 university courses with dance as a subject area in the UK; with an estimated 1,000 dancers graduating each year from vocational training schools and university dance courses (One Dance UK, 2015).

Before discussing the health benefits of dance as an activity, it is important to define what is meant by the term wellbeing. The construct of wellbeing is both multifaceted and complex, with many different views of how the term should be defined (Lundqvist, 2011). This research adopts a eudaimonic perspective on wellbeing based on the effective psychological and social functioning of the individual (Lundqvist, 2011). That is, wellbeing refers to Keyes' (1998) definition which comprises both psychological (i.e. private and personal aspects of positive functioning) and social aspects of wellbeing (i.e. social function and perceived flourishing in social life) (Lundqvist, 2011). In this thesis, the term wellbeing refers to the thriving and positive function of an individual in his or her personal and/or social life, except when explicitly referred to as psychological wellbeing, encompassing only the psychological (personal/private) aspects of positive functioning (Keyes, 1998; Keyes & Lopez, 2005).

The health benefits of dance may contribute to its growing popularity. Research suggests that health benefits are present across all age groups, from early years to the elderly (Burkhardt & Rhodes, 2012; Quin, Frazer, & Redding, 2007). Particular benefits have been shown in the improvement and maintenance of cognitive functioning and social skills, with advantages for both physical and psychological wellbeing (Alpert, 2011; Burkhardt & Rhodes, 2012; Houston, 2005; Malkogeorgos, Zaggelidou, & Georgescu, 2011; Quin et al., 2007). Quin and colleagues (2007) established evidence for increases in physical fitness and in psychological parameters such as self-esteem and motivation in young adolescents. However, there seems to be a distinction between non-professional dance training and professional dance training where health benefits are concerned (Anshel, 2004; Buckroyd, 2000; McEwen & Young, 2011; Smith, 1997, 1998; Wilson, 1994).

Extant literature presents a paradox in terms of psychological wellbeing and dance training; whereby non-professional dance training generally yields benefits for psychological wellbeing, yet professional dance training can result in psychological detriment (Anshel, 2004; Bakker, 1988, 1991; Buckroyd, 2000; Goodwin, Arcelus, Marshall, Wicks, & Meyer, 2014; McEwen & Young, 2011; Smith, 1997, 1998; Wilson, 1994). While professional training has the potential to deliver the same benefits as non-professional, evidence suggests that it is often capable of

causing psychological damage and failing to protect young people from destructive ways of functioning (Anshel, 2004; Bakker, 1988, 1991; Buckroyd, 2000; Goodwin, Arcelus, Marshall, et al., 2014; Smith, 1997, 1998; Wilson, 1994). Research demonstrates high rates of injury, smoking, substance abuse and eating disorders among trainees and professional dancers (Allen, Nevil, Brooks, Koutedakis, & Wyon, 2012; Arcelus, Witcomb, & Mitchell, 2014; Brinson, 1996; Ekegren, Quedsted, & Brodrick, 2014; Garner, Garfinkel, Rockert, & Olmsted, 1987; Goodwin, Arcelus, Marshall, et al., 2014; Kenny, Whittaker, & Emery, 2016; Schnitt, 1990). In addition, risks to psychological wellbeing may be associated with participation in different dance styles. Much existing research in professional training is based on ballet dancers, with less data in other styles such as contemporary.

While negative psychological impact may be more prolific in professional training, participation at any level has the potential to lead to negative health outcomes (Wonderlich, Ackard, & Henderson, 2004). Childhood participation in dance (ballet and unspecified 'other' styles) has been associated with higher measures of bulimic behaviours, greater drive for thinness, poorer impulse control, greater perfectionism and smaller ideal body mass than non-dancers (Wonderlich et al., 2004). In addition, women in higher level ballet classes have been found to experience greater health risks such as disordered eating and to report increased thinness related learning (TRL) experiences at this level (Annus & Smith, 2009). This may be due to involvement in more competitive training and thus greater exposure to environmental risk (Annus & Smith, 2009).

iii. Concerns for Risk and Prevalence of Negative Health Outcomes in Dance

Although there is a lack of current data, the health risks associated with professional dance training are somewhat reflected in the low success rate seen in this group, where less than 30% of students from nationally recognised ballet schools graduate (Dunning, 1985; Hamilton & Hamilton, 1990). While the dropout rate is suggested to be high, few studies have investigated these rates and reasons for dropout; evidence to date from ballet and contemporary dance styles suggests a dropout rate of around 50%. Walker and colleagues (2012) and Hamilton et al (1997) each studied dropout across four year periods and found dropout rates of 53% and 55%. A wide range of factors were suggested to be associated with dropout, most frequently cited reasons for contemporary dancers included conflicting demands, difficulty making friends, loss of passion, course content and change in aspirations. More minor reasons included physical injury, low perceived competence and the social environment (e.g. feedback from the teacher, ego-involving climates) (Aujla, Nordin-Bates & Redding, 2015; Walker, Nordin-Bates, & Redding, 2012). Hamilton et al (1997) cited the key characteristics of those who did not complete professional ballet training. Factors included

early to average age of menarche, higher incidence of injury, lack of strength, reduced flexibility, preoccupation with the aesthetic standards of ballet, higher scores on measures of deviant eating behaviours, secondary amenorrhea, poorer body image and a clinical eating disorder profile (Hamilton, Hamilton, Warren, Keller, & Molnar, 1997). It is pertinent to note that being assessed out (selected to exit training) was an external factor within both studies in addition to reported rates of dropout. While maturation timing is reported to be associated with dropout in studies of ballet dancers, a recent study with dancers predominantly training in contemporary dance styles reported no effect of maturation in terms of distinguishing those who dropped out from those who continued training, suggesting that dance style plays an important role (Aujla et al., 2015). In summary, reasons for dropout appear to reflect the high selectivity, competitive nature and aesthetic bias of professional dance training. Accordingly, the following section will discuss some of the most prevalent factors which contribute to health risk in dance including psychosocial issues such as eating pathologies and perfectionism; and perceptions of the learning environment.

The physical wellbeing of dancers has been widely studied, particularly in terms of injury prevalence, with some attention given to injury within studies of dropout from training (Allen et al., 2012; Ekegren, Quested, & Brodrick, 2014; Hamilton et al., 1997; Laws, 2005; Walker et al., 2012). Physical injury is a fundamental issue, with up to 80% of dancers sustaining an injury in a working year (Laws, 2005). The physical stress of ballet has previously been compared to that of contact sports (Nicholas, 1975). In a study of 61 sports, classical ballet was ranked highest in terms of physical and mental stress, followed by professional football and hockey (Nicholas, 1975). Physical injury has also been cited as one of the key reasons for dropout in ballet (Hamilton et al., 1997). With strict technical and aesthetic requirements even minor anatomical deviations can be problematic, whereby only “Dancers with the best bodies survive in the art” (Hamilton & Hamilton, 1994, p. 35).

Psychological factors have also received attention in research. In particular, the prevalence and effects of perfectionism have been widely studied, with dancers described as a highly perfectionistic population (Goodwin, Arcelus, Geach, & Meyer, 2014; Nordin-Bates, Cumming, Aways & Sharp, 2011; Penniment & Egan, 2012; Zoletić & Duraković-Belko, 2009). Whether traits such as perfectionism are selected for, lead to self-selection, or are developed within sub-cultures such as ballet, remains under debate but its association with maladaptive behaviours such as eating pathologies, low self-confidence, greater anxiety (cognitive and somatic), low self-esteem and excessive self-criticism has been well documented (Bakker, 1988; Goodwin, Arcelus, Geach, et al., 2014; Nordin-Bates, Schwarz, Quested, Cumming,

Aujla & Redding, 2016; Nordin-Bates et al., 2011; Nordin-Bates, Walker, & Redding, 2011; Penniment & Egan, 2012; Stark & Newton, 2014; Zoletić & Duraković-Belko, 2009).

Research which situates the development of maladaptive behaviours, such as eating pathologies, within specific learning environments has also been conducted, with a focus in dance research on the motivational climate (Carr & Wyon, 2003; de Bruin et al., 2009; Nordin-Bates, Schwarz, Quested, Cumming, Aujla & Redding, 2016; Quested & Duda, 2009, 2010) and the caring climate (Stark & Newton, 2014). Findings from motivational climate literature suggest more task-involving or mastery climates to be associated with more positive psychological outcomes, such as less frequent dieting, less weight-related coach and peer pressure (de Bruin et al., 2009), and striving for excellence and perfection (Nordin-Bates, Hill, Cumming, Aujla & Redding, 2014). Whereas ego-involving climates in dance have been found to be associated with maladaptive behaviours such as greater perfectionistic concerns (Carr & Wyon, 2003; de Bruin et al., 2009; Nordin-Bates et al., 2014), greater anxiety (Carr & Wyon, 2003; Nordin-Bates, Quested, Walker & Redding, 2012), greater weight-related peer pressure and increased dieting (de Bruin et al., 2009). Studies assessing the relationship between motivational climate and self-esteem in dance report a less consistent association (de Bruin et al., 2009; Nordin-Bates et al., 2012). Theories of achievement motivation have been applied to the study of determinants of ill-being in dancers. Findings support research conducted in achievement goal theory whereby perceptions of task-involving climates were related to more positive health outcomes (Quested & Duda, 2010). Task-involving climates have been found to positively predict positive affect, with perceived ego-involving climates corresponding negatively to feelings of competence and relatedness (Quested & Duda, 2009, 2010).

In support of the association between task-involving climates and greater psychological wellbeing, Stark and Newton (2014) advance the notion of an interlinked task-involving and caring climate being associated with better wellbeing, greater positive affect, body esteem and relationships with teachers and peers in the dance context (Stark & Newton, 2014). Enhancing the teacher-student relationship may be important in the prevention of maladaptive behaviours. Recent research suggests that teachers have the potential to assume a role which could moderate the effect of the dance environment upon health and wellbeing (Mitchell et al., 2016). Adopting approaches such as modifying physical aspects of the environment, for example, covering mirrors could help to mitigate psychological and social pressures such as wider cultural expectations (Mitchell et al, 2016). Therefore, in theory the teacher has the potential to assume a protective role and to create an environment (task-involving and caring) which promotes greater psychological wellbeing. Further research is needed to support the efficacy of such approaches in their effect upon physical and psychological health in dance.

While this body of work in achievement theory suggests an association between more task-involving environments and greater wellbeing in dance, recent research highlights the limitations of current conceptualisations and measurement of motivational climate (Nordin-Bates et al., 2016). Specifically, when using the Perceived Motivational Climate in Sport Questionnaire – 2, the measure places excessive focus on progress and/or weakness, which has been highlighted as problematic (Nordin-Bates et al., 2016). In particular this measure may prove problematic for those who are highly perfectionistic, where it may therefore be possible that teachers are perceived to be task-involving even if their behaviours are felt to be pressurising (Nordin-Bates et al., 2016). Alternative conceptualisations of motivational climate such as self-determination theory and different approaches to measurement such as qualitative and longitudinal approaches have been recommended going forward (Nordin-Bates et al., 2016).

Alternatives to motivational theory offer a different perspective to the study of dance training environments. Expectancy theory (Bolles, 1972; MacCorquodale & Meehl, 1953; Rotter, 1954; Tolman, 1932) has been used to explore the nature of environmental risk in dance training (Annus & Smith, 2009). While a focus on the significant pressure to be thin has been widely cited in dance research (Annus & Smith, 2009; Bettle, Bettle, Neumarker, & Neumarker, 2001; Garner & Garfinkel, 1980; Garner et al., 1987; Goodwin, Arcelus, Marshall, et al., 2014; Hamilton, Brooks-Gunn, & Warren, 1985; Holderness, Brooks-Gunn, & Warren, 1994; Le Grange, Tibbs, & Noakes, 1994; Lowenkopf & Vincent, 1982; Ravaldia et al., 2003), the majority of existing research is based on inference of pressure for thinness rather than direct measurement. Furthermore, generalisations are difficult due to the likelihood that different dance training experiences may vary in the degree to which they emphasise thinness and dieting. Eating disorder expectancy theory has been used to address these inferences, providing support for the idea that eating disorder risk in the dance class environment is developed through specific learning experiences concerning the desirability of thinness (Annus & Smith, 2009). Examples of such learning experiences include comments from teachers about the importance of thinness and peer modelling of dieting or other weight control behaviours (Annus & Smith, 2009).

Learning experiences in dance classes concerning thinness are reported to predict adult disordered eating and this relationship appears to be mediated by thinness expectancies (Annus & Smith, 2009). While there is little research specific to measures of thinness related learning, the underpinning theory, expectancy theory, is well researched and has received little attention in the context of dance. The concept of thinness related learning aligns with the

factors of interest in this thesis. That said, this thesis will explore the concept of thinness related learning further, while acknowledging the limitation of current research using measures such as the dance experience questionnaire, which is in its infancy and has not yet been rigorously validated.

Annus and Smith's (2009) initial research has been advanced to explore the interaction between perfectionism and learning experiences in dance class as risk factors for eating disorder development. The association between perfectionism and eating disorder symptoms was found to be partially mediated by learning about thinness and restriction in dance class (Penniment & Egan, 2012). Existing literature in both general and dance contexts suggests that eating disorder symptoms are significantly influenced by this interaction between thinness expectancies and learning experiences (Annus & Smith, 2009; Annus, Smith, & Masters, 2008; Combs, Smith, & Simmons, 2011; Penniment & Egan, 2012; Smith, Annus, Simmons, Flory, & Hill, 2007).

While existing research supports an association between thinness related learning, disordered eating and perfectionism in adults participating in ballet, research has yet to explore these learning experiences within the context of physical and psychological development. It is well established that many psychosocial issues, such as eating disorders, begin at adolescence and that dancers are at significantly higher risk of developing these issues, yet, research on the psychosocial adaptation of young people growing up in dance is limited (Arcelus et al., 2014; Brooks-Gunn & Warren, 1985; Dahl, 2004; Klump, 2013). The original contribution of this thesis is a greater understanding of psychosocial adaptation at puberty. More specifically, how the interactions between biological, psychological and sociocultural factors influence adolescent adjustment and subsequent physical and psychological wellbeing in ballet dancers.

A more comprehensive understanding of the dancer's transition through puberty requires a biocultural approach which considers the interactions of the biological and societal demands placed upon the maturing and developing individual (Cumming, Sherar, Pindus, et al., 2012; Malina, Bouchard, & Bar-Or, 2004; Petersen & Taylor, 1980). Central to the biocultural approach is the assumption that the biological changes of puberty occur within a cultural context and can both directly and indirectly affect adolescent behaviours. An interdisciplinary perspective may provide a more complete understanding of how to reduce risk and prevent maladaptive responses to learning environments in dance. Adopting an interdisciplinary approach and combining both quantitative and qualitative methods, this thesis aims to more fully understand experiences surrounding the complex topic of maturity timing in dance and

the maturity characteristics of adult and adolescent female ballet dancers. This thesis does not aim to demonstrate cause and effect but focuses primarily on exploring qualitative experiences and within these experiences, how sociocultural, psychological and biological factors interact. Suggestions for practical application do not present tested solutions but recommendations for future research and practice. While earlier research has been limited to describing psychological outcomes at single time points, the qualitative methods utilised in this thesis aim to develop a greater understanding of psychosocial adaptation to puberty through exploring narratives of growing up in dance and the characteristics of adolescent female ballet dancers.

iv. An Interdisciplinary Approach

To develop a more comprehensive understanding of the relationship between learning experiences and health outcomes in elite dance, it is important to adopt an interdisciplinary approach. An interdisciplinary approach acknowledges that there is a complex set of interactions between different factors in the development of health outcomes such as disordered eating; these factors can be psychological, biological or social. While the majority of research in this area has focused upon psychosocial aspects, biological factors such as maturation timing (variation in the age at which puberty occurs) have been neglected. In this instance, it is proposed that a number of factors are pertinent to the exploration of this relationship: sociocultural factors (e.g. learning experiences and cultural norms and beliefs), psychological factors which are informed by the sub-culture and the associated environment (e.g. thinness expectancies and perceptions of pubertal change), and biological factors (e.g. maturation timing).

Several researchers recommend a biocultural approach for the study of adolescent adaptation and behaviour. McElroy (1990) describes a biocultural approach as a method for studying the interface between biological and cultural factors which affect human wellbeing. Such an approach considers a more comprehensive view of humans as biological, cultural and social beings (McElroy, 1990).

There is an important distinction to be acknowledged between an interdisciplinary approach and biocultural perspectives. An interdisciplinary approach acknowledges the complexity of a phenomenon and utilises different disciplines to seek a more authentic understanding of a phenomenon. In this instance, sociocultural, biological and psychological disciplines. While biocultural models and frameworks are the mechanism through which we can begin to understand the interactions between different factors acting on the individual, which may arise from the different disciplines within an interdisciplinary approach. That said, this research

utilises a biocultural framework for the consideration of a range of interdisciplinary factors. While many studies using a biocultural perspective test mediated effects models it is acknowledged at the outset of this thesis, that due to the lack of research in this area this work is exploratory. Thus, although tested biocultural models will be described in the literature review, this thesis intends to explore factors from a biocultural perspective and in doing so, inform future testing of biocultural models in dance research.

The term 'biocultural' refers to a perspective and/or model in which cultural data are collected and integrated with biological and environmental data (McElroy, 1990). The term originates from biocultural studies, defined as research that specifically includes social, cultural or behavioural variables in its design (McElroy, 1990). Relative to this research, sociocultural data may refer to the ballet sub-culture or social context of ballet (e.g. the social stimulus value of the adolescent body relative to cultural norms and beliefs), environmental data may refer to the specific environment and facets of that environment with which an individual is engaging (e.g. in a vocational ballet training environment daily use of mirrors, ballet attire and the learning climate may all comprise aspects of the environment), biological data may refer to the timing or tempo of maturation (i.e. early or late maturation). Within this thesis, as with other interpretations of biocultural models (e.g. Hunter Smart et al., 2012), psychological perspectives are integrated. In particular, psychological factors which are likely informed by the sub-culture and the associated environment such as thinness expectancies and perceptions of pubertal change. In addition, environmental factors are encompassed within the sociocultural data; facets of the ballet training environment, both physical and social, considered as an integral part of ballet sub-culture. Thus, throughout this thesis the term biocultural refers to the relationship between sociocultural (including environmental), biological and psychological variables. McElroy's (1990) illustration (Figure 1) demonstrates the basic premise of an integrative biocultural model. Application of this framework and the more detailed models which have been developed will be discussed later in the literature review (Section 4, p.45-53).

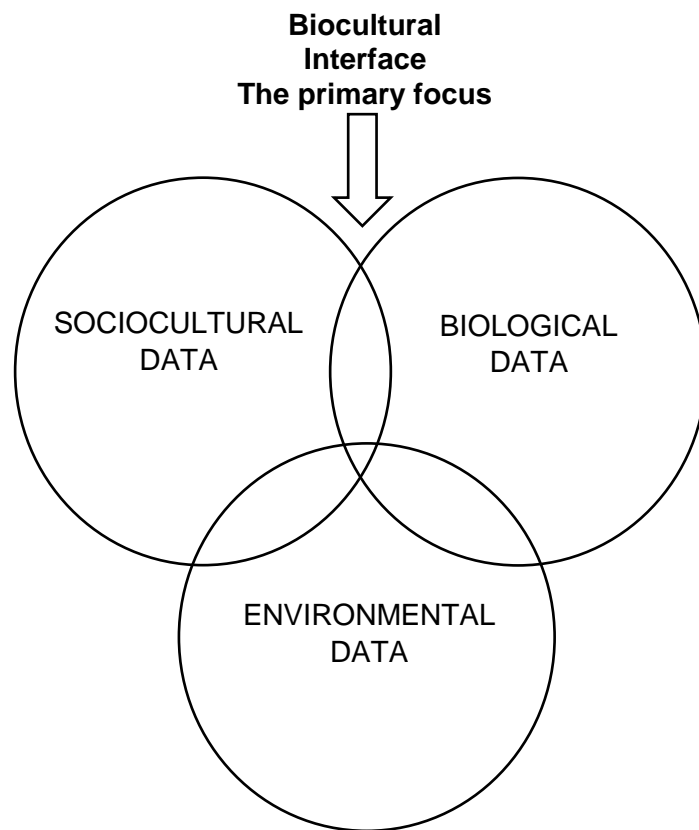


Figure 1. Basic biocultural model, adapted from McElroy, 1990

Researchers have applied a biocultural approach to the study of adolescent populations and physical activity (Cumming, Sherar, Pindus, et al., 2012; Hunter Smart et al., 2012; Malina et al., 2004; Petersen & Taylor, 1980). These studies have advanced our knowledge of the interaction between sociocultural, psychological and biological factors surrounding the adolescent individual. The physical changes of puberty, the timing of physical change and the social context in which changes take place are central to determining health and behaviour outcomes (Brooks-Gunn & Warren, 1985; Cumming, Sherar, Pindus, et al., 2012; Pickard, 2013; Summers-Effler, 2004; Tremblay & Lariviere, 2009). In dance, perceptions of pubertal changes may be influenced by maturation timing and the extent to which individuals meet the social demands of the dance style, in addition to how significant others perceive and react to these changes. This contention necessitates a thorough consideration of puberty within the exploration of health in this domain. In line with the need for an interdisciplinary approach, the literature review will consider biological, psychological and sociocultural perspectives with a focus on the interaction between these factors and subsequent implications for health and behaviour in the general population and in the context of dance.

Chapter 1

Literature Review

Section 1 – Puberty, Adolescence and Maturation

Puberty is a particularly challenging time for young dancers, with a high risk for development of maladaptive behaviours and detrimental health outcomes (Brooks-Gunn, Attie, Burrow, Rosso, & Warren, 1989; Brooks-Gunn & Warren, 1985; Buckroyd, 2000; Daniels et al., 2001; Stark & Newton, 2014). Puberty presents both opportunity and challenge for young dancers; while puberty brings advantages such as increased strength and higher cognitive functioning, it also presents a series of challenges such as gains in fat mass and disruption to flexibility which may place individuals at increased risk within a dance training context (Dahl, 2004; Malina et al., 2004). The degree to which pubertal change positively or negatively impacts health is determined by a variety of external and internal factors pertaining to the individual (Petersen & Taylor, 1980). These include the physical changes of puberty (including the extent and order of pubertal changes); the social context in which puberty occurs; the social stimulus value of these changes within the context; the timing of maturation; and the physical self-concept of the individual (Brooks-Gunn & Petersen, 1983; Cumming, Sherar, Gammon, Standage, & Malina, 2012; Cumming, Sherar, Hunter Smart, et al., 2012; Petersen & Taylor, 1980).

The change in pubertal status represents a dramatic change for the individual and has been associated with both detrimental and beneficial outcomes. Changes throughout adolescence are characterised by rapid increases in both physical and mental capabilities: improvements in physical capacities, such as reaction time, immune function, resistance to injury and physical stress; and improvements in mental competencies, such as reasoning abilities (Dahl, 2004). While developmentally, adolescence represents a period of strength and resilience, Dahl (2004) calls attention to the health paradox associated with this period; despite maturational improvements across several domains, overall morbidity and mortality rates increase by 200% during adolescence (Dahl, 2004). It has been suggested that the main sources associated with these rates are related to difficulties in the control of behaviour and emotion, resulting in issues such as depression, eating disorders, alcohol and substance abuse (Dahl, 2004; Dahl & Gunnar, 2009). How an individual adapts to biological, psychological and physical changes at adolescence can be significant in determining the direction of these outcomes. However, this adaptation is situated within a highly complex setting and is likely to be influenced by many factors, including the individual's environment,

personal feelings about changes and the perception of changes by significant others (Cumming, Sherar, Gammon, et al., 2012; Summers-Effler, 2004).

The distinct differences in pubertal changes between females and males and the subsequent differences in measurement of pubertal status and timing necessitate consideration of each individually. In addition, within the social context of dance overt changes for females may have very different social meaning and value compared to pubertal changes for males, and therefore experiences of puberty will likely be very different. It is acknowledged that similar research with males is also justified, though this is not possible within the scope of this PhD. Therefore only females will be considered within this body of work.

1.1 Defining Puberty, Adolescence and Maturation

Before reviewing how puberty impacts upon the developmental experiences of young dancers, it is important to define puberty, to describe the physical and psychological changes that accompany it, and how puberty can be assessed.

Puberty and Adolescence

Puberty can be defined as the period of rapid change leading to physical and reproductive maturation (Petersen & Taylor, 1980). The term puberty encompasses the process of physical changes, such as increased body mass and height, which indicate the beginning of adolescence. Puberty is also associated with significant changes in drives, motivations, rapid changes in hormone levels, psychology and social life (Blakemore, Burnett, & Dahl, 2010; Rosenfield, 1991; Tanner, 1962). Thus, puberty is not a single event but a complex set of interrelated changes which occur over a long interval of time and span several domains of growth and development (Dorn, Dahl, Woodward, & Biro, 2006). The process of adolescence is marked by the onset of complex changes, encompassing the period of physical, cognitive and social maturation between childhood and adulthood (Blakemore et al., 2010).

Hormonal changes are responsible for physical developments during puberty, such as changes in body size, shape and functioning with the resulting physique forming an individual's adult proportions and functions (Sugar, 1993). There are many physical changes which occur during puberty; an increase in height and weight, the attainment of mature reproductive capacity, changes in the distribution of body fat, the development of a variety of secondary sexual characteristics and shifts in body proportions (Faust, 1977; Tanner, 1962).

Early adolescence is characterised by physical changes to the body resulting from the onset of puberty, these changes have a biological basis. Puberty itself involves three endocrine events: adrenarche, gonadarche and activation of the growth axis (Blakemore et al., 2010; Petersen & Taylor, 1980). Adrenarche, also described as the activation of the hypothalamic-pituitary-adrenal axis, often begins before gonadarche, outside of the context of adolescence (Blakemore et al., 2010; Hubert & Carson, 1990; Malina et al., 2004; Parker, 1991). This process contributes to the development of secondary sex characteristics (Blakemore et al., 2010; Malina et al., 2004).

Gonadarche is the biological process leading to activation of the hypothalamic-pituitary-gonadal axis and results in the attainment of reproductive maturity (Blakemore et al., 2010; Malina et al., 2004). This process occurs between age eight and fourteen in females (average age of eleven) and between age nine and fifteen in males (average age twelve) (Blakemore et al., 2010).

The third hormonal event which occurs during puberty is the activation of the growth axis. This happens around age twelve in girls and age fourteen in boys, resulting in a linear growth spurt and changes in body size and composition (Blakemore et al., 2010; Marshall & Tanner, 1969). Therefore, we can identify a biological basis for many of the changes we see pre-puberty and at puberty, both overt (e.g. breast development) and discrete (e.g. menarche). These hormonal changes are examples of factors which directly affect the appearance and function of the body at puberty and beyond.

For females the most pertinent, and typically most overt, pubertal changes include increasing body mass, rapid changes in limb length, body size and distribution of body fat, breast development, and the onset of menarche (Sugar, 1993; Summers-Effler, 2004). The average sequence of pubertal change for females begins with breast development (as early as seven to eight years old), development of pubic hair (from age eleven), peak height velocity i.e. the point of most rapid growth (average age twelve) and onset of menarche (average age 12.4 - 12.8) (Baker, Thornton, Bulik, Kendler, & Lichtenstein, 2012; Marshall & Tanner, 1969; McDowell, Brody, & Hughes, 2007). How an individual adapts to these biological changes may be crucial in terms of their experience; with maladaptive responses increasing risk to psychological health and wellbeing (Brooks-Gunn & Warren, 1985; Summers-Effler, 2004; Yuan, 2012).

In girls, the onset of puberty typically occurs between ten and eleven years of age, however, individual variation in the age at which puberty occurs is considerable, with some girls

experiencing puberty well in advance or delay of same age peers (Mendle, 2014). The timing of puberty can vary by up to five years, thus chronological age is not a good indicator of physical development at puberty (Higham, 1980). Research suggests that the timing of puberty is genetically driven (50-80%) yet is susceptible to environmental change (Golden, 1981; Kaprio et al., 1995; Rowe, 2002; Treloar & Martin, 1990; Van den Akker, Stein, Neale, & Murray, 1987). For example, in response to chronic stressors such as famine, puberty may be delayed and in response to acute stressors such as the absence of a father, puberty can be accelerated (Gluckman & Hanson, 2006; Van den Akker et al., 1987; Westendorp & Kirkwood, 1998).

Maturation

The process of becoming mature, known as maturation, more specifically describes the development of three main biological systems: sexual, skeletal and somatic (Malina, 2014). With each biological system, maturity varies; sexual maturity refers to full functional reproductive capability; skeletal maturity, a fully ossified adult skeleton; and for somatic maturity where there is no definitive end-point which is defined as 'adult', maturity is assumed, for example, when growth in height is less than one centimetre per year (Malina et al., 2004; Ulijaszek, Johnston, & Preece, 1998).

Maturation also refers to the timing and tempo of these processes. Maturation timing describes when specific maturational events, such as onset of menarche in girls, occur and is usually classified as advanced (early), average (on time) or delayed (late) relative to a specific cohort (Malina et al., 2004). Current research suggests 12.4 to 12.8 years to be the average age of menarche (Baker et al., 2012; Malina et al., 2004; McDowell, Brody, & Hughes, 2007), individuals who fall below one year of this age would be described as advanced and those one year above this age, as delayed (Malina et al., 2004). Maturation tempo is defined by the rate at which an individual progresses through maturation (Malina et al., 2004).

The timing of maturation is largely genetically determined (Golden, 1981; Kaprio et al., 1995; Rowe, 2002; Treloar & Martin, 1990; Van den Akker et al., 1987), however can be influenced by environmental stressors (acute and chronic) which can delay or accelerate the maturation process (Gluckman & Hanson, 2006). Environmental stressors include nutritional, prenatal and postnatal influences. For example postnatal nutritional deprivation close to sexual maturity may delay reproductive maturity, effectively waiting for improvement in the environment before maturation progresses (Gluckman & Hanson, 2006; Westendorp & Kirkwood, 1998). Involvement in intensive sport or dance training may also constitute an environmental stressor. However, our understanding of the effect that sports training has on the growing child is limited

due to difficulty in distinguishing the independent effects of training from those of normal growth (Baxter-Jones & Maffulli, 2002). Research in gymnastics suggests that intensive training does not appear to attenuate pubertal growth and maturation rate, timing or tempo (Malina et al., 2013). Similar findings have been reported in novice dancers across a range of dance styles, though there is not yet longitudinal data which addresses young dancers in vocational ballet training (Matthews et al., 2006).

1.2 Measurement of Pubertal Status and Maturation Timing

Defining Pubertal Status and Timing

If we are to objectively discuss pubertal status and timing within the context of this research, it is important to give consideration as to how it is measured. Firstly, it is important to note, that as individuals enter adolescence at varying ages and develop at varying rates, chronological age is not a reliable indicator of physical development at puberty. Individuals of the same chronological age may vary by up to several years in terms of their biological maturation (Dorn et al., 2006; Malina et al., 2004).

Secondly, as maturation measurements can be used to identify stage, tempo and timing, it is important to clarify what is meant by the terms pubertal status and pubertal timing. Measures of pubertal status or pubertal development reflect a static measure of puberty determined at a single point in time. These measures can then be used to deduce pubertal timing as a ranking of pubertal status (Dorn et al., 2006). For example, when categorising an individual as early, average or late or earlier or later on a continuum, the timing of early puberty may be determined by using national norms or the norms of the particular sample, which may not identify pubertal timing as accurately. Alternatively, both timing and tempo can also be measured using a repeated measures strategy such as identifying Tanner stage or height at multiple time points (Mendle, 2014). Therefore, when discussing measurement, we are referring to the measurement of pubertal status from which we can then infer pubertal timing or tempo within a particular cohort or sample.

The complex set of interrelated changes occurring at puberty necessitates a specific approach to measurement; categorisation of individuals as prepubertal or postpubertal has limited value without also specifying the 'event' or set of maturational changes which are being used as a reference point (Dorn et al., 2006). Dorn and colleagues (2006) highlight the inconsistencies of measurement within the extant literature and describe how specificity pertaining to the particular aspects of pubertal development being measured is vital.

It has been surmised that there is no single best method with which to measure puberty and that choice of measurement should be centred around the research question and which aspects of maturation are of greatest relevance and interest (Dorn et al., 2006). In this review measurements for females will be discussed, with consideration of the measurement of sexual, skeletal, hormonal and somatic maturation.

Measurement of Sexual Maturation

Measurement of sexual maturation is based on secondary sex characteristics which can be used as indicators of maturity status and progress in the pubertal phase of growth and maturity. In females this relates to breast development, pubic hair and menarche (Malina et al., 2004). These changes are initiated by the endocrine events, adrenarche and gonadarche, introduced earlier in this review. The early stages of adrenarche are characterised by increasing levels of androgens, such as testosterone and dehydroepiandrosterone (DHEA, the primary precursor of natural estrogens), without any visible signs of puberty. From this perspective, some consider these early stages of adrenarche to be prepubertal and gonadarche to reflect actual puberty (Dorn et al., 2006). When the concentrations of adrenal androgens are high enough, physical changes begin. Therefore, in research studying the pubertal process, hormones and behavioural changes, it may be useful to begin at early adolescence (Dorn et al., 2006).

Gonadarche can be described as representative of a second phase of puberty, characterised by the maturation of primary and secondary sex characteristics (Dorn et al., 2006). Most commonly, secondary sex characteristics are measured using the criteria of Tanner (1962). Tanner's method is based on observing secondary sex characteristics. In females this refers to breast and pubic hair development and onset of menarche. Tanner proposes five main stages of development: stage one indicates the prepubertal state (absence of development of each characteristic); stage two, initial development of each characteristic; stages three and four represent continued maturation of each characteristic; and stage five indicates a mature state for each characteristic (Tanner, 1962).

Averages have been reported for the different stages of development, with breast development reported to occur first for most girls and menarche reported as one of the final developments to occur (Tanner, 1962). The order in which these developments tend to occur may be considered when selecting a measure of sexual maturation. For example, if a study was focusing on girls aged eight to twelve, age of menarche may not be a useful measure as many of the individuals may be premenarcheal. Instead, breast development may be used as an indicator of maturation as this often occurs earlier in the sequence of changes. In terms of

how these stages are measured, stage can be observed through a physical exam with a trained clinician or by self-assessment. Increasingly, self-assessment is used, with moderate to high (.59 - .92) correlations reported between self-ratings and physician ratings (Matsudo & Matsudo, 1994).

There are some limitations associated with use of the Tanner stage method which necessitate caution, particularly with reference to the norms presented. The scale was developed with reference to a single ethnic group (Caucasian) and with a relatively small sample size (200 females, 200 males), warranting caution when applying the norms for average timing of stages presented by Tanner (Dorn et al., 2006; Tanner, 1962). In addition, the nature of the measure in its reliance on breast development can be problematic, with research reporting increased inaccuracy of staging when applied to overweight females (Blakemore et al., 2010; Dorn et al., 2006). Despite these limitations, this method is the most frequently used standard and is still considered to be a gold standard for the measurement of pubertal status (Dorn, 2006). A practical issue which may be of concern with this method is obtaining consent for a physical exam of this nature. Researchers have acknowledged the many difficulties of conducting physical examinations but suggest that this can be overcome through confident and comfortable explanation of the research and physical exam and the use of an experienced health care provider who is comfortable performing the examination (Dorn & Biro, 2011; Dorn et al., 2006).

Menarche, the first menstrual cycle, represents the clearest and least ambiguous maturational event in puberty. That said, due to the fact that menarche tends to occur relatively late in the sequence of changes associated with sexual maturation, it is not considered to be a good indicator of the onset of puberty (Coleman & Coleman, 2002). However, as a measure of pubertal status, age of menarche can be categorised in order to provide an indication of timing with reference to a particular cohort (Malina et al., 2004).

A key consideration when using age of menarche as a measure is the use of terminology when categorising individuals. There is an important distinction to be made between premenarcheal and postmenarcheal and prepubertal and postpubertal (Dorn et al., 2006). As menarche tends to occur relatively late in the sequence of changes, many other pubertal changes are likely to be underway before menarche occurs. Therefore, if an individual is premenarcheal we cannot categorise this individual as prepubertal; further measures of pubertal status would be needed in order to make this distinction. For this reason, as aforementioned, it is important to select measures of pubertal status which are most relevant to the cohort under study.

There are three different ways in which age of menarche can be measured: prospectively, retrospectively and using the status quo method. In a longitudinal study, prospective measurement may be used, whereby individuals are asked on several occasions whether menarche has occurred, and if so, when it occurred. Asking postmenarcheal individuals to recall when menarche occurred, as accurately as possible, is referred to as retrospective measurement (Coleman & Coleman, 2002). The status quo method is a statistical method used to provide a population estimate for age at menarche.

All measures of menarche onset rely on self-reported data and as such there is always a level of error associated (Coleman & Coleman, 2002; Dorn et al., 2006). For retrospective measurement, error increases when used with older girls or adult women as it is reliant upon accuracy of recall. However, it is reported that most teenagers and women can recall this event accurately within a range of three months (Damon, Damon, Reed, & Valadian, 1969). A further limitation is the way in which menarche is reported. The age of menarche is often reported in whole years, which can limit the precise classification of an individual's sexual maturation (Ribeiro, Santos, Duarte, & Mota, 2006). This limitation can be easily mitigated by asking for a more specific report of age of menarche (i.e. year and month) but may have better reliability with adolescents than with older women.

Measurement of the hormones which underlie the external changes reflected by pubertal stage can be carried out using blood or saliva samples. There are some practical issues with this type of measurement. Firstly, obtaining blood or saliva samples is more invasive than other measures. Secondly, depending on the particular hormone, the fluctuation of hormones must be considered within the study design (Brooks-Gunn, 1988; Cauter, 2001; Dorn & Biro, 2011). For example, when looking to measure the hormone estradiol, monthly and daily changes make measurement challenging. In addition, measuring estradiol pre or peri-pubertally may be problematic as the regularity of the cycle may not be predictable until several years after menarche (Dorn & Biro, 2011).

Measurement of Somatic Maturation

The mechanism through which somatic maturation begins is through the activation of the growth axis. This results in a linear growth spurt and rapid changes in limb length. In females, this increase in growth rate is the earliest outward manifestation signalling the beginning of puberty (Tanner & Whitehouse, 1976).

Longitudinal data which charts growth such as height, across time is needed to derive somatic maturity. Somatic maturity cannot be assessed using body measurements, as body size itself is not an indicator of maturity (Malina et al., 2004). Instead, age at onset of the growth spurt and age at peak height velocity (PHV) can be used to indicate somatic maturity. The most commonly used measure is age at peak height velocity which specifically relates to maturity timing and tempo in centimetres per year (Malina et al., 2004). Percentage of adult height has also been proposed as an indicator of maturity status and timing (Malina et al., 2004). Evidence from longitudinal data indicate that PHV occurs at approximately 91–92% of adult stature with the onset of the adolescent growth spurt occurring around 88–89% of adult stature before returning to pre-growth spurt velocity (i.e. rate at take-off) at 95–96% (Baxter-Jones, 2013; Cumming, Lloyd, Oliver, Eisenmann, & Malina, 2017).

There are a number of different methods used to derive maturity timing from the assessment of somatic growth. One example is the Khamis-Roche method which predicts adult stature from age, height, weight and mid-biological parent height (Khamis & Roche, 1994). Advanced maturity is indicated when an individual is closer to their adult height than others of the same chronological age (Khamis & Roche, 1994). Levels of error are associated with estimating peak height velocity and it is suggested to be a more reliable predictor in males than in females (Malina et al., 2004; Van Lenthe, Kemper, & vanMechelen, 1996). If measures of height are being used to reflect pubertal development, female participants may need to be recruited at a younger age than male participants, with multiple measurements each year required in order to capture increased growth velocity (Dorn et al., 2006; Parent et al., 2003).

Measurement of Skeletal Maturation

Skeletal age is regarded as the best indicator of biological maturity status (Dorn et al., 2006; Malina et al., 2004). Unlike many other measures of maturation, skeletal maturity can be measured from infancy to young adulthood.

Skeletal age corresponds to the level of skeletal maturity reached by an individual, relative to the reference sample (Dorn et al., 2006; Malina et al., 2004). The progress of skeletal maturation can be measured using x-rays of the bones in the hand and wrist. In order to infer whether an individual is advanced, average or late in maturity status, skeletal age is compared relative to chronological age. There are three main changes in the bone which provide indicators of maturation: the initial appearance of bone centres; the definition of each bone by gradual shape differentiation; and the fusion of epiphyses with their respective diaphysis in the metacarpals, phalanges, radius and ulna and attainment of adult contours by the carpals (Malina et al., 2004).

Several methods are used for the assessment of skeletal maturity. The three main methods are the Tanner-Whitehouse method, the Fels method and the Greulich-Pyle method (Malina et al., 2004). Each method has its own criteria, scoring and reference sample meaning that skeletal age derived may be different depending on the method used. The most widely used method of the three is reported to be the Tanner-Whitehouse 2 method (Malina et al., 2004). While this method is highly regarded in its accuracy as a measure of maturational status and timing, the exposure to radiation, though minimal, provides an obstacle in terms of widespread and regular use of the method (Dorn et al., 2006).

In addition to considering skeletal, somatic and sexual maturation individually, it is important to acknowledge the relations among these indicators of maturity. While somatic and sexual maturation occur only at the time of puberty, skeletal maturation is the only indicator which spans infancy, childhood and adolescence into young adulthood (Malina et al., 2004). In general these three indicators are positively related to each other, and these relationships are important to consider when comparing studies which have used varying methods and when designing a study, to ensure the practicality of chosen indicators. For example, while sexual, somatic and skeletal indicators are well related during adolescence, due to the influence of different regulatory mechanisms, the tempo of maturation before puberty is said to be independent of these indicators during puberty (Malina et al., 2004).

In summary, there are many ways to measure pubertal status, with no single best measure. The 'best' measure is dependent upon which aspects of development are most relevant to the research question and most appropriate to the cohort under study. Emphasis should be placed on having a strong rationale to support choice of measurement. For example, if the research question focuses on the social stimulus value of pubertal change, a measure of pubertal change which is more visible, such as breast development, may be more appropriate than measurement of the hormones which underlie physical changes (Sherar, Cumming, Eisenmann, Baxter-Jones, & Malina, 2010).

1.3 Objective Versus Self-Report Measures

In addition to the more objective measures of pubertal development described in this review, there are a number of more subjective measures which can be used to assess perceptions of physical change. Literature points toward the benefits of combining more objective measures with self-report measures, such as the pubertal development scale and the sexual maturation

scale (Dorn & Biro, 2011; Kretsch, Mendle, Cance, & Harden, 2016; Moore, Harden, & Mendle, 2014).

The pubertal development scale (PDS) is a self-report instrument designed for adolescent samples to report on the development of five indices of pubertal growth; growth, body hair, skin changes, changes to the voice and growth of facial hair for males and breast development and age of menarche for females (Bond et al., 2006; Petersen, Crockett, Richards, & Boxer, 1988). Individuals can respond on a four-point scale from 'not yet started' to 'seems complete'. In terms of reliability the PDS has been reported to have internal consistency ranging from .68 to .83 across a longitudinal study (Petersen et al., 1988). Validity for the PDS when compared to measurement by physical exam has been reported between .61 and .67 (Brooks-Gunn, Warren, Rosso, & Gargiulo, 1987). In addition, a modified version of the PDS asks the respondent to rate whether they feel their pubertal timing is early, on time, or late with respect to peers, offering a self-perceived categorisation of an individual's timing (Cance, Ennett, Morgan-Lopez, & Foshee, 2012).

The sexual maturation scale (SMS) requires respondents to rate themselves in comparison to drawings of Tanner's five progressive stages of pubertal development of secondary sexual characteristics, ranging from stage one (pre-adolescent) to stage five (adult appearance) (Bond et al., 2006; Tanner, 1962). Inter-rater agreement between SMS and physician ratings is reported to be inconsistent, ranging from very good (kappa coefficients .81 - .91) to poor (kappa coefficients .34 - .79) (Duke, Litt, & Gross, 1980; Hergenroeder, Hill, Wong, Sangi-Haghpeykar, & Taylor, 1999; Schlossberger, Turner, & Irwin, 1992; Taylor et al., 2001; Wu, Schreiber, Klementowicz, Biro, & Wright, 2001).

While self-report measures are associated with error and reporting bias, they are valuable in that they essentially represent the truths of the individual (Dorn & Biro, 2011; Mendle, 2014). Moore and colleagues (2014) contend that self-reports can reveal information about an individual's psychological development; self-reported data may reflect qualities such as mood, personality and cognitive style, in addition to more objective aspects of maturation (Moore et al., 2014). Existing research supports the advantages of combining objective measures with personal perceptions of maturation (Dorn & Biro, 2011; Kretsch et al., 2016; Moore et al., 2014). While no studies have directly compared self-perceptions with physical exams when predicting psychological outcomes, some studies suggest perceived pubertal timing to be more strongly associated with psychosocial outcomes, such as substance abuse, depression, anxiety and sexual risk taking, than more objective measures (Conley & Rudolph, 2009; Graber, Lewinsohn, Seeley, & Brooks-Gunn, 1997; Graber, Seeley, Brooks-Gunn, &

Lewinsohn, 2004; Moore et al., 2014). Moreover, in certain contexts such as ballet, self-perception of maturation may be of amplified importance. In contexts such as ballet, where later maturation is the norm, on time maturation may be perceived, relative to one's peers, as early. Subsequently, that individual may perceive puberty more negatively and experience more similar psychosocial issues to that of an early maturing individual (Brooks-Gunn & Warren, 1985). There is evidence to suggest that perception of development remains comparatively stable throughout the period of puberty and adolescence (Cance et al., 2012). This lends support to the assessment of self-perceptions of development, particularly if relevant to the research question.

Overall, more subjective measures, regardless of accuracy with respect to objective measurement, may inform research into adolescent behaviour and psychosocial outcomes. For example, these measures may contribute to assessing what leads individuals to seek out certain experiences or environments consistent with their perceptions of maturity or may influence how they behave in their relationships with parents and peers (Mendle, 2014).

The methods used in this thesis are informed directly by the research questions and issues of practicality and feasibility. Age of menarche, as a measure of sexual maturation, will be used as a way to derive maturity timing in cohorts of dancers. A key reason for this choice, in addition to age of menarche being the clearest and least ambiguous maturational event in puberty, is the availability of existing data for comparison to other dance cohorts. Limitations of using age of menarche include the self-report nature of data, lack of specificity when reporting only whole ages and that menarche tends to occur relatively late in the sequence of changes associated with sexual maturation (Coleman & Coleman, 2002; Ribeiro, Santos, Duarte, & Mota, 2006). In order to mitigate these limitations a number of steps will be taken. Firstly, participants will be asked to report year and month of menarche, although it is acknowledged that greater accuracy in recall of age of menarche is expected in adolescent samples compared to adult samples (Damon, Damon, Reed, & Valadian, 1969). Secondly, participants will be able to report if they are premenarcheal, as a measure of pubertal status age of menarche can then be categorised in order to provide an indication of timing with reference to the dance cohort (Malina et al., 2004). Thirdly, this thesis will utilise both objective (age of menarche) and subjective measures of maturation. The Pubertal Development Scale will be employed in research with adolescent dancers in order to collect data relative to other indices of growth and maturation, such as breast development and the growth spurt, and to understand perceptions of pubertal development relative to peers.

1.4 Adapting to Puberty: Association with Health Outcomes and Behaviours

Puberty can be primarily distinguished from the rest of the biological life cycle by the rate of change and the magnitude of somatic change (Petersen et al., 1980). While there are other periods of rapid growth in the human life cycle, such as infancy, where growth and development are more rapid, the changes which take place at puberty arguably have greater significance to the individual; infants will not experience change in the same way as an older, adolescent individual (Petersen et al., 1980). For this reason, it is important to consider how individuals adapt to these changes and the behavioural and health outcomes associated with adaptive or maladaptive responses. Within this, it is important to consider the different dimensions implicated in these changes; the biological, physical and psychosocial aspects of change at puberty.

The relationship between pubertal change and adaptation can be clearly seen in the context of physical performance. During the process of puberty, increases in height, fat and lean mass take place. These changes have an effect upon the physical performance of individuals, including strength, flexibility, muscular endurance and basic motor tasks such as balance (Malina et al., 2004).

Relationships between pubertal change and adaptation differ by sex. Motor performance and strength in girls has been shown to reach a plateau during adolescence and even to decline, while the opposite can be seen in males where strength and motor performance tend to increase through adolescence (Malina et al., 2004). These sex differences become notable around age fourteen (Espenschade, 1940; Jones, 1938, 1949; Malina et al., 2004). Sex differences in relation to physical performance can be attributed to greater relative fatness in girls and greater absolute and relative leanness in boys, which exert opposite effects on performance. The former has a negative effect on most motor performance tasks and the latter has a positive effect, attributed to increase in size and muscle tissue (Thomas & French, 1985).

Adaptation to physical changes is not determined solely by sex. Other factors such as the timing of biological maturation play a role in physical performance outcomes at puberty. For example, in males early maturation can be seen to be advantageous in many physical activities and sports; early maturation resulting in greater pubertal gains in height, weight, absolute and relative muscle mass (Malina et al, 2004). In turn, these physical characteristics are associated with a more positive psychological profile, inferring a somewhat smoother adaptation to physical changes. Late maturing males, on the other hand, experience lesser

physical gains and subsequently report poorer psychological adaptation (Malina et al, 2004). These physical changes translate to physical performance. Early maturing males have been shown to have superior explosive power, anaerobic power, endurance, agility, sprinting and isometric strength to their later maturing counterparts (Buchheit & Mendez-Villanueva, 2014; Malina et al., 2004; Myburgh, Cumming, Silva, Cooke, & Malina, 2016). For females it appears to be less advantageous in many contexts to mature early, with greater gains in absolute and relative fat mass and overall size (Gay, Monsma, Smith, DeFreese, & Torres-McGehee, 2014).

The context in which physical changes occur will also impact upon how successfully individuals adapt and may determine the types of physical changes which are welcomed. Involvement in elite sport at adolescence may place considerably higher pressure on successful and rapid adaptation to physical changes. For example, in sports such as tennis or swimming, where power or strength are required, early maturing girls may find their physical development advantageous and adapt positively (Myburgh, Cumming, Coelho-e-Silva, Cooke, & Malina, 2016; Myburgh, Cumming, Silva, et al., 2016). In addition, involvement in aesthetic sports or performing arts, such as ballet, figure skating and gymnastics, may place particular importance upon specific physical outcomes at puberty. In such domains, later maturation is favoured due to its association with a leaner, more linear physique (Gay et al., 2014; Hamilton et al., 1997; Monsma, 2008). Consequently, in a ballet context, late maturing individuals are likely to adapt more positively than those who mature early (Brooks-Gunn & Warren, 1985; Gay et al., 2014).

In order to understand the complexities of adaptation at puberty it is vital to consider the biological and psychological changes underpinning this process of adaptation. A wide range of factors may affect how an individual responds and adapts to puberty. This includes psychosocial factors, such as changes in interests and attitudes towards physical activity; biological factors, such as early or late maturation; and psychological factors, such as self-confidence and motivation. Accordingly, the following section will consider biological and psychological changes in the process of adaptation to puberty.

Section 2 – Puberty: Implications for health and behaviour

2.1 Implications for Health Behaviours

Physical Activity

Before looking more specifically at dancers, it is important to consider the implications of puberty for the general population. When investigating health outcomes, lifestyle and behaviours such as physical activity are important to consider. It is well-established that an active lifestyle is associated with many health benefits, both mental and physical. In addition, an active lifestyle is associated with the prevention of chronic conditions such as coronary heart disease, obesity and depression (UKGov, 2011). However, literature frequently reports that compared to their male counterparts, adolescent girls do not achieve sufficient physical activity levels for health (Fawkner, Henretty, Knowles, Nevill, & Niven, 2014). From a health perspective, it is critical to explore why a decline in physical activity is prevalent among adolescent girls. There are many reasons why adolescence may present a period where girls choose to reduce participation in physical activity. For instance, during puberty girls experience increases in body fat percentage and changes in body size and shape, which may not be considered conducive to performing physical activity (Malina et al., 2004).

Several researchers have hypothesised that maturation may influence physical activity levels in adolescent girls (Cumming, Sherar, Gammon, et al., 2012; Sherar, Cumming, Eisenmann, Baxter-Jones, & Malina, 2010), although literature remains inconclusive. Some studies suggest that maturity timing plays a role in physical activity levels, reporting that early maturing girls are less active than their later maturing peers (Cumming, Sherar, Gammon, et al., 2012; Fairclough & Ridgers, 2010; Jackson et al., 2013; Sherar et al., 2010). In contrast, Fawkner and colleagues (2014) found that relatively more mature girls may be more physically active than their later maturing counterparts. Yet other studies report no influence of early or late maturation upon physical activity (Niven, Fawkner, Knowles, & Stephenson, 2007; Sherar et al., 2009). The inconsistency across existing studies may be related to use of varying measures of maturation, age groups of participants and definitions of physical activity (Sherar et al., 2010).

The association between physical activity and maturation has also been explored from a biocultural perspective (Cumming, Standage, Gillison, Dompier, & Malina, 2009). This approach considers physical activity as a behaviour, but also as a biological process, encompassing the complex cultural context surrounding the issue (Cumming et al., 2009). A biocultural approach acknowledges that psychological and social factors alone cannot explain

changes in exercise behaviour, therefore consideration of biological and cultural factors is fundamental to generating a true understanding (Cumming et al., 2009). A model of maturity-associated variance in physical activity was developed in order to explore this further (Cumming, Sherar, Pindus, et al., 2012). The model encompasses external factors such as social support and intervening variables such as physical self-concept, which may mediate the effect on physical activity, along with antecedent biological variables such as changes in body size and composition, which may have a direct effect on physical activity (Cumming, Sherar, Pindus, et al., 2012). While there is inconsistency throughout the main body of literature pertaining to biological maturation and physical activity, biocultural approaches which account more fully for the complexity of the issue, may enable more conclusive findings to develop.

Obesity

Obesity is a growing public health concern which has been associated with an increased risk of negative health outcomes including heart disease, diabetes and some cancers (Malina et al., 2004). Although often used interchangeably, the terms overweight and obesity are not synonymous: overweight is characterised by a moderate degree of excess weight for height, while obesity is characterised by a more severe state (Malina et al., 2004). Obesity and overweight have also been investigated for their association with biological maturation. In particular, earlier sexual maturation has been highlighted as a risk factor for overweight and obesity (Benedet, da Silva Lopes, Adami, de Fragas Hinnig, & de Vasconcelos, 2014; Coelho-e-Silva, Ronque, Cyrino, Fernandes, Valente-dos-Santos, Machado-Rodrigues, et al., 2013; Himes et al., 2004; Li, Chen, & Wang, 2009; Li, Joung, & Paik, 2008; Ribeiro et al., 2006; Wang, 2002). Studies have also explored the association between skeletal maturation and obesity. Findings suggest trend for obese subjects to have accelerated skeletal maturation compared with overweight and normal weight subjects (Akridge et al., 2007; Van Lenthe et al., 1996).

Although the direction of the association between early maturation and obesity or overweight and suggestions of causality remain controversial, the majority of studies are in agreement that there is an association between the two factors (Li et al., 2009; Ribeiro et al., 2006). Results of a meta-analysis assessing the causal relationship between sexual maturation and obesity concluded that early sexual maturation increases the risk for subsequent obesity in females (Li et al., 2009). Studies report a higher prevalence of excess weight and increased height for age in early maturing females and a lower prevalence of excess weight and decreased height for age in late maturing females (Benedet et al., 2014; Himes et al., 2004; Li et al., 2008; Ribeiro et al., 2006; Wang, 2002). While most studies agree that early

maturation is a risk factor for obesity or overweight, some studies report early maturing girls to be almost twice as likely to be overweight, compared to those who mature on time or late (Adair & Gordon-Larsen, 2001; Ribeiro et al., 2006).

When considering the relationship between sexual maturation and overweight or obesity, the method of measurement may be of particular importance. Although the majority of studies assess sexual maturation using Tanner's criteria for breast development and pubic hair development, the two have different effects on fatness and body composition (Ribeiro et al., 2006; Van Lenthe et al., 1996; Wang, 2002). Researchers have noted an important distinction between measures of breast development and pubic hair development, recommending that the two be considered separately for their association with growth and body composition (Himes et al., 2004). Physiologically, breast development and pubic hair development have different effects on fatness and body composition as they respond to different hormones and signal the maturation of different endocrine systems (Himes et al., 2004; Wang, 2002).

Measures of somatic and skeletal maturation, used alone or in conjunction with other maturity measures, have also been associated with obesity. Studies show a trend for obese subjects to have accelerated skeletal maturation compared with overweight and normal weight subjects (Akridge et al., 2007; Van Lenthe et al., 1996). The tempo of maturation has also been studied, those who mature more rapidly reporting greater levels of obesity than those who mature more slowly (Van Lenthe et al., 1996). In terms of the direction of this association, studies suggest that it is most likely that biological maturation influences obesity (Van Lenthe et al., 1996). Somatic maturation has also been studied in relation to obesity, with advanced biological maturation reported to be positively associated with overweight and obesity (Coelho-e-Silva, Ronque, Cyrino, Fernandes, Valente-dos-Santos, Machado Rodrigues, et al., 2013).

Studies using combined measures of maturation (skeletal and sexual) and the observation of tempo as well as timing appear particularly compelling (Van Lenthe et al., 1996). Combining measures of maturation helps to combat some of the limitations associated with certain measures, such as age of menarche. Conclusions relating to the direction of this association are inconsistent, though studies suggest that biological maturation likely has a greater influence on obesity, than obesity on biological maturation (Van Lenthe et al., 1996).

Psychosocial Issues

While adolescence is a period of maturational improvements across many domains, overall morbidity and mortality rates are reported to increase by 200% over the same interval of time (Dahl, 2004). This increase in morbidity and mortality is attributed to difficulties in the control

of behaviour and emotion which result in psychosocial issues such as depression, eating disorders, reckless and delinquent behaviours (Dahl, 2004). Existing research suggests that maturity timing may play a role in vulnerability to developing psychosocial issues (Brooks-Gunn, 1988; Brooks-Gunn & Warren, 1985; Ellis, 2004; Mendle, Turkheimer, & Emery, 2007).

Girls who mature in advance of their peers generally experience greater gains in absolute and relative fat mass during maturation (Gay et al., 2014; Malina et al., 2004). Greater gains make these individuals more susceptible to a range of negative psychosocial outcomes such as negative body image, disordered eating, low self-esteem and more negative perceptions of self within environments that accentuate peer comparison and thinness (Brooks-Gunn, 1988; Brooks-Gunn & Warren, 1985; Cumming, Sherar, Pindus, et al., 2012). Brooks-Gunn (1988) confirms that early maturation does not appear to be a social advantage for girls; being 'on time' is argued to be more advantageous than being 'off time'. Within this, early maturing girls are hypothesised to be at a greater disadvantage than late maturing girls as they are more deviant in comparison to their peers (Brooks-Gunn, 1988). Reported negative effects of early maturation include negative body image, increased eating pathology scores and a general decrease in emotional health (Brooks-Gunn, 1988; Brooks-Gunn & Warren, 1985; Cauffman & Steinberg, 1996; Tremblay & Lariviere, 2009).

Existing studies argue that increased negative body image and higher eating pathology presence in early maturing girls can be explained by consideration of social context: where early maturing individuals do not conform to cultural values which promote thinness due to increased gains in fat mass, they are more vulnerable to negative body image and the development of maladaptive eating behaviours (Brooks-Gunn, 1988; Brooks-Gunn & Warren, 1985; Cauffman & Steinberg, 1996). An interaction between dating (i.e. going out as a member of a couple) and menarcheal status in the prediction of dieting and disordered eating behaviours has been reported, with a stronger association between dieting and disordered eating among girls who had recently experienced menarche (Cauffman & Steinberg, 1996). Further, social pressures such as peer pressure, peer comparison and negative comments have been found to contribute to the prediction of these issues in adolescent girls (Tremblay & Lariviere, 2009).

There is a consensus in existing literature that social context places early maturing girls at greater risk for the development of psychosocial problems, such as negative body image and disordered eating (Ackard & Peterson, 2001; Brooks-Gunn & Warren, 1985; Cauffman & Steinberg, 1996; Ellis, 2004; Moore, McKone, & Mendle, 2016; Tremblay & Lariviere, 2009). Studies are consistent in their acknowledgment of the complexity of these issues and their

development with social context playing a key role. Early maturation has been suggested to be a particular disadvantage within certain social contexts, such as ballet (Brooks-Gunn et al., 1989; Brooks-Gunn & Warren, 1985; Hamilton et al., 1997). Maturation timing is relative to an individual's own social context, therefore perception of being 'on time' or 'off time' is relative to that of an individual's peers. Consequently, in an environment such as ballet, being 'on time' may have similar negative effects to that of early maturation in non-dance cohorts (Brooks-Gunn et al., 1989; Brooks-Gunn & Warren, 1985).

Although all studies considered within this review are in agreement regarding the association between early maturation and body related disorders such as disordered eating and negative body image, this must be put into perspective. While early maturation has been identified a risk factor, the effects appear to be small. Due to the influence of factors, such as social context and how an individual perceives timeliness, not all early maturing girls will experience these negative effects (Brooks-Gunn, 1988; Cumming, Sherar, Pindus, et al., 2012; Fawkner et al., 2014). Early maturing girls are considered to be most at risk when the requirements of a particular social context and an individual's physical or behavioural characteristics are mismatched (Brooks-Gunn, 1988). This highlights the importance of embedding maturation timing within a larger, biocultural framework.

Delinquent Behaviours

Earlier physical development places early maturing girls at increased risk for engagement in adult behaviours, such as alcohol consumption, smoking and intercourse (Costello, Sung, Worthman, & Angold, 2007; Cumming, Sherar, Gammon, et al., 2012; Magnusson, Stattin, & Allen, 1986; Skoog, Stattin, Ruiselova, & Ozdemir, 2013; Stice, Presnell, & Bearman, 2001). While the majority of research is in agreement, there are inconsistencies reported in the association between maturity timing and engagement in delinquent behaviours. It has been noted that associations may be related to visible signs of maturity such as breast development (Costello et al., 2007). Therefore, inconsistency in findings may be partly attributed to variance in the measures used to assess maturity. Cultural contexts have also been noted as significant in the development of problem behaviours in early maturing girls (Skoog et al., 2013). For instance, in Sweden, a culture that is accepting of adolescent heterosexual involvement, early-maturing girls reported more problem behaviours than in Slovakia where more conservative views are reported (Skoog et al., 2013).

On the whole, existing literature holds that early biological maturation in girls is associated with health implications. Health implications include increased risk in a number of health behaviours and issues such as obesity, physical activity, body disorder issues and problem

behaviours. Existing literature suggests sociocultural factors to be a key consideration in the development of health behaviours. This demonstrates the necessity of considering these factors as complex issues, and the importance of approaches which consider biological and sociocultural components.

2.2 Wider Implications

The timing of maturation may also have wider implications. Researchers have studied the impact of maturity timing upon academic achievement. Although more recent studies are lacking, previous research in this area is inconsistent. Some studies report no effect (Petersen & Crockett, 1985), others report only an effect in deviant behaviour in early maturing boys, but no effect in girls of any maturity timing group (Duncan, Ritter, Dornbusch, Gross, & Carlsmith, 1985). One study reported that late maturing girls showed the highest achievement in the domains of language arts, literature, and social studies, but few long-term effects of puberty on these achievement measures were found (Dubas, Graber, & Petersen, 1991). Inconsistency in findings may be associated with the measures used to assess maturity and the potential relevance of psychosocial maturity in addition to pubertal timing.

More recently, relative age effect (RAE) has been explored in the context of academic achievement. Relative age effect does not refer to biological maturity, instead it refers to a child's relative age within their cohort i.e. born in the first or third quarter of the year (Cobley, McKenna, Baker, & Wattie, 2009). Studies have found that relatively older children (born between September to November) attain consistently higher scores across subject areas, compared to relatively younger children (born between January and August) (Cobley et al., 2009). Other studies have found similar effects but report that differences in academic achievement diminish around age 13 (Hauck & Finch, 1993). In addition, some studies suggest that relatively older children are more likely to assume leadership roles within school environments (Dhuey & Lipscomb, 2008).

Relative age effect has also received attention with regard to achievement in sport. RAE has been reported to exist in many, but not all sports, including football, ice hockey, baseball and tennis (Baxter-Jones, 1995; Gibbs, Jarvis, & Dufur, 2012; Grondin & Koren, 2000; Johnson, Farooq, & Whiteley, 2017). To date, football and ice hockey have received the most attention with regard to relative age effects (Andronikos, Elumaro, Westbury, & Martindale, 2016; Gibbs et al., 2012; Johnson et al., 2017; Musch & Grondin, 2001). Of note, skeletal maturation status has been reported to be more strongly associated with football academy selection than birth quarter, as any advantages associated with RAE disappear once athletes are skeletally

mature (Johnson et al., 2017). In activities such as dance, volleyball and table tennis an absence of RAE is reported (Rossum, 2006). In female gymnasts a 'flip flop phenomenon' has been suggested, whereby no RAE was found in a collective sample of 921 female gymnasts, but differences were observed when the sample was split by age (Hancock, Starkes & Ste-Marie, 2015). In female gymnasts under 15 years of age a RAE was observed (relatively older were advantaged) and in those over 15 years of age the effect was reversed (relatively younger were advantaged) (Hancock et al., 2015). This trend is unusual, with most sports reporting RAE showing fairly stable patterns throughout youth sport. It is suggested that this trend may exist in gymnastics due to peak performance taking place at puberty, rather than after puberty as in many other sports, similar observations may be relevant to ballet (Hancock et al., 2015). There is some evidence to suggest that the absence of RAE in some sports or activities is associated with those athletic tasks being heavily dependent upon the technical ability of the participant, therefore relative advantages such as physical size, are less beneficial (Rossum, 2006). In addition, RAE may interact with biological maturation to enhance or mask effects of age (Johnson et al., 2017). For example, in an individual who is both delayed in maturity and relatively young within their age group, any effects of age may be enhanced. Conversely, in an early maturing individual who is relatively young within their age group, any effects of age may be masked.

Section 3 – Maturation in the Context of Ballet

The social context in which puberty occurs is known to affect how well individuals adapt to pubertal change. In certain social contexts pubertal changes may be welcomed, while in other social contexts puberty may have more negative connotations (Ryan, 1996). Desirability of pubertal changes may also depend on the gender of the individual. For instance, in the social context of ballet training, pubertal changes may be welcomed for boys, bringing the benefits of strength and power, yet seen as detrimental for girls, shifting them away from the prescribed ideal of a more prepubescent physique (Buckroyd, 2000; Pickard, 2012). This section will discuss puberty within the social context of dance, more specifically in ballet, considering impact upon physical performance, psychological adaptation to pubertal changes and the effects of maturity timing.

3.1 Physical Implications of Puberty in Ballet

Physical and Functional Changes

Elite training in ballet can be a full-time commitment from as young as ten years old. Young dancers have to contend with high expectations for physical performance, in addition to negotiating the changes of puberty. Physical changes of puberty, such as increases in height, weight, fat mass and breast development may have a direct impact upon physical performance. Physical changes coincide with an increase in training intensity as the dancer moves toward the most critical years of training; while young dancers attempt to adapt to their changing bodies, expectation for continued improvement of technique and performance remain (Buckroyd, 2000; Pickard, 2013; Pickard, 2015).

For young dancers, the physical changes of puberty may have a significant impact. Changes to basic physical parameters can have a direct effect upon performance, technical ability and injury risk (Bowerman, Whatman, Harris, Bradshaw, & Karin, 2014; Daniels et al., 2001; Malina et al., 2004; Wyatt, 2015). Basic physical changes such as increases in height, fat and lean mass can affect aspects of physical performance, including strength, flexibility, muscular endurance and basic motor tasks, such as balance (Malina et al., 2004).

Most changes to physical performance are attributed to the timing of growth spurts and/or anatomical and functional changes in the joints, which occur during adolescence (Malina et al., 2004). For young dancers these changes are likely to affect performance in a number of ways; an overall decrease in technical skill and control, decreases in strength and flexibility, decreased coordination and balance and changes to alignment necessitated by increased

limb length relative to the spine (Bowerman et al., 2015; Daniels et al., 2001). These changes will impact upon some of the core dance movements, for example, reduced strength and flexibility will result in lower leg extensions and reduced balance and coordination will affect pirouettes (turns) and balance positions, and as technical control decreases, risk of injury increases (Daniels et al., 2001). Research on dance teacher perceptions of puberty highlights noticeable changes in flexibility, strength and balance (Mitchell et al., 2016). Notably, late maturing girls have been shown to perform better in motor performance tasks such as flexibility and jumping, compared to their early maturing counterparts from age 14 (Beunen et al., 1976; Malina et al., 2004). This would suggest that as well as an aesthetic advantage, late maturing dancers may also benefit in terms of physical performance.

Flexibility is a particularly important component in dance and can be disrupted by growth of the lower extremities and the trunk during growth spurts (Malina et al., 2004). While literature supports an increase in average flexibility in girls between the ages of 11 and 14 before reaching a plateau, this has been measured using the sit and reach test where growth in trunk length (growth spurt in sitting height) and growth spurts of the long bones in the upper extremity (which happen around the same time) will influence an individual's reach. In physical activities such as dance, more dynamic measures of flexibility may translate better in terms of gauging more accurately the effect of growth on physical performance. However, it is clear that growth can affect flexibility for young dancers and due to the social context of elite dance, any loss in flexibility may be especially evident and challenging to adapt to (Daniels et al., 2001; Mitchell et al., 2016).

Gender differences are also apparent within changes to physical and functional capacity. A plateau or decline in strength and motor performance for adolescent female dancers may become noticeable around age fourteen (Espenschade, 1940; Jones, 1938, 1949; Malina et al., 2004). This may be challenging for the young dancer, to whom these physical factors are key to maintaining and improving dance technique and performance.

Injury Risk

The most common injuries in adolescent dancers are reported to be lower extremity overuse injuries (Bowerman et al., 2015; Ekegren, Quedsted & Brodrick, 2011). However, a key consideration with injury data in dance is the different definitions of injury used throughout the literature, this can make comparisons between studies problematic (Kenny, Palacios-Derflingher, Whittaker & Emery, 2017). Definitions range from time loss (an inability to complete one or more classes, rehearsals or performances one or more days beyond onset), to medical attention, to any complaint (Kenny et al., 2017).

Physical changes at puberty have been associated with increased injury risk. For young dancers increased risk may arise from factors such as the rate of growth, the timing of growth and adapting to physical changes. There is some evidence to suggest that rate of growth (tempo) is associated with greater injury risk in young ballet dancers (Bowerman et al., 2014). In this study, injury was defined as any physical harm resulting in pain or discomfort that required a dancer to modify their dance activity during one or more classes, or which required a dancer to cease all dance related activity (Bowerman et al., 2014). Using change in foot length as an indicator of growth, differences in right foot length growth were found to be associated with small to moderate increases in risk of lower extremity overuse injuries in elite adolescent ballet dancers with an injury rate ratio of 1.41 (CI = 0.93–2.13); meaning that a difference of 0.5 centimetres in right foot length growth was linked to a moderate increase in injury risk (Bowerman et al., 2014). This study highlights rate of growth as a potential contributor to increased injury risk in young dancers, however, a small sample size (n=46) limits wider application of these findings. Further research is warranted to substantiate the risks associated with growth rate in young dancers.

Research in high-intensity sport has also considered growth rate as an injury risk factor. Close monitoring of Osgood-Schlatter's disease symptoms and modification of training load in response to symptoms, was reported to significantly reduce days lost due to growth related injury in adolescent squash athletes (Horobeanu, Jones, & Johnson, 2017). Similar approaches may be beneficial for reducing injury risk in the context of dance, however, quantifying training load in dance is problematic. Studies use a variety of definitions of training load and measures to infer training load (Borressen & Lambert, 2009). A broad definition of training load encompasses the frequency, duration and volume of training with measures of training load ranging from questionnaires, to diaries, to physiological monitoring and direct observation (Borressen & Lambert, 2009). In dance, self-report questionnaires are the most frequently used measure for assessment of training load; questionnaires assess hours of dance per week and/or number of dance classes and other extra-curricular physical activities (Matthews et al., 2006; Steinberg et al., 2008). A greater understanding of the accuracy of methods for quantifying training load in dance to account for intensity, frequency and volume of training is needed in order to implement any modifications to training load.

Dissociation of bone mass accrual from increases in standing height may also increase vulnerability to injury for young dancers (Bonjour, Theintz, Buchs, Slosman, & Rizzoli, 1991; Bowerman et al., 2015; Fournier, Rizzoli, Slosman, Theintz, & Bonjour, 1997; Theintz et al., 1992). Increases in skeletal mass during puberty are mainly attributed to an increase in skeletal size, not to increased skeletal volume and density. This leads to an asynchrony

between the rate of growth in stature and the accumulation of bone mass (Burckhardt, Wynn, Krieg, Bagutti, & Faouzi, 2011; Fournier et al., 1997). This results in a transient state of low bone mass, reducing the resistance of the bones to mechanical stress and consequently increasing the risk of injuries such as stress fractures in high impact activities like ballet and gymnastics (Bowerman et al., 2015; Burckhardt et al., 2011; Fournier et al., 1997; Guerra et al., 2016). The maximal dissociation between bone mass accrual and stature occurs during the period of peak height velocity, at around age 11 - 12 for females. This lag can continue for three to four years, coinciding with increases in the intensity of dance training, leaving young dancers at high risk of overuse injuries (Bowerman et al., 2015; Fournier et al., 1997).

Bowerman and colleagues (2015) note the additional challenge and increased injury risk associated with adapting to pubertal changes, the 'relearning period'. During this period young dancers must relearn technique and re-programme this technique to adjust to new biomechanical challenges, such as decreased strength, power and flexibility and rapid change in limb length (Bowerman et al., 2015; Phillips, 1999). The increased susceptibility to injury associated with the adolescent growth spurt through factors such as transient low bone mass and adjustment to new biomechanical challenges, often coincides with increased intensity of dance training. While researchers have recommended monitoring the intensity and volume of training to avoid overuse injuries during periods of rapid growth, no clear solution has been presented which addresses the significant differences between individuals in terms of the biological timing of maturation (Bowerman et al., 2015; Daniels et al., 2001; Horobeanu et al., 2017).

The timing of maturation can also have implications for injury risk, in particular for young female dancers who are delayed in maturation, where the incidence of fractures has been reported to rise with increasing age at menarche (Warren, Gunn, Hamilton, Warren, & Hamilton, 1986). This increased risk of injury is associated with prolonged hypoestrogenism, referring to a lower than normal level of oestrogen, and is a well-recognised complication of weight loss, dieting and physical training in girls and young women (Tanchev, Dzherov, Parushev, Dikov, & Todorov, 2000; Warren, Brooks-Gunn, Hamilton, Warren, & Hamilton, 1986). Delayed growth and maturation lead to a prolongation of the vulnerable growing years, exposing the growth plates to the influence of adverse mechanical factors, such as pressure, impact and microtrauma, for a longer period (Tanchev et al., 2000). Further injury risk factors identified in adolescent gymnasts, which may be applicable to young dancers, include skeletal immaturity, insufficient rest periods and repetitive movements (DePalma, 2006; Wyatt, 2015).

3.2 Psychosocial Implications of Growing Up in Ballet

While the physical changes experienced during puberty necessitate changes to psychological aspects such as perceptions of self, young dancers must contend with these basic adaptations within a context which subjects them to amplified risk. While individuals are at a high risk of developing eating disorders at adolescence, experiencing adolescence within the context of dance amplifies this risk (Arcelus et al., 2014; Brooks-Gunn & Warren, 1985; Klump, 2013; Wonderlich et al., 2004). A systematic review and meta-analysis holds that dancers have a three times higher risk of suffering from eating disorders than non-dancers (Arcelus et al., 2014). More specifically, dancers are reported to be at higher risk for anorexia nervosa and eating disorders not otherwise specified (EDNOS) with the highest prevalence of disorders reported in ballet dancers (Arcelus et al., 2014). Facets of the ballet context which have been associated with higher incidences of psychosocial issues, such as eating disorders and poor body image, include critical comments concerning shape and weight (de Bruin et al., 2009; Goodwin, Arcelus, Marshall, et al., 2014), thinness related learning environments (Anus & Smith, 2009; Penniment & Egan, 2012), use of mirrors and ballet attire (Price & Pettijohn, 2006; Radell et al., 2002; Radell et al., 2011; Radell et al., 2014) and dance teacher behaviours (Francisco, Alarcao, & Narciso, 2012; Green, 1999; Mitchell et al., 2016).

Pickard's research (2009, 2012, 2013, 2015) on the lived experiences of young ballet dancers across a period of four years, emphasises the significance of developing within the social world of ballet or ballet sub-culture. Pickard notes how the identity of young ballet dancers is shaped by the need to attach positive meaning to lived experiences related to pain and suffering and learn to re-frame or suppress pain and negative emotions. This is accepted as part of the process of embodying an identity as a ballet dancer (Pickard, 2012; Pickard & Bailey, 2009). In the ballet world, physical and emotional pain are understood as capital and currency which is traded in order to succeed, with dominant ideas, beliefs, norms, behaviours, values and expectations of ballet culture transmitted via the ballet teacher (Pickard, 2012). For example, Megan (11 years old) states: "I'm so lucky because I'm naturally slim and little and that's exactly how you must be in ballet. I don't have to diet at the moment but I know lots of my friends have to be very aware of what they eat because they have those sorts of bodies" (Pickard, 2013, p. 14). This is an example of how Megan has been shaped through her development within the ballet world. Megan has increased physical capital because of her naturally slim and petite physique. At the age of 11 Megan is already very aware of the notion of the ideal body for ballet and how important it is in order to succeed in the ballet world.

The relationship between the notion of an ideal body and identity as a ballet dancer is also important: "...if the body does not fit with the expectations of slim in size and shape then, they will not fit the expectations of ballet and will not be able to call themselves or claim identity as a ballet dancer" (Pickard, 2013, p. 16). Consistent with findings from Mitchell et al (2016), rejection of the body is described as a potential result of puberty for female dancers and this type of rejection and disappointment is viewed by young dancers as an expected part of becoming a ballet dancer (Pickard, 2013). Dancers understand from a young age, the notion of physical capital and the value of the body as a 'process of construction', an 'aesthetic project' and a 'product in performance' (Pickard, 2012; Pickard, 2013). Notably, the dancers studied in Pickard's research were involved in non-residential ballet training, meaning that they inhabit a number of different social worlds in addition to ballet, such as home or school. Pickard's explanation for why the influence of the social world of ballet appears to be dominant is related to the individual's commitment to becoming a ballet dancer and the development of his/her identity as a dancer (Pickard, 2012).

Pickard's work lends further support to the narrative of conflict between ballet and the adolescent body. Functional changes are highlighted as a challenge for dancers at puberty who are expected to remain 'co-ordinated', 'slim' and 'graceful' despite the changes they are experiencing (Buckroyd, 2000; Pickard, 2012): "I'm really struggling at the moment because I've had a bizarre growth spurt and I'm completely off balance. I hate that I can't control my body at the moment. It is embarrassing. I keep looking at myself in the mirror in my leotard. I'm trying everything to get it all back but I feel so clumsy" (Tracey, 15 years old) (Pickard, 2012, p. 33). This description demonstrates the conflict between the developing adolescent body and the performing body; while many young people experience self-consciousness during adolescence, young dancers find themselves in a position where their developing body is constantly seen, in mirrors, by teachers and peers, in minimal clothing and with permission to touch the body rarely sought by the teacher (Pickard, 2012).

Overall, there are a number of physical and psychological challenges associated with developing in the context of ballet, however, it is also apparent that there may be a number of ways to mitigate or ease some of these challenges (Mitchell, Haase, Cumming, & Malina, 2017; Mitchell et al., 2016). While early selection enables retention of those who are most naturally suited to the aesthetic requirements of ballet, it is important to question whether this approach is truly beneficial to the training and health of young dancers and whether there are more appropriate ways in which we can train dancers at adolescence. It is important to consider approaches which more directly address the healthy development of the young people within these training systems.

Existing literature outlines how the social context of the ballet world presents many challenges for the adolescent dancer. The expectations of this social world, in many ways, conflicting with the changes of puberty. Many of these challenges have the potential to be moderated by the social context to detrimental effect but could equally be moderated to facilitate more positive outcomes. This thesis aims to develop a greater understanding of the challenges faced by the adolescent dancer by exploring the interactions between biological and sociocultural demands placed on the maturing and developing dancer.

3.3 Implications of Maturation Timing in Ballet

The preference for slim bodies in ballet is well-established. This requirement places great pressure upon changes at puberty which has been described as a “make or break” event for young dancers in terms of their suitability for a career in ballet (Mitchell et al., 2016; Pickard, 2013). Timing of maturity is often inferred by age of menarche, with the average age of menarche in the general population reported to be between 12.4 and 12.8 (Baker et al., 2012; Malina et al., 2004; McDowell et al., 2007). Average age of menarche for dancers is comparatively delayed, with averages reported between 13.1 and 13.9 (Burckhardt et al., 2011; Hamilton et al., 1997; Steinberg et al., 2008). While both Hamilton et al (1997) and Burckhardt (2011) studied only a small sample of ballet dancers, Steinberg and colleagues (2008) derived their average age of menarche (13.1 years) from a sample of 1,482 female dancers across a range of dance styles, providing strong evidence to support the trend for delayed maturation in dancers.

The biological timing of pubertal events can be pivotal in determining the trajectory of physical developments; late maturation leading to a more desirable, lean physique and earlier maturation presenting greater aesthetic challenges for young dancers (Gay et al., 2014). Whether or not particular timing is favourable may depend on the type of activity in which a young person is involved. For example, early maturation can be seen to be advantageous in many physical activities and sports which involve power and strength, whereas late maturation, which results in a smaller and more lean physique, may be more favourable for endurance, aesthetic sports or performing arts, such as ballet (Ackland, Elliott, & Richards, 2003; Buchheit & Mendez-Villanueva, 2014; Monsma, 2008; Myburgh, Cumming, Coelho-e-Silva, et al., 2016; Myburgh, Cumming, Silva, et al., 2016).

In ballet, earlier age of menarche and greater breast development have been highlighted as characteristics of those who did not complete professional training, suggesting that certain

physical developments are not considered to be conducive to a career in ballet (Hamilton et al., 1997). While the majority of the literature points toward a preference for later maturation in ballet and other dance styles (Burckhardt et al., 2011; Hamilton, Brooks-Gunn, Warren, & Hamilton, 1988; Hamilton et al., 1997; Pickard, 2012, 2013; Steinberg et al., 2008; Warren, 1989), recent research calls into question long-standing assumptions about late maturation as a purely advantageous condition for young ballet dancers (Mitchell et al., 2016).

Literature is largely in agreement that early maturation is not socially advantageous for females, particularly within social contexts such as ballet, where there are clear preferences and benefits associated with later maturation (Burckhardt et al., 2011; Hamilton et al., 1988; Hamilton et al., 1997; Pickard, 2012, 2013; Steinberg et al., 2008; Warren, 1989). However, research conducted with 10 ballet teachers working with vocational and recreational dancers reported mixed opinions as to the benefits associated with early, average and late maturation (Brooks-Gunn & Warren, 1985; Mitchell et al., 2016). In terms of awareness of the impacts of differing timing within the context of dance there were mixed opinions of what might be most advantageous for a young dancer. Opinions ranged from views in agreement with previous findings, that later maturation gives a nicer 'look'; to perceiving earlier maturation to be a potential advantage in terms of getting a lot of the 'growing done' before serious training begins; to viewing the timing of maturation as irrelevant (Mitchell et al., 2016). Teachers described advantages and disadvantages relative to when the testing of a young dancer occurs. For example, it might be advantageous to mature later in the context of auditioning for schools as it provides a better 'look'; though equally it might be advantageous to mature earlier, in order to be ready for when more intensive training begins (Mitchell et al., 2016). These findings diverge from the general consensus presented in existing literature that up to 70% of professional ballet dancers are late maturing (Hamilton et al., 1988; Hamilton et al., 1985). While there are, in many ways, advantages associated with later maturation in the ballet world, there are also potential merits to earlier maturation which have not yet been explored. In addition, it is important to acknowledge that existing literature reporting a bias toward late maturation may be outdated and therefore the views of ballet teachers in this study may represent more current views (Mitchell et al., 2016). Further research is needed to establish current trends in ballet.

The majority of research studies in this area show a bias towards later maturation in ballet, with differing explanations as to why and a lack of research in other dance styles (Burckhardt et al., 2011; Hamilton et al., 1988; Hamilton et al., 1997; Pickard, 2012, 2013; Steinberg et al., 2008; Warren, 1989). However, the most compelling conclusion suggests that the trend towards delayed maturation in ballet results from a combination of factors, such as maintaining

a low body mass during adolescence, inadequate nutrition, low body fat, high ratio of lean mass to body mass in conjunction with formal selection of these body types and self-selection of late maturers into ballet (Bowerman et al., 2015; Steinberg et al., 2008). The bias of formal selection processes in favouring the physique of late maturing individuals and the self-selection of late maturing individuals into ballet are well documented (Bowerman et al., 2015; Brooks-Gunn et al., 1989; Hamilton et al., 1997; Hamilton et al., 1988). Other researchers have suggested delayed maturation to be an indirect 'product' of intensive dance training, with intensive dance training leading to weight control and subsequent delayed maturation (Pigeon, Oliver, Charlet, & Rochiccioli, 1997). However, intensive training per se has been shown to have no negative effect on growth and maturation in gymnasts and dancers (Malina et al., 2013; Matthews et al., 2006; Steinberg et al., 2008).

The timing of pubertal changes appears to have an effect, not only in terms of the ability to meet the social expectations of the ballet world, but on the subsequent psychological wellbeing of individuals relating to how changes are perceived within their social context. The social context of ballet has been found to amplify the effects of maturation timing and the resulting detriment to psychosocial wellbeing (Brooks-Gunn & Warren, 1985). Early and on time maturation within a ballet training context was associated with higher incidences of eating pathologies than in early and on time non-dancers (Brooks-Gunn & Warren, 1985). It was hypothesised that effects of maturation timing may be moderated by the social context and cultural and individual beliefs about the importance of behaviours associated with maturation (Brooks-Gunn & Warren, 1985).

Perceptions of the benefits and limitations associated with different maturity timing are moderated by the social context (Brooks-Gunn & Warren, 1985; Mitchell et al., 2016; Petersen & Taylor, 1980). Given the cultural expectation of thinness within ballet, late maturation is deemed to be advantageous both physically and psychologically; late maturation resulting in desirable physical attributes such as a lower body weight and psychological attributes, such as lower concern about weight, and control over eating (Brooks-Gunn & Warren, 1985; Vincent, 1981). Further, it has been suggested that on time and late maturing ballet dancers will differ more than on time and late non-dancers; late maturing dancers exhibiting more desirable physical and psychological attributes than those who are on time (Brooks-Gunn & Warren, 1985).

Within the social context of ballet, where it is normative for dancers to mature late, those who mature on time may experience similar psychological disadvantages to early maturing individuals in non-dance populations (Brooks-Gunn et al., 1989; Brooks-Gunn & Warren,

1985). Three hundred and forty-five adolescent girls aged 14-18, non-dancers (n=276) and ballet dancers (n=76) from three national ballet company schools in the same city were compared. On time ballet dancers rated themselves as heavy and desired to lose weight (even though they were below their ideal weight), with higher dieting and bulimia scores (Brooks-Gunn & Warren, 1985). While, on time non-dancers reported the most positive body image and fewer psychosocial issues (Brooks-Gunn & Warren, 1985). These findings are further supported by a subsequent study by Brooks-Gunn and colleagues (1989). Compared to late maturing ballet dancers, dancers who matured on time reported less positive body image, rated themselves as heavier relative to others and reported more dieting behaviours. These findings support the contention that maturing on time within a ballet context may not be a particularly valued condition and may in fact, be analogous to early maturation in non-dance populations in terms of psychosocial implications.

Perception of biological timing and the social context which shapes these perceptions appear to be particularly significant within a ballet context. It has been hypothesised that the prevalence of negative body image and eating pathology behaviours in early maturing girls can be explained by consideration of social context; earlier maturing girls may not conform to cultural values which promote thinness due to increased gains in fat mass and therefore are more vulnerable to negative body image and the development of maladaptive eating behaviours (Brooks-Gunn, 1988). Studies of physical activity support this notion, reporting a relationship between early maturation, physical activity and peer acceptance, whereby in an environment with reduced peer acceptance, early maturing individuals report reduced physical activity, thus the environment moderates the behavioural outcome (Cumming, Sherar, Pindus, et al., 2012). Individual perceptions of timeliness within the social context have also been highlighted as important; negative effects may be mediated depending on whether the individual perceives themselves as 'on time' or 'off time' (Brooks-Gunn, 1988). With this in mind, individuals who are objectively advanced in maturity and perceive themselves as 'off time' are suggested to be most at risk, particularly when the requirements of a particular social context and an individual's physical or behavioural characteristics are mismatched (Brooks-Gunn, 1988).

Selection

Selection procedures for vocational ballet training may vary but generally involve assessment of adequate physical (i.e. body proportions, flexibility, physical suitability for intensive training), technical and artistic aptitude (i.e. musicality, co-ordination, responsiveness, performance qualities and commitment) and previous training, tested at audition and by physical examination (Dance School of Scotland, 2018). Generally this process is initiated through

submitting an application including details such as height and weight, parent height, details of dance training to date and any injuries or medical conditions (RBS, 2018; Elmhurst Dance, 2018; ENBS, 2018). Audition photographs in specific ballet positions are often required to support an application (RBS, 2018; Elmhurst Dance, 2018). Applicants are chosen on this basis for preliminary audition where assessment of technique and physique will be conducted through participation in technique classes (ballet and often other styles or stretch activities depending on the school or course auditioned for) and sometimes performance of a choreographed piece (Central School of Ballet, 2017; Dance School of Scotland, 2018). A panel of artistic staff members, selected by the director watch throughout the audition day. The candidate's application forms, photographs and references will be assessed alongside audition performance against the audition selection criteria (Central School of Ballet, 2017; Elmhurst Dance, 2018). The panel shortlist candidates for a final audition which follows a similar procedure (ballet technique class/classes in other dance styles) and an orthopaedic assessment/physical examination (usually conducted by a physiotherapist) (Central School of Ballet, 2017; Dance School of Scotland, 2018). Once training at a vocational school, young dancers usually undergo yearly assessments in order to remain in the training system (RBS, 2018; Elmhurst Dance, 2018). Key points for assessment out of training are often in the third year of training (year 9 of school) and before sixth form (RBS, 2018; Elmhurst Dance, 2018).

The effects of maturity timing are afforded greater significance in ballet due to their association with success in the profession. Around 70% of female ballet dancers are reported to be late maturing, while comparative data shows only six percent of girls in pre-professional training are early maturing (Brooks-Gunn & Warren, 1985; Hamilton et al., 1997). A significant drawback of formal selection strategies in ballet is the emphasis on assessment which coincides with the physical changes of puberty. While research has yet to explore these theories, plausibly, for those who mature earlier, this may result in being assessed out of training due to less 'conducive' physical developments, while for those who mature later, physical testing and increases in training load occur at a time when they were experiencing the most rapid changes in growth. Arguably, neither circumstance is conducive to the healthy physical and psychological development of young dancers. Additionally, it may also be detrimental to the success of the training programmes themselves, as they are basing selection of dancers on testing individuals at this time. Data on training load for ballet and gymnastics show a significantly higher training load at the time late developers reach puberty compared to their early maturing counterparts, exposing late developers to greater impact during growth and thus, potentially to greater injury risk (British Gymnastics, 2006; Caine et al., 2016; Ekegren et al., 2014; Kadel, Donaldson-Fletcher, Gerberg, & Micheli, 2005). Consideration of maturity timing when testing and evaluating young dancers would enable

earlier maturing girls not to be delayed in their progress, and later maturing girls to be assessed and experience increases in training load at a more developmentally appropriate time point (Mitchell et al., 2016).

While the physical changes of puberty present challenges to young ballet dancers in terms of technique, performance and injury risk, further conflicts can arise between pubertal changes and physical appearance, which becomes increasingly important during the rigorous formal selection process. Early selection (i.e. selection into formal training at a young age, as compared to selection from general audition in adulthood) is argued by some to be a necessary process to select those most suited to the profession (Hamilton et al., 1988).

Hamilton and colleagues contend that highly selected ballet dancers are less susceptible to the development of eating problems as they are more naturally suited to the thin ideal required by the ballet profession. Less rigorously selected dancers reported significantly more eating problems than those who had been selected early (46% and 11% respectively). While the findings of this study appear to support early selection with regard to preferable outcomes for psychological health, there are two key limitations to consider. Firstly, only 49 dancers took part in this research, 36 were in the highly selected group and only 13 belonged to the less selected group. Secondly, while it is important to consider the benefits of early selection upon psychological wellbeing in ballet, this study focuses only on early selection as a predictor of eating behaviours.

Although selection may be a contributing factor, study of the development of eating pathologies requires a more complex approach, with consideration of environmental, biological and social factors (Annus & Smith, 2009; Klump, 2013; Penniment & Egan, 2012). Early selection of ballet dancers may 'weed out' those who mature earlier than their peers and who may also be more vulnerable to body image and eating issues, however, this explanation considers only one perspective. Taking into account environmental and social factors, those same individuals, if given a more supportive environment, for example, may not develop psychosocial issues such as disordered eating (Brooks-Gunn & Warren, 1985; Cumming, Sherar, Pindus, et al., 2012).

The process of early selection takes place throughout adolescence and encompasses selection into elite training and continuous assessment in order to remain in training. While some researchers have advocated for early selection, research with ballet teachers provides a different insight. Dance teachers viewed early selection as a negative process (Mitchell et al., 2016). Interviews with ballet teachers demonstrated a negative attitude towards early

selection, which was suggested to have limited training benefits and great potential disadvantages for psychological wellbeing, particularly for those being selected out of the training system. Many teachers felt that the early selection process was not conducive to training as a dancer and that this adolescent period was not a time to decide if a young person should have a career in ballet. One teacher likened this approach to 'Russian roulette', assessing aptitude for a professional career in dance at this point akin to a gamble (Mitchell et al, 2016). A preferred option suggested by teachers to be more conducive to the health and training of young dancers, is to support them through a non-residential, part-time system, similar to the 'associate' system (where young dancers attend pre-vocational classes/workshops in addition to studying with their regular teacher and attending a regular school). In line with Pickard's (2013) notion that these individuals would then continue to inhabit several different 'social worlds' during their adolescence, this may result in the development of a less narrow set of norms and beliefs and potentially lead to healthier psychological development. Further research is needed to substantiate this theory.

Summary

The processes of puberty present many challenges to young dancers, particularly within the context of ballet. While researchers have considered puberty as a risk to physical and psychological wellbeing, little recent research exists which encompasses the biological components of puberty such as maturity timing and the psychosocial components associated with maturing in a dance training context. There is limited research on psychosocial adaptation to puberty in dance, though existing research highlights the importance of social context regarding psychosocial outcomes and holds that the social context of ballet amplifies detriment to psychological wellbeing during puberty (Brooks-Gunn et al., 1989; Brooks-Gunn & Warren, 1985; Mendle et al., 2007). In addition, the social context and subsequent implications of puberty are likely to differ by dance style. The majority of existing research focuses on ballet, with less research exploring adolescence in other dance styles and contexts such as contemporary dance. This may be related to the fact that full-time training generally begins later in other dance styles and therefore there is less opportunity to study these dancers.

Brooks-Gunn and Warren provide the only existing studies on maturity timing and wellbeing in the context of ballet. While Brooks-Gunn and Warren's (1985, 1989) research suggests an association between early maturation and poorer psychological wellbeing, only dancers aged 14 -18 were studied. This limits our existing knowledge of psychosocial adaptation at puberty. Although many of the dancers in their study may have experienced puberty, those who are delayed or very delayed in maturation have yet to experience some of the more visible physical changes associated with puberty at the time of the study. Therefore this study may be lacking

in its assessment of very late maturing individuals and their psychosocial adaptation to puberty when they eventually begin to experience physical changes. In addition, Brooks-Gunn and Warren's solely quantitative approach is limited to describing few psychological outcomes and at one time point. The qualitative methods utilised in this thesis aim to develop a greater understanding of psychosocial adaptation to puberty through generating narratives surrounding participants' experiences of growing up in dance. However, it is acknowledged that a longitudinal study would be beneficial in order to study these changes in greater depth. Nevertheless, Brooks-Gunn and Warren's studies provide a starting point for this thesis and a point of comparison with non-dance adolescents; with the ballet context shown to amplify effects of maturity timing (Brooks-Gunn & Warren, 1985).

While no other studies have specifically explored maturity timing and wellbeing in dance, research aimed at preventing eating disorders in a pre-professional ballet school with dancers aged ten to eighteen, provides insight into growing up in a dance training context (Piran, 1996; Piran, 1998; Piran, 1999). This longitudinal intervention study utilised a participatory approach and modified the training environment on a systemic level. The participatory approach used by Piran appears critical to the success of the intervention. This approach relies on dialogue with participants (dance students) to determine the course of the intervention, that is, the intervention is not a predetermined professionally derived curriculum (Piran, 1998). The intervention developed to include regular student group meetings facilitated by an outside consultant, where students could discuss things which affected their experience of their body at the school or factors which affected them in terms of wanting to change their body shape and/or size. Among other factors these meetings raised issues about peer interaction, teacher behaviours and aspects of pubertal change (Piran, 1998). Student suggestions for change would initiate a process of change at the school such as changes in the curriculum, training, staff education, staff replacement and living conditions in their residential setting (Piran, 1998). The programme was run for a period of ten years, with the incidence of eating disorders at the school ranging from 1.67 cases per year prior to the intervention and only two cases in a period spanning eight years since the implementation of the programme (Piran, 1996; Piran, 1998). While there was no control group for comparison and therefore changes cannot necessarily be attributed to the programme, qualitative analysis supports changes in students' experiences of their bodies and themselves across the ten years of the programme (Piran, 1998). Piran's research provides a good example of the importance of the sociocultural environment in determining aspects of psychological wellbeing during adolescence and may serve as a useful model for future interventions.

In addition to interventions such as those implemented by Piran, more recent innovations such as the process of 'bio-banding' may address some of the challenges experienced by the adolescent dancer and may offset some of the limitations of continuous formal selection. Bio-banding (i.e. grouping athletes relative to physical size) has been applied in a number of team sports in order to create more developmentally appropriate competition and training structures (Cumming, Lloyd, et al., 2017). Although physical size may be of limited relevance in dance styles such as ballet, dancers could be grouped relative to their maturity status. Grouping by maturity status could benefit processes such as selection and could be utilised to individualise training load and stimulus so that it is more developmentally appropriate. Research is beginning to document the benefits of this approach for young athletes in contributing towards physical, psychological, and social development (Cumming, Brown, et al., 2017).

Section 4 – Biocultural Perspectives in the study of puberty

In order to develop a more comprehensive understanding of the relationship between factors such as learning experiences, maturation timing and health outcomes, it is crucial to adopt an interdisciplinary approach. As outlined in the introduction to this review, an interdisciplinary approach acknowledges that there is a complex set of interactions between different factors in the development of health outcomes; these factors can be psychological, biological and sociocultural (McElroy, 1990; Petersen & Taylor, 1980). Much research in this area has focused upon psychosocial aspects, while biological factors, such as maturation timing, have been neglected. A review of existing research suggests that there are a number of factors pertinent to the exploration of this relationship: sociocultural factors, such as learning experiences and cultural norms and beliefs regarding puberty; psychological factors, such as thinness expectancies; and biological factors, such as maturation timing. This section will look at the components of a biocultural model in more detail, introduce mediating and moderating factors and direct and indirect effects models, discuss support for biocultural models in extant literature and finally, explore how a biocultural model might be applied to the context of dance training.

Researchers have been aware, for some time, of the need to adopt an interdisciplinary approach when researching adolescence. Susman (1997) describes a turning point for research in this area; from a 'one-hormone, one-behaviour' approach, to consideration of hormones, behaviours and contexts of development. Moreover, Susman highlights interdisciplinary collaboration as a priority for research on adolescence (Susman, 1997). The notion of a biocultural approach was developed and advanced by Petersen and Taylor (1980), providing a framework within which biological, psychological and sociocultural factors affecting the adolescent individual could be considered. McElroy (1990) describes the basic premise of an integrative biocultural model simply, as a method for studying the interface between biological and cultural factors which affect human wellbeing. More recently, researchers have begun to apply this biocultural approach successfully to enable a comprehensive consideration of these factors; encompassing the interaction of biological and societal demands on the maturing and developing individual (Cumming, Sherar, Pindus, et al., 2012; Malina et al., 2004)

4.1 Biocultural Models

Petersen and Taylor's (1980) approach considers humans as biological, social and cultural beings and has been developed from the standpoint that biological factors may be important

for psychosocial development. Petersen et al's (1980) model for biopsychosocial development includes sociocultural influences, psychological development of the individual, hormonal influences, peer and family influences and broader society. In order to begin to understand the relationships between biological, social and psychological factors in adolescent individuals, direct and mediated effects models can be used.

Direct effects models attribute specific psychological effects to direct physiological sources, though literature to support these types of interactions is limited (Arnett, 1999; Petersen & Taylor, 1980). For example, direct effects of puberty may describe any unmediated effects which puberty has upon the psychological wellbeing or behaviours of an individual. This may include changes to physical performance, like loss of flexibility or balance, or increased aggressive behaviour in males, as a result of increased testosterone levels (Petersen et al, 1980).

Researchers have explored direct effects hypotheses with regard to testosterone and aggressive behaviour. Petersen and Taylor (1980) assessed the notion that this effect is direct, that is, changes in the biological system directly produce behavioural effects. Two hypotheses have been proposed, the Direct Hormone/Mood State Linkages Hypothesis and the Drive Hypothesis (Petersen & Taylor, 1980). The former proposes direct linkages between pubertal changes in hormone levels and changes in psychological states and the latter advances the notion of biologically based motivational changes such as increases in sexual and aggressive impulses (Kestenberg, 1967a, 1967b, 1968). Early studies by Kestenberg (1967a, 1967b, 1968) hypothesised direct relationships between pubertal changes in hormone production and phases of psychological development. Similarly, later studies suggested a causal relationship between depression and changes in androgen and estrogen levels in women (Angold, Costello, Erkanli, & Worthman, 1999). However, evidence to support the direct effects of hormonal changes is lacking. Most studies found effects to be confounded with sociocultural factors and therefore found the effect to be mediated rather than unmediated (Money, 1967; Petersen & Taylor, 1980; Steiner, Born, & Dunn, 2003; Udry, 1990).

More recently, researchers have described previous attempts to understand the role of pubertal hormones in adolescent behavioural and emotional changes as overly simplistic (Dahl, 2004). Research holds that pubertal hormones do not seem to cause behavioural problems or emotional turmoil; individuals with the highest levels of these hormones demonstrated little or no problems with stress, emotions or behaviour (Arnett, 1999; Dahl, 2004). Theories emphasise the inherent complexity of these relationships, questioning the

extent to which biological changes at puberty are accountable in the development of 'storm and stress' (Arnett, 1999).

The general consensus in existing literature holds that biological changes make some contribution to psychosocial wellbeing and behavioural outcomes, however, this contribution may be small and reliant upon interaction with other factors (Arnett, 1999; Brooks-Gunn, Graber, & Paikoff, 1994; Brooks-Gunn & Warren, 1989; Dahl, 2004). In one study, hormones were found to account for only four percent of the variance in negative affect, while social factors accounted for 8-18% and the interaction between negative events and pubertal factors 9-15% (Brooks-Gunn & Warren, 1989). In a further study by Brooks-Gunn and colleagues (1994) similar findings were reported. While direct hormonal effects were small, the authors concluded that their interaction with psychological and social factors implicates hormonal changes at puberty, not only in the development of depressive and aggressive affect but also for several other behaviours (Brooks-Gunn et al., 1994). In summary, the complex nature of puberty appears to render the use of direct effects models redundant. Literature points towards a focus on indirect relationships, using mediated effects models when researching puberty.

4.2 Mediated/Moderated Effects Models

Indirect or mediated effects models illustrate how psychological effects are mediated by complex causal chains of intervening variables (Petersen & Taylor, 1980). Although referred to as mediated effects models by Petersen et al (1980), these models involve both mediating and moderating factors and will be referred to in this dissertation as mediated/moderated effects models. The effect can be mediated by endogenous constructs, such as self-perceptions and/or are moderated by exogenous factors, such as social context or the perceptions of significant others (Cumming, Sherar, Pindus, et al., 2012). For example, the social context in which pubertal changes occur may moderate the psychological impact of changes in physique. A biocultural model is an example of a mediated/moderated effects model and fits well with the interdisciplinary nature of this research exploring a range of moderating factors, such as the social context and culture of dance training and mediating factors, such as thinness expectancies, self-esteem and the maturation process.

In order to explore this biocultural approach in more depth, it is important to consider the role of mediating and moderating factors within a mediated/moderated effects model. Personal or mediating factors influence how the individual perceives pubertal changes, while external or moderating factors influence how overt pubertal changes are perceived and evaluated by significant others. Pubertal youth interact within many social contexts – society in general, the

family, school, peer groups, among others; each context is an external or moderating factor which presents different challenges (Mitchell et al., 2017). In the social context of ballet training, the dance teacher and peers may be important moderating factors for the young dancer (Mitchell et al., 2017; Mitchell et al., 2016). For example, the social context of a ballet studio may influence the psychological impact of pubertal changes in physique (Mitchell et al., 2017). If the dance teacher directly or indirectly indicates a preference toward a particular physique, this may affect how a young dancer perceives and responds to physical changes at puberty. Equally, if the dance teacher accepts inter-individual variability, pubertal changes may be viewed more positively and will likely reduce the risk of negative health outcomes and dropout (Mitchell et al., 2017). These types of relationships, among other factors, are central to mediated/moderated effects models.

Cultural and social factors which are external to the individual, such as the dance teacher, are important moderators of individual adaptations to pubertal change (Mitchell et al., 2017). A young dancer's immediate social context may include objects of the physical environment, such as mirrors and dancewear, the atmosphere of the studio, the dance teacher and peers (Mitchell et al., 2017). The environment or "culture" of a specific dance studio is established by the dance teacher and other involved adults. The environment created by the dance teacher is influenced by factors such as culturally shared beliefs, attitudes or perceptions concerning puberty per se and early or late maturation; cultural standards of attractiveness; and notions of desirable and undesirable physical development (Mitchell et al., 2017; Petersen & Taylor, 1980). For example, in the social context of ballet where later maturation is the norm, attitudes may be favourable towards later maturation due to the likelihood of maintaining a slimmer and more suitable physique (Brooks-Gunn & Warren, 1985, Mitchell et al., 2016). These moderating factors are generally overlooked and are especially lacking in the context of dance, where focus on performance and evaluation makes moderating factors particularly important (Mitchell et al., 2017; Mitchell et al., 2016).

Mediating factors originate from an individual's personality and/or value system (Petersen & Taylor, 1980). Factors which are generally considered endogenous include self-esteem, self-concept and internalised feelings about the body, and meanings attached to bodily processes and pubertal changes (Cumming et al., 2011, Petersen & Taylor, 1980). Some endogenous factors such as physical self-concept and internalised thoughts and feelings about the body are shaped by cultural expectations and social contexts (Mitchell et al., 2017; Pickard, 2013).

Mediated/moderated effects models contain both mediators and moderators, expressing more complex causal pathways than direct effects models (Petersen & Taylor, 1980). When

researching the effects of maturation upon an individual's psychological wellbeing, it is fundamental to consider that maturation is a highly complex phenomenon concerning many different processes, including the timing of pubertal changes, morphological changes (development of secondary sex characteristics for females) and the development of adult reproductive capacity (onset of menarche in females) (Petersen & Taylor, 1980). Each of these factors may interact with the variables of personality and sociocultural context in different ways. Therefore, a mediated/moderated effects model acts as a more suitable framework for consideration than a direct effects model when attempting to garner a true understanding of these complex interactions.

A biocultural model of pubertal adaptation in adolescent dancers must recognise the potential for both direct and indirect factors (Mitchell et al., 2017). The model provides an appropriate framework for understanding the impact of puberty upon young dancers and the various mechanisms and processes which underlie the effects (Mitchell et al., 2017). The biological changes associated with pubertal growth and maturation likely interact with the behavioural characteristics of the individual and the context of dance in different ways. For example, visible changes such as breast development may influence both the young dancer and the evaluations of significant others such as the dance teacher (Mitchell et al., 2017). These interactions and others may subsequently influence the learning experiences of the dancer and in turn, behavioural and health outcomes (Annus & Smith, 2009; Mitchell et al., 2017; Summers-Effler, 2004).

Existing research advances several mediated effects models, including Magnusson and colleagues' (1985, 1986) Peer Socialisation Hypothesis. This hypothesis holds that adolescents select peers of a similar maturity status, with the individual exhibiting behaviours consistent with their peer group (Magnusson, Stattin, & Allen, 1985, 1986). Two further hypotheses deriving from developmental psychology may have more relevance in the context of dance – the Puberty-Initiated Mediation hypothesis (Ge & Natsuaki, 2009) and the Contextual Amplification hypothesis (Ge, Brody, Conger, Simmons, & Murry, 2002). The former suggests that physical and functional characteristics associated with variation in the timing of puberty hold social stimulus value for important others, such as educators, peers and parents, and thus influence their perceptions of the individual and the nature and quality of social interactions with her (Ge & Natsuaki, 2009). Social stimulus value describes the interactions among adolescent bodily changes, personality and sociocultural variables; the social stimulus value of physical changes depends on the social context in which they occur (Mitchell et al., 2017; Petersen & Taylor, 1980). For instance, the body size and shape of a

female dancer may influence a dance teacher's evaluation of current ability and future potential (Mitchell et al., 2016).

In the social context of ballet training where a linear physique is preferred (Vincent, 1981), later maturation and the physical characteristics associated with this condition, hold a more positive social stimulus value for dance teachers and peers than physical characteristics associated with early maturation (Brooks-Gunn & Warren, 1985; Mitchell et al., 2017; Pickard, 2013). Ballet teachers have been shown to perceive early maturing girls less positively (Mitchell et al., 2016). Physical changes associated with earlier maturation such as widening of the hips, breast development and an increase in fat stores, were viewed as not 'conducive' to a career in ballet. In contrast, ballet teachers perceived late maturing girls more positively in terms of their physical characteristics and potential for a career in ballet (Mitchell et al., 2016). Similar findings have been reported with high school female artistic gymnasts (Cumming, Eisenmann, Smoll, Smith, & Malina, 2005). Girls who were taller, heavier and carrying greater weight-for-height perceived their coaches as less likely to engage in positive coaching behaviours, such as reinforcement, encouragement and instruction, and as more likely to engage in negative coaching behaviours, such as punitive technical instruction and punishment (Cumming et al., 2005). While the Puberty-Initiated Mediation hypothesis is consistent with these observations, further validation is needed, particularly in the context of dance.

Another hypothesis which may have relevance in the context of dance training is the Contextual Amplification hypothesis (Ge et al., 2002). This hypothesis contends that the negative effects of puberty are accentuated in contexts which are averse, especially in early maturing girls (Allison & Hyde, 2013; Ge et al., 2002). Applied to the context of dance, the hypothesis proposes that an early maturing ballet dancer who experiences visible changes in physique such as widening of the hips and breast development, will have negative experiences during puberty (Mitchell et al., 2017). More specifically, training for long hours in a learning environment which emphasises thinness may increase the likelihood of maladaptive responses in young early maturing dancers such as issues with body image and self-esteem (Mitchell et al., 2017). Research comparing dance and non-dance students aged 14-18 years, provides some evidence that the social context of ballet amplifies the effects of maturity timing (age at menarche) and has consequences for psychological wellbeing. Early and on time maturation within the context of ballet training was associated with higher incidences of disordered eating than in early and on time non-dance students (Brooks-Gunn & Warren, 1985). It was hypothesised that the effects of maturity timing may be moderated by the social

context, cultural beliefs and individual beliefs about the importance of behaviours associated with maturation (Brooks-Gunn & Warren, 1985; Mitchell et al., 2017).

Although data are somewhat limited, there is increasing support for the notion that the effects of maturity timing may be greater in the context of ballet and other aesthetic disciplines, such as gymnastics and figure skating, than in the general population (Mitchell et al., 2016; Mitchell et al., 2017). The notion that on time and late maturing ballet dancers may differ more in terms of psychosocial outcomes than on time and late non-dancers is consistent with the Contextual Amplification Hypothesis (Brooks-Gunn & Warren, 1985; Brooks-Gunn et al., 1989). Within the social context of ballet, where it is normative for dancers to mature late, those who mature on time may experience the same psychological disadvantages as early maturing individuals in non-dance populations. Research has reported psychosocial differences between on time and late maturing ballet dancers with on time dancers reporting poorer psychological outcomes. In contrast, non-dancers who were on time had the most positive body image and fewer psychosocial issues (Brooks-Gunn & Warren, 1985). These findings are in line with the Contextual Amplification hypothesis (Ge et al., 2002), suggesting that social context acts as a moderator between maturation timing and problematic behaviours in ballet, e.g. negative body image and disordered eating (Mitchell et al., 2017).

More recent evidence, in the form of interviews with ballet teachers (Mitchell et al., 2016), provides further support for the Contextual Amplification hypothesis. Interviews were conducted to explore how ballet teachers perceived and valued the adolescent body in dance. The study found differences in teacher approaches to managing puberty within the context of ballet. Three distinct approaches were used: direct, indirect and passive. Direct approaches involved engaging in an open dialogue with young dancers, with actions such as adjusting aspirations to fit with the outcomes of puberty (Mitchell et al., 2016). Indirect approaches accommodated pubertal changes through more subtle actions, such as the removal of studio mirrors. In line with the Contextual Amplification hypothesis, these approaches have the potential to create a protective environment in the dance studio, whereby the teacher acts as a moderator between maturity-related factors and the social context of the ballet world (Mitchell et al., 2017; Mitchell et al., 2016). In contrast, a passive approach, which does not accommodate variation in pubertal timing, is likely to be consistent with intensifying the effects of variation in maturity timing among dancers (Mitchell et al., 2017; Mitchell et al., 2016). Existing findings are limited to a small study with ballet teachers, further research is needed to substantiate the influence of different teaching approaches in mitigating negative behavioural or health outcomes.

Research with dance teachers is generally consistent with the assertion that the potential effects of variation in maturation timing are moderated by the social and cultural context and individual beliefs about the importance of behaviours associated with maturation (Brooks-Gunn & Warren, 1985; Mitchell et al., 2017; Mitchell et al., 2016). While dance teachers reported mixed opinions about the potential advantages of individual differences in pubertal timing (early, on time or late), the majority of teachers were in agreement that a bias towards a late maturing physique was dictated by the culture of the ballet world (Mitchell et al., 2017; Mitchell et al., 2016). This ballet sub-culture was viewed by the teachers as something that they were unable to change (Mitchell et al., 2017). While teachers could positively evaluate pubertal changes and adjust individual aspirations accordingly, they were not able to change the way in which physical changes associated with puberty were viewed by the wider ballet world (Mitchell et al., 2016).

Support for biocultural models is increasing in studies of sport and physical activity, although few studies to date have actively considered a biocultural perspective in the context of dance (Cumming, Sherar, Pindus, et al., 2012; Cumming et al., 2011; Hunter Smart et al., 2012; Malina, Cumming, & Coelho-e-Silva, 2016; Mitchell et al., 2017; Mitchell et al., 2016). Nevertheless, an indirect relationship between maturity status and physical activity, mediated by physical self-concept, has been found outside of dance (Figure 2) (Cumming et al., 2011). A study of 407 female British year 7 to 9 pupils (mean age 13.2 years) reported an association between early maturation in adolescent females and reduced participation in physical activity, whereby physical self-concept was a mediator of this relationship. A further study with 222 female British year 7 to 9 pupils (mean age 12.7) explored relationships between maturity status, physical activity, physical self-concept and health-related quality of life. An association was found between early maturation in adolescent females and reduced involvement in physical activity, and a potential role for physical self-concept in mediating the relationship between maturity status and physical activity (Figure 3) (Hunter Smart et al., 2012). Existing literature on growth and maturation within the context of ballet requires further development before mediated/moderated effects models can be tested. This thesis aims to explore the different factors which may be important in relation to maturation in the context of ballet and therefore to contribute to our understanding of factors which may be pertinent to include in future research testing mediated/moderated effects models.

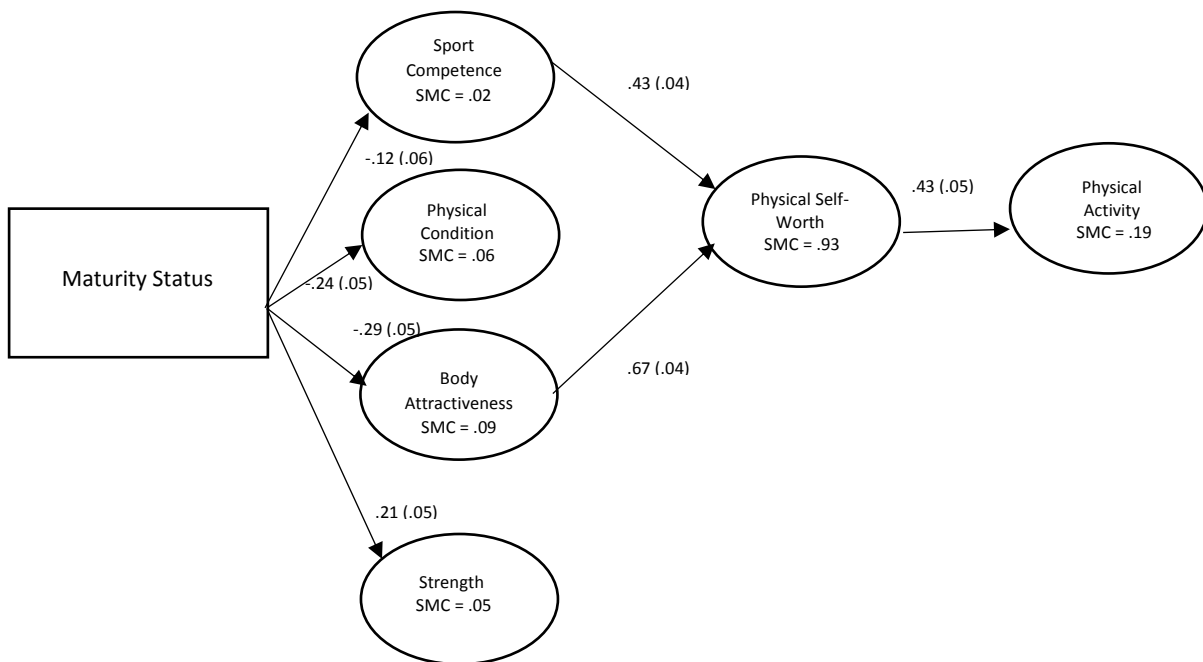


Figure 2. Adapted from Cumming et al (2011) Revised mediated/moderated effects model describing the role of physical self-concept in explaining relations between biological maturity status and physical activity in adolescent females.

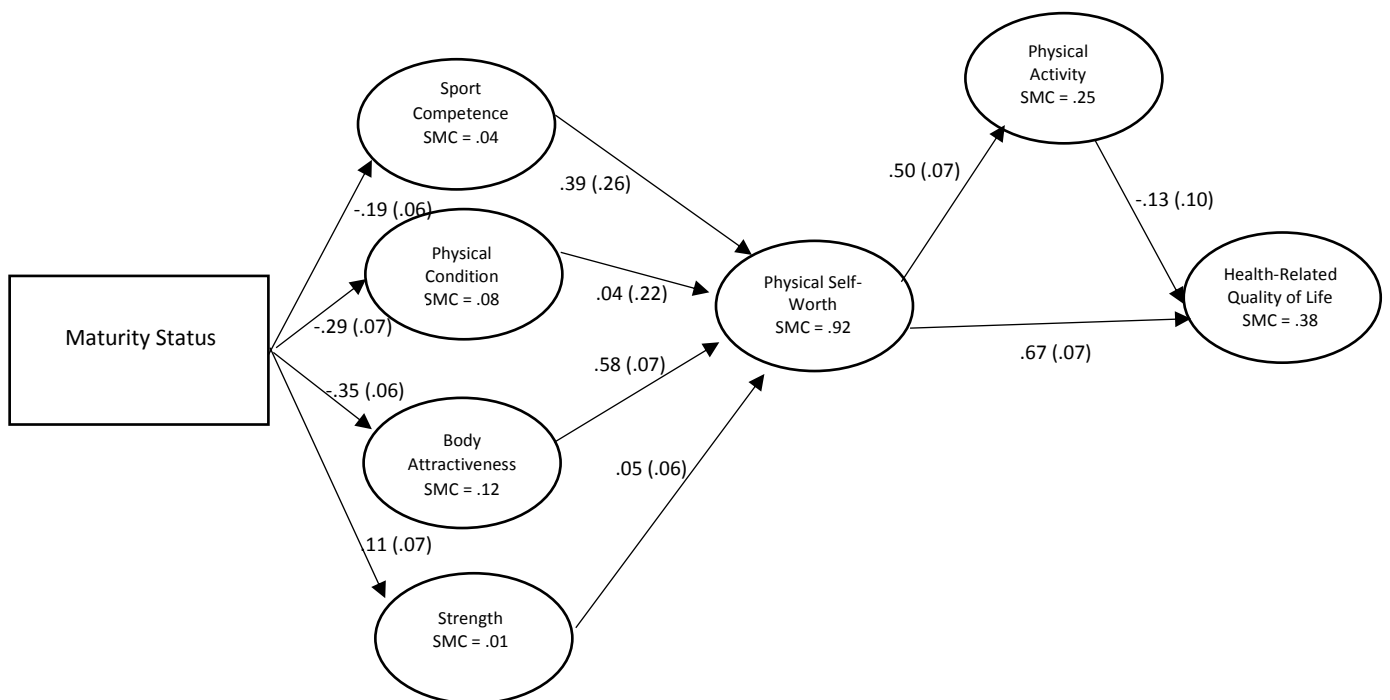


Figure 3. Adapted from Hunter Smart et al (2012) Hypothesised mediated/moderated effects model describing relations between biological maturity status, physical self-concept, physical activity and health-related quality of life in adolescent females.

Section 5 – Summary

5.1 Summary

The extant literature illustrates a complex narrative. The risks and prevalence of health outcomes reported in dance, in particular, ballet, present a paradox where involvement in dance as an activity has the potential to cause both harm and benefit (Buckroyd, 2000). When these existing environmental risks are combined with the vulnerabilities and risks associated with the process of maturation, individuals may have to negotiate many obstacles in order to develop healthily and to succeed. The complexities of maturing and developing within the social context of dance necessitate the utilisation of a biocultural approach. This approach considers the interaction between biological, sociocultural and psychological factors and subsequent psychological, behavioural and health outcomes.

5.2 Overview of Research Aims

With a lack of existing research in this area specific to dancers, this programme of research will be exploratory in nature. As much existing research is dated, it is important to ground the work in relation to the characteristics of today's dance professionals. That said, this thesis aims 1) to explore the physical and psychological attributes of an international sample of elite adult dancers (ballet and contemporary); 2) to generate an understanding of what characterises elite ballet dancers' experiences of growing up in dance; 3) to explore the maturity characteristics and lived experiences of adolescent dancers in pre-professional ballet training.

5.3 Introduction to Programme of Work

Adopting an interdisciplinary approach and combining both quantitative and qualitative methods, the intention of this programme of research is to more fully understand the experiences surrounding the complex topic of maturity timing in dance. Embedded within the context of dance training, this thesis considers the complex interplay between biological and sociocultural factors, in this case, the ballet environment, psychological factors such as perceptions of pubertal change, and biological factors such as pubertal timing. While earlier research has been limited to describing psychological outcomes at single time points, the qualitative methods utilised in this research aim to develop a greater understanding of psychosocial adaptation at puberty through generating narratives surrounding each participant's experiences of growing up in dance. While narrative accounts are subject to

researcher bias and rely on the accuracy of participant recall, they may provide a lens through which interactions between different factors, biological, sociocultural, and psychological, can be viewed more fully. This is the first programme of work to explore experiences of maturation and wellbeing in elite dance and as such, this research aims to address the existing gap in the literature and to contribute to increasing our understanding of how different biological, psychological and sociocultural factors may interact within this context.

A programme of research studies will be conducted in order to address these aims. The first study (Chapter 2), a cross-sectional study, aims to gather data from a large sample of elite dancers (ballet and contemporary dancers in vocational training and professionals). This study will explore physical and growth related attributes and psychological health and wellbeing, examining differences by dance style with further analyses to assess the extent to which physical attributes and learning experiences are associated with psychological wellbeing outcomes.

In order to begin to develop a more comprehensive understanding of these complex interactions a more in-depth understanding of individual experiences and responses is important. Using an interpretative phenomenological approach, the second study (Chapter 3) of this thesis will explore what characterises elite ballet dancers' experiences of growing up in dance. Semi-structured interviews will be conducted to understand lived experiences of growing up in dance, exploring narratives from puberty, to survival in the training system, to success in the profession.

Focusing in on experiences of adolescence, studies three to six (Chapter 4) will assess the maturity characteristics of young elite ballet dancers and explore their lived experiences of growing up in dance. Interviews with young dancers aim to explore the interactions between learning experiences in dance, maturation timing and wellbeing through individual experiences.

In addition to this programme of studies, a work placement with national dance organisation One Dance UK comprises an integral part of this work. Working in collaboration with One Dance UK, this project aims to generate greater impact through creating educational resources for dance teachers and professionals as an additional research output.

Chapter 2

Maturity Timing, Learning Experiences and Psychological Wellbeing in Elite Adult Dancers

2.1 Introduction

This study explores the physical and psychological attributes of an international sample of elite adult ballet and contemporary dancers. The variables of interest include physical and growth related attributes (i.e. maturity timing, BMI, height, age); learning experiences (i.e. thinness related learning) and psychological health and wellbeing (i.e. body dissatisfaction, eating pathology, self-esteem, psychological wellbeing, and thinness & restricting expectancies). Differences in physical and psychological attributes will be examined by dance style with further analyses to examine the degree to which physical attributes and the perceived learning environment are associated with psychological health and wellbeing in the context of dance.

As discussed in the literature review, maturity timing in dance can have significant repercussions for the female dancer. In particular, earlier maturation may affect desirability of body size and shape for ballet and have a negative influence upon psychobehavioural characteristics such as self-esteem, body satisfaction and eating pathologies (Brooks-Gunn et al., 1989; Brooks-Gunn & Warren, 1985; Hamilton et al., 1988; Hamilton et al., 1997). With 70% of elite ballet dancers being late developers, maturity timing appears to play a role in both selection into, and perhaps also, success within the profession (Hamilton et al., 1988; Hamilton et al., 1985). Existing research reports differences in psychosocial wellbeing between early and late maturing adolescent ballet dancers, however, the role of maturity timing within a professional, adult sample of ballet dancers and dancers who focus in contemporary styles has not been investigated. The majority of existing research focuses on ballet, with less research exploring maturity characteristics in other dance styles and contexts such as contemporary dance. This may be related to the fact that full-time training generally begins later in other dance styles and therefore there is less opportunity to study these dancers. Exploring maturity characteristics in a sample of adult professional ballet and contemporary dancers provides an opportunity to contribute to gaps in the existing literature relating to maturity characteristics across different dance styles and to provide a basis for further research around this topic in both styles of dance.

There is some evidence to suggest that psychosocial issues associated with early maturation such as depression, anxiety, disruptive behaviour disorders, and elevated antisocial

personality traits, can persist into young adulthood (Graber et al., 2004). In the study of dancers, understanding whether maturity associated differences in psychological wellbeing persist to adulthood could inform longitudinal research with dancers and ultimately inform approaches to healthcare and support for dancers. It is important to acknowledge the significant selection bias toward later maturation reported in ballet and the age and professional status of the sample. As such, there may be limited variation in maturity across the sample. For contemporary dancers, there is no existing research to suggest whether or not there may be a selection bias toward dancers of particular maturity timing at the professional level. However, data relating to average age of menarche in adolescent dancers age 10-18 predominantly training in contemporary dance styles, suggests no strong maturity bias (Aujla et al., 2015). Average age of menarche in this sample was 12.6 years, suggesting on-time maturation to be normative for dancers specialising in contemporary styles (Aujla et al., 2015). With a lack of current data in adult professional ballet dancers and a lack of data relating to adult contemporary dancers, this study aims to provide new information about maturity characteristics across different ages and styles of dancers.

Existing research asserts that level of involvement in dance is a key factor in determining health and behavioural outcomes. A paradox exists whereby involvement in dance has the potential to cause both harm and benefit (Buckroyd, 2000). Recreational involvement is associated with benefits such as enhanced emotional and social functioning and improved physical and psychological wellbeing, such as increased self-esteem (Alpert, 2011; Burkhardt & Rhodes, 2012; Houston, 2005; Malkogeorgos et al., 2011; Quin et al., 2007; Swami & Harris, 2012). However, vocational, higher level involvement in dance, in particular ballet, is associated with disordered eating, negative body image, low self-esteem and reduced psychological wellbeing (Annus & Smith, 2009; Anshel, 2004; Brooks-Gunn & Warren, 1985; Buckroyd, 2000; McEwen & Young, 2011; Stark & Newton, 2014; Swami & Harris, 2012). While both forms of participation may expose individuals to risk, those involved in vocational ballet training or professional dance are reported to be at higher risk.

In addition to health risks being determined by the level and nature of dance participation, another important factor is the style of dance. The majority of research focuses on ballet dancers with far fewer studies of other dance styles, such as contemporary and urban. Available literature suggests that contemporary and street dancers report greater levels of body appreciation and more positive body image than non-dancers (Langdon & Petracca, 2010; Swami & Tovée, 2009). Literature supports the contention that ballet dancers are at greater risk of disordered eating and report greater body dissatisfaction, compared to contemporary dancers (Schluger, 2010; Swami & Harris, 2012). Research consistently shows

body dissatisfaction and low self-esteem to be prevalent amongst ballet dancers (Bettle et al., 2001; Heiland, Murray, & Edley, 2008; Oliver, 2008; Price & Pettijohn, 2006; Radell et al., 2014). Body dissatisfaction has been highlighted, in particular, for its role as a mediator of disordered eating behaviours (Lynch, Heil, Wagner, & Havens, 2008; Ricciardelli, Tate, & Williams, 1997; Seidel, Presnell, & Rosenfield, 2009). Dancer ratings for both body dissatisfaction and self-esteem are reported to be closely associated with aspects of the ballet training environment such as mirrors and form-fitting clothing (Oliver, 2008; Price & Pettijohn, 2006; Radell et al., 2002; Radell et al., 2011; Radell et al., 2014). In addition, existing research in ballet has found maturity associated differences in body image, with early and on time adolescent dancers reporting poorer body image compared to later maturing peers (Brooks-Gunn & Warren, 1985).

A systematic review and meta-analysis on the prevalence of eating disorders in dance concluded that female dancers have a three times higher risk of suffering from an eating disorder, compared to non-dancers (Arcelus et al., 2014). In particular, dancers are reported to be at higher risk for anorexia nervosa and eating disorders not otherwise specified (EDNOS) (Arcelus et al., 2014). While Arcelus and colleagues were unable to directly compare between ballet and contemporary dancers due to a limited number of studies, they reported a greater prevalence of eating disorders in ballet dancers (16.4%) compared to other dancers (12%) across styles such as jazz and national dance or those who participated in arrange of styles and levels (Arcelus et al., 2014).

While ballet and contemporary dancers frequently practice other dance styles as part of their training, the differing aesthetic demands and training regimes of different dance styles necessitate differences in body composition and body type (Liiv et al., 2013). Ballet dancers consistently report lower body fat and weight compared to contemporary dancers, in addition to greater homogeneity as a population (Hergenroeder, Brown, & Klish, 1993; Kadel et al., 2005; White, Philpot, Green, & Bembem, 2004). Flexibility in body type required to thrive in a particular style of dance may serve to amplify or mitigate the impact of maturity timing; the stockier physique associated with earlier maturation, potentially less problematic within more contemporary and urban dance styles than in classical ballet.

Differing styles and levels of involvement pertain to different learning environments (Annus & Smith, 2009). Facets of the ballet training context which have been associated with higher incidences of psychosocial issues include critical comments concerning shape and weight (de Bruin et al., 2009; Goodwin et al., 2014), ego-involving climates (Carr & Wyon, 2003; de Bruin et al., 2009; Nordin-Bates et al., 2012, Nordin-Bates et al., 2014), thinness related learning

environments (Annus & Smith, 2009; Penniment & Egan, 2012), use of mirrors and ballet attire (Price & Pettijohn, 2006; Radell et al., 2002; Radell et al., 2011; Radell et al., 2014) and dance teacher behaviours such as a passive approach to pubertal changes (Francisco et al., 2012; Green, 1999; Mitchell et al., 2016). These factors may moderate health and behavioural outcomes in the context of ballet.

Literature highlights the context of vocational ballet training and associated thinness related learning experiences as prominent factors contributing to reduced wellbeing in individuals participating in ballet (Annus & Smith, 2009; Oliver, 2008; Penniment & Egan, 2012; Radell et al., 2011; Radell et al., 2014). While much research has been conducted establishing the prevalence of these factors in ballet, there is a lack of research considering potential maturity associated differences. One study of female ballet dancers (n=76) age 14-18 from three national ballet company schools reported a negative association between early and on time maturation and psychological wellbeing which was amplified in the context of vocational ballet training (Brooks-Gunn & Warren, 1985). Earlier maturing (EM) dancers had higher dieting (EM mean 4.24, LM mean 3.24) and bulimia scores (EM mean 3.29, LM mean 2.67) as assessed using the EAT-26 scale and greater weight loss desire scores (EM mean score 12.45, LM mean score 8.73) assessed using the Weight Related Concerns scale compared to later maturing (LM) dancers. In addition, there is no available literature on thinness related learning experiences in contemporary dancers. This thesis aims to contribute to knowledge in this area and to examine differences between professional ballet and contemporary dancers. While previous research has studied participants who reflected on past recreational involvement in ballet, the present study proposes to test a sample of dancers who are currently involved in ballet and contemporary dance at an elite level and who would therefore be likely to be at increased risk for health issues such as eating pathology development (Annus & Smith, 2009).

Maturity associated differences in physique may have increased salience in dance. For example, increased body fat and relatively shorter limb length which are associated with earlier maturation may lead to greater perception of negative feedback related to the body in the context of ballet, where long limbs and lower body fat are preferred (Gay et al., 2014; Mitchell et al., 2016). Research with ballet teachers suggests that the physical characteristics associated with early maturation hold lesser social value compared to the physical characteristics for later maturation (Mitchell et al., 2016). While studies have yet to be conducted with dancers (ballet or contemporary), research in gymnastics illustrates the potential for maturity associated differences in perception of the learning environment and in coach-athlete interaction, with those who do not meet social expectations of body size or

shape perceiving less positive and supportive interactions with coaches and less liking for the coach (Cumming et al., 2005).

In line with a biocultural perspective, this study explores biological (i.e. maturity timing), psychological and sociocultural (i.e. thinness related learning) factors. While not explicitly looking at mediated effects, this study aims to identify salient variables and differences in dance style to inform the focus of mediated effects models going forward.

The aim of this study is to explore the physical and psychological attributes of an international sample of elite adult dancers. Based on the available literature, the following hypotheses will be tested: There will be differences between contemporary and ballet dancers in terms of physical and psychological characteristics, specifically, ballet dancers will have lower BMI, and will be later in maturation. In terms of psychological characteristics ballet dancers will report greater scores in body dissatisfaction, thinness related learning, disordered eating behaviours, and thinness and restricting expectancies, and lower scores in self-esteem and psychological wellbeing.

Differences in physical and psychological attributes will be examined by dance style, with further analyses to assess the extent to which physical and growth related attributes (i.e. maturity timing, BMI, age) and learning experiences (i.e. thinness related learning) contribute to psychological wellbeing outcomes (i.e. body dissatisfaction, eating pathology, self-esteem, psychological wellbeing and, thinness and restricting expectancies). The second hypothesis that will be tested in this study is that differences in psychological wellbeing will be predicted by thinness related learning experiences to a greater extent in ballet dancers than contemporary dancers. Greater thinness related learning experiences will predict greater body dissatisfaction, thinness and restricting expectancies, disordered eating behaviours and lower self-esteem in ballet dancers and to a lesser extent in contemporary dancers.

2.2 Methodology

Participants

Three hundred and two participants completed the survey. The sample was international, the majority were from the United Kingdom (61.7%), 21.7% were from the United States and the remaining 16.7% from a wide range of other countries, including Canada (2%), Sweden (2%) and Australia (2%). Eighty seven percent of the sample were Caucasian, 6% were of mixed ethnicity, 3.7% Asian and 1.3% black (African American and Black British). In terms of age at onset of menarche, the majority of the sample (59.7%) selected the age 12-14 group, 23.3% selected 'over 14 years old' and 16.7% selected 'under 12 years old'. The mean (\pm *SD*) age of menarche was 13 ± 2 years.

Fifty eight percent of the sample described their main style of dance as contemporary, 30.3% as ballet, with urban, jazz, tap and Latin and ballroom as the other main styles. The majority of the sample (60.7%) were in full-time or vocational training at the time of the survey, 24.7% described themselves as professional dancers and 14.7% as semi-professional or recent graduates of vocational dance training. Eighty nine percent of the sample currently, or had previously, attended vocational dance training. The majority of individuals surveyed (77%) began this training between the ages of 13 and 20 years.

Procedure

Ethical approval was received from the University of Bath Research Ethics Approval Committee for Health (Bath, 2014) (reference: EP 14/15 121). See Appendix A for full ethics application. The inclusion criteria selected for female participants aged from 16 years and over, currently in full-time dance training or dancing professionally. The questionnaire was piloted on adult participants familiar with dance training and who had trained in different countries. As a result of the pilot, a description was added to explain the term 'vocational' training as this was not easily understood across all participants.

The sampling strategy followed three strands: the first being to distribute the survey link to larger organisations within the researcher's network; the second, to distribute via email to the researcher's contacts, and the third, to distribute the link via social networking and forums. The first stage of the recruitment process was to disseminate the survey link to all contacts UK-wide and then to distribute it internationally. The participant information form (Appendix A) was used to advertise the study. An advert with participant information was distributed with a link for the survey to enable participants' instant access to complete the survey. Vouchers were used as an incentive for participation, information about the opportunity to win vouchers

as part of a prize draw was included in the advert. Amazon vouchers were used due to seeking out an international sample of survey respondents. Five vouchers to the value of £30 were offered. The survey was launched using Bristol Online Survey and was selected to remain active for three months to allow time to gather a high response rate.

Measures

This study utilised a cross-sectional quantitative design, taking a positivistic approach to assess relationships between the specific exposure and outcome variables. Validated questionnaires were used to measure psychological variables (psychological wellbeing, eating pathologies, thinness expectancies, body dissatisfaction and self-esteem) and a variable associated with perceptions of the learning environment (i.e. thinness related learning). Data pertaining to physical and growth related attributes were obtained through basic demographic questions at the beginning of the survey.

Demographic variables

Basic demographic questions were included at the beginning of the survey to establish the characteristics of the sample. Age was assessed by asking '*please state your current age*' in addition to requiring date of birth for entry into the survey, whereby only those age sixteen and over could participate. Participants were asked to select their country of residence, options included '*United Kingdom*', '*United States of America*' and '*Canada*' with an '*Other*' box where participants could enter their country if not listed. Ethnicity was obtained by offering participants several options including '*Caucasian*', '*Black British*', '*African American*', '*Asian*' and an '*Other*' box for participants to describe their ethnicity if not listed. Participants were asked to select their main style of dance from the following options '*Ballet*', '*Contemporary/Modern*', '*Urban*', '*Tap*' and '*Other*' with a box for participants to specify their main style of dance. In order to obtain data about past experience in dance, participants were asked '*At what age did you start dance?*' and '*How many years of formal training (serious training toward a career in dance e.g. beginning of vocational grades or beginning more than 2 classes per week) have you completed?*' and to select their current status as a dancer from the options '*professional*', '*vocational/full-time training*' and '*semi-professional/recent graduate*', an option for '*other*' was included for participants to describe any other variation in their status as a dancer. Additionally, participants were asked '*Did you or do you currently attend a vocational (full-time) dance school?*' and '*If yes, from what age have you/did you train vocationally (full-time)?*' For the complete survey, see Appendix A.

Dance Experience Questionnaire (DEQ)

The Dance Experience Questionnaire (Annus & Smith, 2009) assesses specific learning experiences within dance classes that relate to thinness alongside basic aspects of dance experiences, such as type of dance studied and duration of study (Annus & Smith, 2009). The scale consists of 14 items divided into two parts: Part one asks participants to report whether or not they have studied dance along with basic demographic questions, such as weight and height. Participants were asked to describe their height with options given in both feet and inches and in centimetres: *'What is your height? Please select your height (choices are in feet and inches, with the equivalent alongside in cm) If you do not know your exact height, please give your best estimate'*. An *'other'* box was included in case participants chose to describe height in different terms. Participants were also asked to describe their weight: *'What is your weight (when measured first thing in the morning without clothes on)? If you do not know for sure, please give your best estimate. Options are presented in stones with the equivalent in pounds and kilograms alongside.'* An *'other'* option was provided for participants to type in an alternative answer. Body mass index was derived from these data using weight/height^2 (kg/m²) (Deurenberg, Andreoli, Borg, & Kukkonen-Harjula, 2001). Part two of the DEQ pertains to the instructors participants have studied under, for example, *'How often are you weighed as part of the class or expected to make a certain weight; 'How often does the instructor make comments about your weight/shape, your classmates' weight/shape or weight/shape in general?'* Each item is scored on a 6-point Likert scale from 1 *'not at all'* or *'none'* to 6 *'all'* or *'always'*. Thinness related learning is measured by summing participants' learning scores, with higher scores indicating higher levels of thinness related learning (Annus & Smith, 2009). The authors reported strong concurrent validity and internal reliability for their questions assessing thinness-related learning ($\alpha = .91$). Internal consistency of the DEQ in the current study was good ($\alpha = .82$).

Participants in the present study were currently training or working as dancers, therefore questions relating to whether or not they had studied dance were omitted. In the original DEQ participants were asked to complete all questions in part two for each instructor they have studied under (Annus & Smith, 2009). Annus and Smith's (2009) original study was retrospective and did not focus specifically on vocationally trained/professional dancers. As the present study focused on this specific population, participants were asked only to complete the questions in part two relating to their current instructor. Professional dancers may have had many dance teachers and therefore this modification was made to keep the survey succinct and to increase the level of participation and the likelihood of survey completion. As the original survey was retrospective, the tense for the current survey was adapted accordingly.

Eating Disorder Examination – Questionnaire (EDE-Q)

The Eating Disorder Examination Questionnaire (Fairburn & Beglin, 1994) was adapted from the Eating Disorder Examination Interview (Cooper & Fairburn, 1987). The EDE-Q is a widely used measure of eating disorder symptoms designed to assess and describe the specific psychopathology of eating disorders, including severity of eating pathology and key behavioural problems/associated disturbances over the past 28 days (Túry, Güleç, & Kohls, 2010). The questionnaire has 33 items with four subscales: restraint, eating concern, weight concern and shape concern. Items are scored from 0 'not at all' or 'no days' to 6 'markedly' or 'every day'. A global score provides a measure of the overall severity of the eating disorder psychopathology. This is calculated by adding each subscale score and dividing the resulting total by the number of subscales (i.e. four). Average global scores (\pm SD) for the general population are reported between $.93 \pm .90$ and 1.52 ± 1.3 (Aardoom, Dingemans, Slof, t Landt, & Van Furth, 2012; Mond, Hay, Rodgers, & Owen, 2006). Average scores for eating disorder populations range from 3.46 ± 1 to 4.34 ± 1 (Aardoom et al., 2012). Reported internal consistencies for the EDE-Q subscales range from coefficient α .78 to α .93, with test-retest reliability (Pearson r), ranging from .81 to .94 across a two week period (Luce & Crowther, 1999; Túry et al., 2010). Internal consistency of the EDE-Q in the current study was strong (α .95). The questionnaire has been validated with adolescent and adult populations (Binford, Le Grange, & Jellar, 2005; Carter, Stewart, & Fairburn, 2001; Mond et al., 2006; Mond, Hay, Rodgers, Owen, & Beumont, 2004) and has also been widely used with samples of dancers (Annus & Smith, 2009; Penniment & Egan, 2012; Ravalidia et al., 2003) and elite ballet dancers (Francisco et al., 2012; Goodwin et al., 2014).

Rosenberg Self-Esteem Scale (RSE)

The Rosenberg Self-Esteem scale (Rosenberg, 1965) assesses global self-esteem; an individual's feelings and attitudes about themselves. The scale was originally developed for adolescents and is widely used with adults (Blascovich & Tomaka, 1991; Kelly, Vimalakanthan, & Carter, 2014; Orth & Luciano, 2015; Pearl, White, & Grilo, 2014). The RSE is a 10-item questionnaire with each item scored on a 4-point Likert scale ranging from 1 'Strongly Disagree' to 4 'Strongly Agree'. Scores are summed, with higher scores indicating higher self-esteem. The Rosenberg Self-Esteem scale has established validity and reliability, internal consistency ranges from coefficient α .77 to α .88 and test-retest (Pearson r) ranges from .82 to .85 in individuals aged 15 – 65 years (Blascovich & Tomaka, 1991; Kelly et al., 2014; Pearl et al., 2014; Rosenberg, 1965). Internal consistency of the RSE scale in the current study was strong (α = .89).

Psychological Wellbeing scale (PWB)

The Psychological Wellbeing scale (PWB) (Diener et al., 2009) assesses important aspects of human functioning ranging from positive relationships to feelings of competence, to having meaning and purpose in life (Diener et al., 2009). The Psychological Wellbeing scale does not measure individual facets of psychological wellbeing but yields an overview of positive functioning (Diener et al., 2009).

The PWB scale is an 8-item scale with each item scored on a 7-point Likert scale ranging from 1 '*Strong Disagreement*' to 7 '*Strong Agreement*'. Strong disagreement with all items produces a low score whereas strong agreement with all items produces a high score; high scores signify that respondents view themselves in very positive terms in various areas of functioning (Diener et al., 2009). Diener and colleagues (2009) reported high internal and temporal reliabilities and high convergence with other similar scales ($\alpha = .69$ to $.80$), strong correlations were reported with total scores for other psychological wellbeing scales (Deci and Ryan's Basic Need Satisfaction Scale (2000); and Ryff's 2008 PWB scale). Internal consistency of the PWB scale in the current study was strong ($\alpha = .89$).

Body dissatisfaction subscale of the EDI-2

The Eating Disorder Inventory-2 (EDI-2) is a revised version of the original EDI, designed to measure behavioural and psychological traits of anorexia nervosa and bulimia nervosa (Garner, 1991). The subscale scores of the EDI-2 can be used separately or summed to give a total score (Túry et al., 2010). In this study, the Body Dissatisfaction Subscale has been used. The subscale has nine items, each item is scored on a 6-point Likert scale ranging from '*always*' to '*never*'. The most extreme response (always or never depending on the keyed direction) earns a score of three; the immediately adjacent response two, the next response one and the three choices opposite to the most extreme response receiving no score (zero). The scale score is the summation of all item scores. EDI subscales are reported to have good psychometric properties; the EDI and all of its subscales have been found to discriminate between anorexic or bulimic individuals and control participants (Túry et al., 2010). Internal consistencies of the eight subscales have been reported to range from coefficient $\alpha .80$ to $\alpha.91$ (Túry et al., 2010) with test-retest reliability (Pearson r) being reported as $>.80$ in a non-clinical female sample across a three week period (Wear & Pratz, 1987). Internal consistency of the body dissatisfaction subscale of the EDI-2 in the current study was strong ($\alpha = .89$).

Thinness and Restricting Inventory (TRI)

The Thinness and Restricting Inventory (Smith, 2014) measures expectancies of thinness and restriction. The TRI is an 8-item scale, adapted from the longer 44-item thinness and restricting

expectancy inventory (Hohlstein, Smith, & Atlas, 1998). A 7-point Likert scale is used from 1 'completely disagree' to 7 'completely agree', with higher scores indicating greater expectations for reinforcement from thinness or restricting food intake. The original inventory has been shown to be reliable; able to discriminate between controls, anorexic and bulimic individuals; and to correlate with symptom level among participants aged 15 – 66 years (Hohlstein et al., 1998). The new, shorter scale, developed by Smith and colleagues (2010, 2011), has been used in longitudinal studies with adolescents and young adults and has shown to be reliable and stable over time with good evidence for validity and internal consistency ($\alpha = .92$) (Combs, Pearson, & Smith, 2011; Pearson, Combs, & Smith, 2010). Internal consistency of the TRI in the current study was strong ($\alpha = .94$).

Age of menarche

Age at menarche refers to the first menstrual period and is part of the sequence of changes associated with sexual maturation. Maturation timing describes when specific maturational events, such as age of menarche, occur and is usually classified as advanced (early), average or delayed (late) (Malina et al., 2004). Age at menarche can be used to infer the timing of maturation within a specific cohort. Participants were asked '*At what age did you have your first period? (i.e. at what age did you get menarche, your first menstrual period)*' answering by selecting from either '*Under 12 years of age*', '*12-14 years of age*', '*over 14 years of age*' or '*I haven't yet had my first period*'. These groups were defined by existing norms for dancers (Burckhardt et al., 2011; Hamilton et al., 1997; Steinberg et al., 2008). Participants were then asked '*If you can recall your age (in years) when you first started your period please select your age*' and '*If you can recall the month in that year when you first started your period please select here*'. It is reported that most teenagers and women can recall this event accurately within a range of three months (Damon et al., 1969). This measure does not exclude individuals who are premenarcheal, accordingly, the survey included an option to report that menarche has not yet begun.

Data cleaning and assumption checking

Data were imported into SPSS Statistics Data Editor (version 22) for analysis (SPSS, 2013). Scales were scored according to the original protocol for each. Anchors for both the Rosenberg self-esteem scale and the EDI Body Dissatisfaction subscale were reversed in order to be consistent with the other measures and to avoid biased responses due to response set reporting. For analysis these were reverted to their original form. The data were cleaned for erroneous responses and missing values were labelled. In the course of this process two respondents were removed from the analysis due to not meeting the inclusion criteria for

participation in the study. The two respondents who were removed identified as dance teachers rather than professional dancers. Scales and sub-scales were then analysed for internal reliability and Cronbach alpha values have been reported (Tables 2 and 3).

Assumptions were checked prior to running statistical analyses. To assess the normality of data, visual checking of P-P and Q-Q plots was conducted for all variables (Ghasemi & Zahediasl, 2012). Visual checks suggested non-normality in thinness and restricting expectancy, learning experience and eating disorder data. To investigate further, normality tests were conducted for all variables. The Shapiro-Wilk test reported p-values greater than .05 which indicates an underlying normal distribution of data (Ghasemi & Zahediasl, 2012). In order to avoid multicollinearity, height and weight were removed from analyses of variance and regression analyses. All other assumptions were met. For the regression analysis, linearity was checked using a curve estimation, where a linear model was the best fit.

Data Analysis

Descriptive statistics

Descriptive statistics were calculated for the demographic, dance specific and psychological characteristics of the sample (Tables 1-3). Means, standard deviations and frequencies were examined, and comparisons across groups (ballet and contemporary) were made on the variables of interest including age, height, weight, BMI, age of menarche and age participants started dancing.

Correlations

Pearson product-moment correlation analyses (one-tailed) were conducted for an initial investigation of the relationships between variables of interest including psychological variables, BMI, dance experience and age of menarche (Table 4). One-tailed analyses were conducted as the expected direction of relationships had been hypothesised. Fisher r-to-z transformation was used to assess the significance of the difference between correlation coefficients for ballet and for contemporary dancers.

Analyses of variance

The data was split by dance style, the two main styles (ballet and contemporary) have been analysed with data from other styles removed. Multivariate analyses of variance were conducted to examine whether or not there were significant differences between dance styles (ballet and contemporary) across physical and psychological characteristics (Table 5). A follow up univariate analysis was conducted to compare differences in physical and psychological

characteristics between dancers of different styles, ballet and contemporary (Table 6). Physical characteristics included BMI, age and age at menarche. Psychological characteristics included body dissatisfaction, thinness related learning, disordered eating behaviours, self-esteem, thinness and restricting expectancies and psychological wellbeing.

Linear Regression

Linear regression was carried out to explore potential differences in the factors associated with psychological wellbeing in ballet and contemporary dancers (Tables 9 – 18). A backwards elimination approach was used in order to examine the joint predictive capability of all variables, and subsequently, to assess which predictors are of greatest significance to each psychological outcome. The analysis begins with the full model and successively eliminates one at a time (Bursac, Gauss, Williams, & Hosmer, 2008; Xu & Zhang, 2001). The first variable removed is the one with the smallest contribution to the reduction of predictive error that does not meet the level for staying in the model (.10). Once an effect is removed from the model, it remains excluded, the process is repeated until no other effect in the model meets the specified level for removal (Bursac et al., 2008; Xu & Zhang, 2001). Analyses were conducted for prediction of body dissatisfaction, thinness and restricting expectancies, disordered eating behaviours, psychological wellbeing and self-esteem. Predictors explored within the analysis included thinness related learning experiences, BMI and maturity timing. As aforementioned, assumptions were tested prior to running the analysis. All assumptions were met. Linearity was checked using a curve estimation, where a linear model was the best fit.

2.3 Results

Descriptive statistics

Descriptive statistics are presented in Table 1. Relative to sex specific norms, the mean age of menarche reported by dancers in this study is above average (13.2 years compared to 12.4 years), while BMI is lower than normal populations (19.9 kg/m² compared to 23.2 – 24.9 kg/m²), relative to sex and age specific norms (Baker et al., 2012; McDowell et al., 2007; Nysom, Mølgaard, Hutchings, & Michaelsen, 2001; Wells, Treleaven & Cole, 2007). Relative to age and sex specific norms, EDE-Q mean scores are higher than the general population (Aardoom et al., 2012), body dissatisfaction scores are just above average (Garner et al, 1983), self-esteem scores are lower than average (Sinclair et al, 2010) and scores are in line with norms for general psychological wellbeing (Diener et al, 2009) (See Table 2). In Table 3 descriptive statistics for the EDE-Q subscales are presented.

Table 1. Descriptive statistics for age, BMI, age of menarche and age started dancing.

Variables	<i>M</i>	<i>SD</i>	Range	N
Age (years)	23.0	5.7	16-46	300
Height (m)	1.6	.06	1.5-1.9	300
Weight (kg)	53.2	5.3	38.1-71.0	300
BMI (kg/m ²)	19.9	1.5	14.3-24.4	300
Age at onset of menarche (years)	13.2	1.7	8-19	288
Age started dancing (years)	7.0	4.3	3-25	300

M = Mean, SD = Standard Deviation, BMI = Body Mass Index

Table 2. Descriptive statistics for self-esteem, body dissatisfaction, thinness related learning experiences, eating pathologies, psychological wellbeing and thinness and restricting expectancies, N=300

Variables	<i>M</i>	<i>SD</i>	Range	α
Self-esteem (RSE)	17.1	5.5	1 – 29	.89
Body dissatisfaction (EDI-2)	10.5	7.5	0 – 27	.89
Psychological wellbeing (PWB)	44.8	7.4	19 – 56	.89
Eating Pathologies (EDE-Q)	2.3	1.5	0 - 6	.95
Thinness and Restricting expectancies (TRI)	30.8	14.0	8 – 56	.94
Thinness related learning (DEQ)	16.2	5.5	9 – 36	.82

M = Mean, SD = Standard Deviation

Table 3. Descriptive statistics for EDE-Q Subscales, N=300.

Variables	<i>M</i>	<i>SD</i>	Range	α
EDE-Q	2.3	1.5	0 - 6	.95
EDE-Q Restraint subscale	1.9	1.6	0 - 6	.83
EDE-Q Eating Concern subscale	1.6	1.6	0 - 6	.80
EDE-Q Weight Concern subscale	2.6	1.7	0 - 6	.83
EDE-Q Shape Concern subscale	2.9	1.8	0 - 6	.93

M = Mean, *SD* = Standard Deviation, α = Cronbach's alpha

Correlations

Relations between measures of self-esteem, body dissatisfaction, thinness related learning experiences, eating pathologies, psychological wellbeing, age of menarche, BMI and thinness and restricting expectancies are presented in Table 4. Thinness related learning experiences were positively associated with EDE-Q global score, body dissatisfaction and thinness and restricting expectancies, and negatively associated with psychological wellbeing and self-esteem. Notable relations include a significant negative association between age of menarche and self-esteem, suggesting that earlier age of menarche is associated with higher self-esteem (Table 4).

Table 4. Pearson product-moment correlations (1-tailed) between measures of self-esteem, body dissatisfaction, thinness related learning, eating pathologies, psychological wellbeing, age of menarche, BMI and thinness and restricting expectancies, N=300.

Variables	1	2	3	4	5	6	7	8
1. Thinness related learning (DEQ)	–							
2. Body Mass Index (BMI)	-.21**	–						
3. Eating Pathologies (EDE-Q)	.36**	-.04	–					
4. Thinness & Restricting expectancies (TRI)	.30**	.06	.77**	–				
5. Psychological Wellbeing (PWB)	-.15**	.07	-.41**	-.33**	–			
6. Self-esteem (RSE)	-.22**	.14**	-.59**	-.52**	.64**	–		
7. Body Dissatisfaction (EDI-2)	.34**	.05	.77**	.72**	-.40**	-.60**	–	
8. Age of menarche	.06	-.25**	.06	-.02	-.02	-.10*	.05	–

**Correlation is significant at the .01 level (1-tailed). *Correlation is significant at the .05 level (1-tailed).

N.B. Age of menarche n=288.

Differences in physical and psychological attributes by dance style

Differences in physical and psychological characteristics between contemporary and ballet dancers were hypothesised. Specifically, that ballet dancers will have lower weight and BMI, and will be later in maturation. In terms of psychological characteristics ballet dancers will report greater scores in body dissatisfaction, thinness related learning, disordered eating behaviours, and thinness and restricting expectancies, and lower scores in self-esteem and psychological wellbeing.

Multivariate analysis of variance

Multivariate analysis of variance was conducted to explore dance style related differences in physical characteristics (age, BMI and age of menarche) and psychological characteristics (body dissatisfaction, self-esteem, psychological wellbeing, disordered eating, thinness and restricting expectancies and thinness related learning). A significant main effect was observed for dance style related differences in physical characteristics: Wilk's $\Lambda = .89$, $F(3, 252) = 10.33$, $p < .001$, multivariate $\eta^2 = .11$. The multivariate $\eta^2 = .11$ indicates that approximately 11% of multivariate variance of the physical variables is associated with dance style. A significant main effect was also observed for dance style related differences in psychological characteristics: Wilk's $\Lambda = .86$, $F(6, 258) = 6.80$, $p < .001$, multivariate $\eta^2 = .14$. The multivariate $\eta^2 = .14$ indicates that approximately 14% of multivariate variance of the psychological variables is associated with dance style.

Univariate analysis of variance

Subsequent univariate analyses reveal significant differences between ballet and contemporary dancers in BMI, $F(1, 254) = 25.5$, $p < .05$ (Table 5). There were no significant effects found for age $F(1, 254) = 3.9$, $p > .05$ or age at menarche $F(1, 254) = .23$, $p > .05$ (Table 5).

Table 5. Descriptive statistics for age, BMI and age at onset of menarche for ballet and contemporary dancers

Variables	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>	F(1,	η^2
Dance Style	Ballet		Contemporary		254)	
Age (years)	22.2 (6.0)	91	23.7 (5.3)	174	3.9	.02
BMI (kg/m ²)	19.2 (1.6)	91	20.2 (1.4)	174	25.5	.09*
Age at onset of menarche (years)	13.1 (1.7)	87	13.2 (1.6)	169	0.2	.00

*significant at $p < .05$ level. *M = Mean, SD = Standard Deviation, $\eta^2 = Eta-Squared$*

For psychological variables, univariate analysis of variance revealed significant differences in thinness related learning experiences $F(1, 263) = 34.5, p < .05$ (Table 6). There were no significant differences in thinness and restricting expectancies $F(1, 263) = 1.4, p > .05$, psychological wellbeing $F(1, 263) = .03, p > .05$, self-esteem $F(1, 263) = .2.0, p > .05$, body dissatisfaction $F(1, 263) = 5.7, p > .05$, and disordered eating $F(1, 263) = 4.7, p > .05$ (Table 6).

Table 6. Descriptive statistics for psychological health and wellbeing characteristics of elite ballet dancers and contemporary dancers

Variables	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>	F(1,	η^2
Dance style	Ballet		Contemporary		263)	
Self-esteem (RSE)	16.6 (5.9)	91	17.6 (5.3)	174	2.0	.01
Body dissatisfaction (EDI-2)	11.7 (8.1)	91	9.5 (6.7)	174	5.7	.02
Psychological wellbeing (PWB)	44.7 (8.1)	91	44.9 (6.9)	174	.03	.00
Eating pathologies (EDE-Q)	2.6 (1.6)	91	2.1 (1.4)	174	4.7	.02
Thinness and Restricting expectancies (TRI)	31.9 (15.1)	91	29.8 (13.4)	174	1.4	.01
Thinness related learning (DEQ)	18.7 (6.1)	91	14.7 (4.7)	174	34.5	.12*

*significant at $p < .05$ level. *M = Mean, SD = Standard Deviation, $\eta^2 = Eta-Squared$*

Descriptive data for eating pathologies is shown in Table 7. Ballet dancers reported overall higher scores and greater levels of symptomology than contemporary dancers with both groups reporting particularly high scores for weight and shape concern. Eating concern was reported as the lowest score for both groups. All averages reported for the ballet sample are at the 75th percentile or above in relation to average scores (Mond et al., 2006). Univariate analysis of variance revealed a significant difference in level of restraint $F(1, 263) = 8.2, p < .05$ between ballet and contemporary dancers.

Table 7. Descriptive statistics for eating pathologies measured by EDE-Q Subscales, ballet and contemporary dancers

Variables	<i>M</i> (<i>SD</i>)	Range	<i>M</i> (<i>SD</i>)	Range	<i>F</i> (1, 263)	η^2
Dance style	Ballet		Contemporary			
EDE-Q Restraint subscale	2.4 (1.8)	0-6	1.8 (1.5)	0-6	8.2	.03*
EDE-Q Eating Concern subscale	1.8 (1.6)	0-6	1.5 (1.5)	0-5.5	2.6	.01
EDE-Q Weight Concern subscale	2.9 (1.8)	0-6	2.5 (1.6)	0-6	3.2	.01
EDE-Q Shape Concern subscale	3.2 (1.8)	0-6	2.8 (1.8)	0-6	2.6	.01

*significant at $p < .05$ level. *M* = Mean, *SD* = Standard Deviation, η^2 = Eta-Squared

Correlations

Pearson product-moment correlations between psychological variables and maturity timing were analysed for each group and are shown for both ballet and contemporary dancers in Table 8. Learning experiences are more strongly associated with psychological wellbeing variables in ballet dancers than in contemporary dancers. A significant positive association was found between age of menarche and thinness related learning experiences in ballet dancers only. This would suggest that earlier ages at menarche are associated with reduced perception of thinness related learning and later maturation is associated with greater perception of thinness related learning in ballet. A significant negative relationship between age at menarche and self-esteem is also shown for contemporary dancers but not for ballet dancers. This would suggest that later maturation in contemporary dancers is associated with lower self-esteem.

Fisher *r*-to-*z* transformation revealed significant differences only for the relationships between eating pathologies and self-esteem and thinness and restricting expectancies and self-esteem. Greater levels of eating pathology are associated with lower self-

esteem in both ballet and contemporary dancers. The difference between these correlations was statistically significant, $Z = 3.23$, $p < .01$, suggesting that self-esteem is more highly associated with eating disorders in ballet than in contemporary. Greater thinness and restricting expectancies are associated with lower self-esteem in both ballet and contemporary dancers. The difference between these correlations was statistically significant, $Z = 1.61$, $p < .05$, suggesting that thinness and restricting expectancies are more highly associated with self-esteem in ballet than in contemporary.

Table 8. Pearson product-moment correlations (1-tailed) between measures of thinness related learning experiences, eating pathologies, thinness and restricting

Variables	1	2	3	4	5	6	7
1. Thinness related learning (DEQ)	–	.40**	.41**	-.26**	-.32**	.36**	.24*
2. Eating pathologies (EDE-Q)	.38**	–	.77**	-.45**	-.75**	.77**	.13
3. Thinness and restricting expectancies (TRI)	.25**	.78**	–	-.33**	-.61**	.77**	.13
4. Psychological Wellbeing (PWB)	-.18**	-.38**	-.36**	–	.62**	-.37**	-.01
5. Self-esteem (RSE)	-.18**	-.50**	-.46**	.66**	–	-.64**	-.17
6. Body Dissatisfaction (EDI-2)	.33**	.78**	.71**	-.40**	-.56**	–	.16
7. Age of menarche	.07	.10	-.03	-.02	-.13*	.07	-

expectancies, psychological wellbeing, self-esteem, body dissatisfaction and age of menarche for contemporary dancers (lower diagonal) and ballet dancers (upper diagonal).

**Correlation is significant at the .01 level (1-tailed). *Correlation is significant at the .05 level (1-tailed).

The lower diagonal represents the correlation between psychological wellbeing variables and maturity timing for contemporary dancers (n=174 for psychological wellbeing variables, n= 167 for maturity timing); the upper diagonal represents the correlation between psychological wellbeing variables and maturity timing for ballet dancers (n=91 for psychological wellbeing variables, n=87 for maturity timing).

Linear regression

The second hypothesis holds that differences in psychological wellbeing will be predicted by thinness related learning experiences to a greater extent in ballet dancers than contemporary dancers. Greater thinness related learning experiences will predict greater body dissatisfaction, thinness and restricting expectancies, disordered eating behaviours and lower self-esteem in ballet dancers and to a lesser extent in contemporary dancers.

Contemporary dancers

In contemporary dancers, the final regression models were significant in explaining variance in body dissatisfaction, $F(2, 166) = 8.22, p < .001, R^2 = .09$ (Table 9), thinness and restricting expectancies, $F(2, 166) = 7.11, p < .001, R^2 = .08$ (Table 11), eating disorder pathology, $F(3, 165) = 11.24, p < .001, R^2 = .17$ (Table 12), and psychological wellbeing, $F(1, 167) = 8.86, p < .001, R^2 = .05$ (Table 13). The final regression model predicting variance in self-esteem in contemporary dancers was not statistically significant, $F(2, 166) = 3.73, p > .001, R^2 = .04$ (Table 10). Maturity timing and age were retained in the final model. Age served as a positive, yet statistically non-significant, predictor of self-esteem and maturity timing as a negative, yet statistically non-significant, predictor of self-esteem. Thinness related learning was a significant predictor of body dissatisfaction, psychological wellbeing and disordered eating in contemporary dancers. Thinness related learning and BMI combined were significant predictors of thinness and restricting expectancies.

Table 9. Summary of Regression Analysis for Variables Predicting body dissatisfaction in contemporary dancers (n = 174)

Variable	Model 1			Model 2			Final model		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Age	-.06	.10	-.05						
BMI	.75	.38	.15	.74	.38	.15	.63	.37	.13
Maturity timing	.41	.33	.10	.38	.33	.09			
Thinness related learning	.42	.11	.29**	.43	.11	.29**	.43	.11	.29**
R²		.10			.10				.09
F for change in R²		4.55**			.43				1.36

**Significant at .01 level, for maturity timing n=169. *B* = Unstandardised, β = Standardised

Table 10. Summary of Regression Analysis for Variables Predicting self-esteem in contemporary dancers (n = 174)

Variable	Model 1			Model 2			Final model		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Age	.15	.08	.15	.15	.07	.15	.16	.07	.17
BMI	.20	.30	.05						
Maturity timing	-.42	.26	-.13	-.47	.25	-.14	-.47	.25	-.15
Thinness related learning	-.12	.09	-.11	-.12	.08	-.11			
R²		.24			.24			.21	
F for change in R²		2.53			.44			2.20	

**Significant at .01 level, for maturity timing n=169. *B* = Unstandardised, β = Standardised

Table 11. Summary of Regression Analysis for Variables Predicting thinness and restricting expectancies in contemporary dancers (n = 174)

Variable	Model 1			Model 2			Final model		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Age	-.14	.19	-.06	-.13	.19	-.05			
BMI	2.00	.75	.21**	1.90	.72	.20**	1.90	.72	.20**
Maturity timing	.18	.64	.02						
Thinness related learning	.63	.21	.22**	.63	.21	.22**	.65	.21	.23**
R²		.08			.08				.08
F for change in R²		3.67**			.08				.49

**Significant at .01 level, for maturity timing n=169. *B* = Unstandardised, β = Standardised

Table 12. Summary of Regression Analysis for Variables Predicting disordered eating pathology in contemporary dancers (n = 174)

<i>Variable</i>	<i>Model 1</i>			<i>Final model</i>		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
<i>Age</i>	-.02	.02	-.06			
<i>BMI</i>	.13	.08	.13	.13	.08	.13
<i>Maturity timing</i>	.13	.07	.15	.12	.07	.14
<i>Thinness related learning</i>	.12	.02	.39**	.12	.02	.40**
<i>R²</i>		.17			.17	
<i>F for change in R²</i>		8.61**			.76	

**Significant at .01 level, for maturity timing n=169. *B* = Unstandardised, β = Standardised

Table 13. Summary of Regression Analysis for Variables Predicting psychological wellbeing in contemporary dancers (n = 174)

Variable	Model 1			Model 2			Model 3			Final model		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Age	.02	.10	.02									
BMI	.26	.39	.05	.26	.39	.05	.29	.37	.06			
Maturity timing	-.11	.34	-.03	-.11	.33	-.03						
Thinness related learning	-.31	.11	-.22**	-.31	.11	-.22**	-.31	.11	-.22**	-.32	.11	-.23**
R²		.06			.05			.05			.05	
F for change in R²		2.37			.05			.10			.59	

**Significant at .01 level, for maturity timing n=169. *B* = Unstandardised, β = Standardised

Linear regression - Ballet dancers

In ballet dancers, the final regression models were significant in explaining variance in body dissatisfaction, $F(1, 85) = 17.30$, $p < .001$, $R^2 = .17$ (Table 14), self-esteem, $F(2, 84) = 12.12$, $p < .001$, $R^2 = .22$ (Table 15), thinness and restricting expectancies, $F(1, 85) = 16.63$, $p < .001$, $R^2 = .16$ (Table 16), eating disorder pathology, $F(1, 85) = 25.52$, $p < .001$, $R^2 = .23$ (Table 17), and psychological wellbeing, $F(2, 84) = 8.14$, $p < .001$, $R^2 = .16$ (Table 18). Thinness related learning was a significant predictor of body dissatisfaction, thinness and restricting expectancies, psychological wellbeing and disordered eating in ballet dancers. Thinness related learning and BMI were significant predictors of self-esteem.

Table 14. Summary of Regression Analysis for Variables Predicting body dissatisfaction in ballet dancers (n = 91)

Variable	Model 1			Model 2			Model 3			Final model		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Age	-.05	.14	-.04									
BMI	-.31	.54	-.06	-.32	.54	-.06	-.36	.53	-.07			
Maturity timing	.20	.49	.04	.20	.48	.04						
Thinness related learning	.52	.14	.39**	.52	.14	.39**	.53	.14	.39**	.55	.13	.41**
R²		.18			.18			.17			.17	
F for change in R²		4.39**			.13			.16			.46	

**Significant at .01 level, for maturity timing n=87. *B* = Unstandardised, β = Standardised

Table 15. Summary of Regression Analysis for Variables Predicting self-esteem in ballet dancers (n = 91)

Variable	Model 1			Model 2			Final model		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Age	.08	.09	.08						
BMI	.94	.37	.25	.95	.37	.26	1.00	.37	.27**
Maturity timing	-.32	.33	-.10	-.31	.33	-.09			
Thinness related learning	-.30	.10	-.31**	-.30	.10	-.31**	-.31	.10	-.33**
R²		.24			.23			.22	
F for change in R²		6.42**			.73			.84	

**Significant at .01 level, for maturity timing n=87. *B* = Unstandardised, β = Standardised

Table 16. Summary of Regression Analysis for Variables Predicting thinness and restricting expectancies in ballet dancers (n = 91)

Variable	Model 1			Model 2			Model 3			Final model		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Age	-.31	.25	-.12	-.32	.25	-.12	-.31	.25	-.12			
BMI	-.38	1.01	-.04									
Maturity timing	.35	.90	.04	.40	.89	.05						
Thinness related learning	.98	.27	.39**	1.00	.26	.40**	1.03	.25	.41**	1.02	.25	.41**
R²		.18			.18			.18			.16	
F for change in R²		4.57**			.14			.21			1.55	

**Significant at .01 level, for maturity timing n=87. *B* = Unstandardised, β = Standardised

Table 17. Summary of Regression Analysis for Variables Predicting disordered eating pathology in ballet dancers (n=91)

Variable	Model 1			Model 2			Model 3			Final model		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Age	-.03	.03	-.11	-.03	.03	-.11						
BMI	-.15	.10	-.14	-.15	.10	-.15	-.16	.10	-.15			
Maturity timing	.04	.09	.04									
Thinness related learning	.12	.03	.44**	.12	.03	.45**	.12	.03	.44**	.13	.03	.48**
R²		.27			.27			.25			.23	
F for change in R²		7.45**			.20			1.35			2.48	

**Significant at .01 level, for maturity timing n=87. *B* = Unstandardised, β = Standardised

Table 18. Summary of Regression Analysis for Variables Predicting psychological wellbeing in ballet dancers (n=91)

Variable	Model 1			Model 2			Final model		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Age	-.15	.14	-.11	-.15	.14	-.11			
BMI	1.03	.55	.20	1.05	.54	.20	1.03	.54	.20
Maturity timing	-.12	.49	-.03						
Thinness related learning	-.40	.14	-.30**	-.41	.14	-.30**	-.42	.14	-.31**
R²		.18			.18				.16
F for change in R²		4.36**			.06				1.25

**Significant at .01 level, for maturity timing n=87. *B* = Unstandardised, β = Standardised

2.4 Discussion

The aim of this study was to explore the physical and psychological attributes of an international sample of elite adult dancers and to examine the differences between individuals specialising in ballet and contemporary dance styles.

Total group observations

Descriptive statistics for the total sample are in line with what we might expect to see for a group of elite dancers, with below average mean BMI and above average scores for eating pathologies (Arcelus et al., 2014). The mean age of menarche in this study (13.2 years) is consistent with reports that dancers are typically delayed in maturation compared to general population norms. A mean age of menarche of 13.1 years has been reported as average for adult ballet dancers (Burckhardt et al., 2011; Hamilton et al., 1997), while data pertaining specifically to adult contemporary dancers is lacking, the mean age of menarche reported in adolescent contemporary dancers is 12.6 years (Aujla et al., 2015), closer to the average for the general population, which is reported to be between 12.4 and 12.8 (Baker et al., 2012; Malina et al., 2004; McDowell et al., 2007). This study contributes to our understanding of maturity timing in adult contemporary dancers, with this sample reporting delayed maturation consistent with existing data in adult ballet dancers and later than averages reported in adolescent contemporary dancers.

No physical or psychological factors were found to be strongly associated with maturity. Significant correlations were only apparent for self-esteem and BMI in the total sample analysis. Contrary to the negative association ($r = -.10^*$) found between age of menarche and self-esteem in this study, previous research with adolescent female dancers, age 10-18, predominantly training in contemporary dance styles reported a positive association ($r = .06$) (Nordin-Bates et al., 2011). This association between self-esteem and maturity timing within a sample of adult dancers may suggest that self-esteem, in particular for earlier maturing dancers, is important for continued participation in dance training or retention within dance training systems. Of note, self-esteem scores in later maturing adult dancers were lower than that of earlier maturing dancers. These findings may be partially explained by the Underdog Theory (Gibbs et al., 2012). It is possible that earlier maturing dancers develop psychological attributes, such as self-esteem, in order to succeed in a system where their physical characteristics may be less ideal; later maturing dancers, perhaps able to rely more heavily on their relatively more amenable physical characteristics in order to succeed. It is reported that only a small percentage of these 'underdogs' succeed in the system. This is consistent with the relatively small number of early maturing dancers present in the total sample (Gibbs

et al., 2012). Equally, it is possible that only early maturing dancers who already possess greater self-esteem are able to succeed in the profession. Further research is needed in order to unpick the complexities of any interaction between maturation and factors such as self-esteem in the context of dance.

Total sample correlations are generally in line with extant theories. Consistent with existing literature, thinness related learning experiences in dance had a strong positive correlation with eating pathologies (Annus & Smith, 2009; Penniment & Egan, 2012). No significant association was found between age of menarche and thinness related learning experiences in the total sample analysis. This may suggest that other factors, such as dance style, are central to determining the importance of thinness related learning experiences upon psychological variables such as self-esteem.

Dance style related differences in physical characteristics

Diverging from the original hypothesis, there was no significant difference between average age of menarche in the ballet and contemporary groups. However, in line with the earlier hypothesis, differences in physical variables such as weight and BMI, which can be associated with maturity timing, were found. Consistent with existing research, there were significant differences between weight and BMI, with ballet dancers reporting lower weight and BMI compared to contemporary dancers (Hergenroeder et al., 1993; Kadel et al., 2005; White et al., 2004). These differences are likely due to differing aesthetic demands and training regimes which necessitate differences in body composition and body type (Liiv et al., 2013).

Only twenty percent of each sample (ballet and contemporary) reported early maturation (age of menarche less than or equal to 12.1 years). Consistent with other findings (Hamilton et al., 1988; Hamilton et al., 1985), this sample of adult dancers represent a fairly narrow range in terms of maturity timing characteristics, thereby limiting the capacity to discern quantifiable differences associated with maturity. However, while differences may not be apparent quantitatively, arguably there may be differences in the qualitative experiences of those early maturing dancers who succeeded into the profession, compared to later maturing individuals. For example, maturity associated differences in physique, such as increased body fat and relatively shorter limb length associated with earlier maturation, may not be apparent in the psychological and physical characteristics of elite adult dancers, but may be relevant to their journey into the profession (Gay et al., 2014; Mitchell et al., 2016).

Just how dancers of varying maturity timing succeed is likely to be qualitatively different. How dance teachers perceive adolescent dancers of differing maturity timing and their subsequent

interactions with young dancers is reported to be influenced by the lesser social value associated with early pubertal changes (Mitchell et al., 2016). This is further supported by similar findings with young gymnasts whereby coach-athlete interactions were influenced by physical characteristics such as height and weight (Cumming et al., 2005). Dance teacher responses to 'less conducive' pubertal changes included encouraging dancers to pursue a different career pathway (Mitchell et al., 2016). These types of interactions with teachers may be crucial in a dancer's journey into the profession. Whether these experiences are different for dancers who mature early, on time and late warrants further exploration. However, the differing physical characteristics of early and late maturing individuals, combined with the available evidence from gymnastics and dance, would suggest that experiences are likely to be different (Cumming et al., 2005; Gay et al., 2014; Mitchell et al., 2016).

Dance style related differences in psychological characteristics

Average EDE-Q scores were higher in ballet dancers than in contemporary dancers, which is in line with what we might expect drawing on current literature (Arcelus et al., 2014; Schluger, 2010). Ballet dancers reported overall higher scores and greater levels of symptomology than contemporary dancers with both groups reporting particularly high scores for weight and shape concern, and ballet dancers reporting a greater level of restraint. Eating concern was reported as the lowest score for both groups. All averages reported for the ballet sample are at the 75th percentile or above in relation to average scores for young women (Mond et al., 2006). Further, the mean EDE-Q scores for both the whole group and ballet group were higher than previous mean EDE-Q scores reported for dancers. Arcelus and colleagues' (2014) meta-analysis reports a mean EDE-Q score of 1.58 for all dancers and 1.07 for ballet dancers from their data (Arcelus et al., 2014, p. 95). Higher scores for eating pathologies within our sample of dancers could be related to sample size, with a relatively small pool of participants compared to the meta-analysis conducted by Arcelus and colleagues which utilised data from 3,337 dancers. The findings from the present study provide evidence to support a high incidence of eating pathology in dancers and highlight concern over weight and shape as key factors within this.

A significant positive association was found between age of menarche and thinness related learning experiences in ballet dancers only, although there was no statistically significant difference between ballet and contemporary dancers. A positive association would suggest that in ballet, earlier ages of menarche are associated with reduced perception of thinness related learning, while later maturation is associated with greater perception of thinness related learning. Existing literature holds that thinness related learning environments are strongly associated with the development of eating disorder symptomology in adults participating in ballet (Annus & Smith, 2009; Penniment & Egan, 2012). Further, earlier

maturation is associated with greater incidences of eating pathologies (Brooks-Gunn & Warren, 1985; Zehr, Culbert, Sisk, & Kiump, 2007). This diverges from the finding that earlier maturing dancers may perceive less thinness related learning in their dance classes. Moreover, it may be explained by the age of the sample, with previous research having been conducted with adolescent dancers, age 14 -18 years (Brooks-Gunn & Warren, 1985). It is possible that those earlier maturing dancers who perceive greater thinness related learning within their training environment are not present within the current sample, having self-selected out or been assessed out of dance training (Hamilton et al., 1997). Alternatively, perception of maturity timing is likely to be of greater significance to psychological wellbeing than objective measures of timing (Conley & Rudolph, 2009; Graber et al., 1997; Graber et al., 2004; Moore et al., 2014); those earlier maturing dancers who succeeded into the profession, and are present in the current sample, may not perceive themselves to be early maturing and subsequently may not experience negative psychological outcomes that are associated with earlier maturation (Moore et al., 2016). Research has shown that long term effects of maturation hinge more on subjective interpretations than objective indicators (Moore et al., 2016). In contexts such as vocational dance training, self-perception of maturation may be of amplified importance. Further qualitative research may help to unravel the complex interactions between maturation and succeeding in dance.

A significant negative relationship between age of menarche and self-esteem is shown for contemporary dancers but not for ballet dancers, although Fisher r-to-z transformation revealed no statistically significant difference between ballet and contemporary dancers. The suggestion that a negative association exists between these factors, with later maturation in contemporary dancers being associated with lower self-esteem, conflicts with studies of general populations (Graber et al., 1997; Mendle et al., 2007). Existing literature holds that earlier and on time maturing girls report lower self-esteem compared to later maturing girls. Equivalent literature comparing self-esteem in contemporary and ballet dancers is lacking. One study reports lower self-esteem in ballet dancers compared to contemporary dancers, with no statistically significant difference between dance styles (Clabaugh & Morling, 2004). It is likely, given the differences in demand and nature of the two dance styles, that the relationship between self-esteem and maturity timing may be different. While late maturation is perceived to be advantageous for ballet dancers, particularly in terms of physique, the demands and nature of contemporary dance are very different (Liiv et al., 2013). It may be that just as earlier maturation is beneficial in other sports, due to strength and power, earlier maturation may have benefits for contemporary dancers (Buchheit & Mendez-Villanueva, 2014; Malina et al., 2004). Further research is warranted in order to explore this relationship further.

Thinness related learning experiences appear to be more strongly associated with psychological wellbeing variables in ballet dancers than in contemporary dancers. This may reflect the differing demands of the two dance styles in terms of expectations for thinness and a specific physique (Liiv et al., 2013). Thinness related learning experiences were found to be significantly different between ballet and contemporary dancers, with ballet dancers reporting greater thinness related learning experiences. This is consistent with existing research on thinness related learning environments which reports high levels of thinness related learning experiences in women involved in ballet (Annus & Smith, 2009; Penniment & Egan, 2012). While comparative research has not yet been conducted with contemporary dancers, research on the broader topic of psychological wellbeing in dance suggests contemporary dance training environments to be more positively associated with psychological wellbeing (Langdon & Petracca, 2010; Schluger, 2010; Swami & Harris, 2012; Swami & Tovée, 2009).

Thinness related learning as a factor includes items relating to comments from teachers and peers about the benefits of dieting, social comparison between peers, weighing dance students in class and observational learning of dieting and restriction through teacher or peer modelling (Penniment & Egan, 2012). These factors may be amplified by the ballet training environment more so than contemporary dance training environments. While little research has been conducted with contemporary dancers, much research has been carried out in ballet examining aspects of the training environment, such as use of mirrors, ballet attire and critical comments concerning weight and shape. These factors have been associated with psychosocial issues such as body dissatisfaction, eating pathologies and low self-esteem (Goodwin et al., 2014; Price & Pettijohn, 2006; Radell et al., 2002; Radell et al., 2011; Radell et al., 2014).

In this study, while dance style was reported to explain some of the variance in body dissatisfaction and disordered eating, these findings were not statistically significant. However, the direction of the relationship is consistent with existing research, where contemporary dancers report greater body satisfaction and lower eating pathology scores compared to ballet dancers (Langdon & Petracca, 2010; Schluger, 2010; Swami & Harris, 2012). Further differences in the psychological characteristics of ballet and contemporary dancers were found in the relationships between self-esteem and eating pathologies and self-esteem and thinness and restricting expectancies. Consistent with existing literature on ballet dancers (Bettle et al., 2001) and in the general population (Fairburn, Cooper, & Shafran, 2003; Zeigler-Hill & Noser, 2015), a stronger negative relationship was found between eating pathology and self-esteem in ballet dancers, suggesting that self-esteem may be especially important in eating disorder

development and/or maintenance for ballet dancers. In addition, a stronger negative relationship between self-esteem and thinness and restricting expectancies was found in ballet dancers compared to contemporary dancers. While research examining the relationship between thinness and restricting expectancies and self-esteem is limited, much research provides evidence for the association between eating pathologies and thinness and restricting expectancies, whereby expectancies are suggested to be predictors of eating disorder behaviour (Annus & Smith, 2009; Annus, Smith, Fischer, Hendricks, & Williams, 2007; Annus et al., 2008; Atlas, Smith, Hohlstein, McCarthy, & Kroll, 2002; Hohlstein et al., 1998; Smith, Annus, Simmons, Flory, & Hill, 2007).

Findings from the regression analyses suggest that the variables included in this study explain more variance in psychological wellbeing outcomes in ballet dancers compared to contemporary dancers. In line with existing research supporting the association between thinness related learning environments and disordered eating behaviours in ballet, thinness related learning predicted 23% of variance in eating pathologies in ballet dancers (Annus & Smith, 2009; Penniment & Egan, 2012). Although no previous data exists for contemporary dancers, thinness related learning was also a significant predictor in the final model predicting eating pathology. Additionally for contemporary dancers, though non-significant, BMI and maturity timing were present in the final model as positive predictors of eating pathology.

While the regression model for self-esteem in contemporary dancers was not significant, the model for ballet dancers predicted 22% of variance in self-esteem with fewer thinness related learning experiences predicting greater self-esteem. This is consistent with the relationship suggested by the correlations where self-esteem appears more pertinent within the context of ballet training in relation to thinness related learning than in contemporary dance training. Little research currently exists which explores self-esteem and thinness related learning in dance, these findings suggest that it may be an area for future research to consider. Of note, BMI was also a significant predictor of self-esteem for ballet dancers, whereby greater BMI was a predictor of greater self-esteem. This finding would appear to contradict the widely held assumption that a higher BMI is a less desirable attribute for dancers, particularly in ballet. However, this may align with theories, such as the Underdog Hypothesis, which suggest that possessing or developing psychological attributes, such as self-esteem, may enable those with less desirable physical attributes such as higher BMI, to succeed (Gibbs et al., 2012).

Body dissatisfaction was found to be predicted by thinness related learning experiences in both ballet and contemporary dancers, although predicting more variance for ballet dancers. While research has yet to be conducted specific to body dissatisfaction and thinness related

learning experiences in dance, body dissatisfaction is an established risk factor for eating pathology behaviours (Lynch et al., 2008; Seidel et al., 2009; Stice & Whitenton, 2002). However, an association between thinness related learning and disordered eating behaviours has been established in ballet (Annus & Smith, 2009; Annus et al., 2008; Hohlstein et al., 1998; Smith, Annus, Simmons, et al., 2007). Consistent with existing research the findings of this study provide evidence for the relationship between thinness related learning experiences and thinness and restricting expectancies in dancers (Annus & Smith, 2009; Penniment & Egan, 2012). For both ballet and contemporary dancers, thinness related learning was a significant predictor of thinness and restricting expectancies. Thinness related learning experiences predicted thinness and restricting expectancies to a greater extent in ballet dancers than in contemporary dancers. While this finding is consistent with assumptions about the two dance styles, this is the first study to report on thinness related learning experiences in contemporary dancers and as such, further research is warranted.

Greater thinness related learning experiences predicted lower psychological wellbeing in both contemporary dancers and ballet dancers, though accounted for a greater proportion of variance in the psychological wellbeing of ballet dancers. Studies have yet to be conducted on the association between thinness related learning and measures of general psychological wellbeing, however, this finding is consistent with reports that thinness related learning experiences are associated with less adaptive health behaviours (Hohlstein et al., 1998; Penniment & Egan, 2012).

Limitations

There are several limitations which necessitate caution when interpreting the findings of this study. Firstly, ballet and contemporary dancers have been considered as distinct groups, while professional ballet and contemporary dancers frequently practice other dance styles as part of their training. However, it is also acknowledged that while dancers may practice across different styles, their main style dictates the aesthetic demands placed upon them and influences their training regime. Existing research supports this distinction with differences in aesthetic demands and training regimes necessitating differences in body composition and body type (Liiv et al., 2013).

Secondly, there are limitations associated with the measures used in this study. For instance, the psychometric indices of the Dance Experience Questionnaire are unknown beyond basic Cronbach's alphas. This necessitates caution when interpreting the findings from this questionnaire and also highlights the need for further development of this questionnaire as a tool for assessing thinness related learning in dance. Further, alterations made to the Dance

Experience Questionnaire may have implications. The questionnaire was designed for use on a retrospective basis, where in this study it has been used to report current dance experiences. Although this may increase the reliability of responses, not relying heavily on participant recall, modifications may affect the validity and meaning of the measure. In addition, the Psychological Wellbeing scale may have slightly lower psychometric strength than other scales which assess psychological wellbeing due to the brevity of the scale (Diener et al., 2009). In the case of this survey, shorter scales were required in order to increase participation and completion of the survey. Self-report measures of height and weight and utilising these to derive BMI may limit the validity and reliability of findings due to the potential for misreporting and underreporting. Existing research across 26 studies and 39,244 women, suggests that women are likely to overestimate height and underestimate weight when self-reporting, although mean variations between self-reported and measured values are reported to be small (ranging from mean error in height from -0.04cm to 2.53cm and mean underestimation of weight ranging from 0.2kg to 3.54kg) (Engstrom, Paterson, Doherty, Trabulsi & Speer, 2003). The online nature of this study limited the use of more accurate and reliable measures, however, this is a factor to consider in future studies with dancers.

Thirdly, it is important to acknowledge smaller sample sizes due to the nature of the analysis by dance style. It is acknowledged that a larger sample size could widen the applicability of these results. In addition, this study focuses on a specific population of elite professional dancers and therefore the findings of this research may not be generalisable to other populations or even to other samples of dancers.

Finally, the nature of the survey means that data was collected at one time point and therefore does not tell us about the stability of factors such as self-esteem. Temporality of measures is another limitation to consider; while the EDE-Q asks participants to report eating behaviours over the last 28 days, this does not enable an understanding of when the behaviours began and the study is therefore limited in terms of causal assumptions. However, the aim of the study was to provide a 'snap shot' of the characteristics of this sample and to explore the relationships between variables at this time point. Future research should advance these findings through longitudinal studies in order to capture changes over time and to develop a greater understanding of the relationships between such factors in dancers.

2.5 Summary

Diverging from the original hypothesis, there was no significant difference between average age of menarche in the ballet and contemporary groups. However, significant differences in growth related attributes such as weight and BMI were found, with ballet dancers reporting lower weight and BMI compared to contemporary dancers. These differences are likely due to differing aesthetic demands and training regimes which necessitate differences in body composition and body type (Liiv et al., 2013).

Consistent with previous findings (Hamilton et al., 1988; Hamilton et al., 1985), this sample of adult dancers represent a fairly narrow range in terms of maturity timing, with only a small percentage of dancers reporting early maturation. Although early maturing dancers were less likely to be represented at the adult level, they did not differ physically or psychologically from their late developing peers, suggesting that only those early developers with the requisite physical and psychological attributes were retained within professional dance. Whether these attributes are developed by early maturing dancers in order to adapt to the demands of the profession, or are attributes these dancers already possessed, requires further exploration.

As an initial exploration of the relationships between thinness related learning experiences, maturity timing and psychological wellbeing, this study confirms the importance of the learning environment. Thinness related learning experiences appear to be more strongly associated with psychological wellbeing variables in ballet dancers than in contemporary dancers. This may reflect the differing demands of the two dance styles in terms of expectations for thinness and a specific physique (Liiv et al., 2013). In line with the hypothesis, thinness related learning appears to be more salient for ballet dancers and accounts for a greater proportion of variance in levels of body dissatisfaction, eating pathologies, self-esteem, thinness and restricting expectancies, and general psychological wellbeing compared to contemporary dancers.

A greater understanding of how psychological wellbeing is affected by maturing within a dance training context is needed. There is currently only a small base of evidence in dance which focusses specifically on adolescent ballet dancers (Brooks-Gunn & Warren, 1985). This existing evidence supports the theory that earlier maturation is associated with poorer psychosocial outcomes (Brooks-Gunn et al., 1989; Brooks-Gunn & Warren, 1985) and further evidence needs to be generated to advance this. It is worth considering for future research that while cross-sectional studies provide a useful starting point in areas where data is scarce, they do not provide an in depth understanding of processes such as puberty, where change occurs over time. A greater understanding of how dancers of varying maturing timing succeed

in the profession, necessitates the use of different approaches. Future research should pursue longitudinal study or qualitative explorations of lived experiences which may capture the 'journey' of this adaptation more effectively and help us to address some of the questions which arise from the current study. Further research is recommended in order to explore these relationships in greater depth and to assess whether there are any qualitative differences in the experiences of dancers of varying maturity timing.

Chapter 3

Growing Up in Dance: Lived Experiences of Elite Adult Ballet Dancers

3.1 Introduction

This second study in this thesis was designed to build upon the findings described in study one (Chapter 2). Although early maturing dancers were less likely to be represented at the adult professional level, they did not differ physically or psychologically from their late developing peers. This suggested that only those early developers with the requisite physical and psychological attributes were retained within professional ballet and contemporary dance. Thinness related learning also appeared to be more salient and accounted for a greater proportion of variance in psychological wellbeing in ballet than in contemporary dance. Accordingly, it was proposed that a qualitative exploration of lived experiences in adult ballet dancers may capture the ‘journey’ of maturing and developing in a dance context more effectively. Such an approach should enable insight into the learning experiences of early, on time, and late maturing dancers, the impact of pubertal timing on perceptions of wellbeing and physical development, and why some early maturing individuals are able to be retained within the dance system. Further, it was hoped that a retrospective analysis of the dance experience as it related to pubertal timing would enable a greater understanding of how psychological, sociocultural and biological factors interact within a dance training context.

Existing literature has examined many different factors associated with success in professional dance. When considering how dancers succeed, experiences of puberty and how dancers adapt to puberty, as well as physical and psychological characteristics, may be important (Brooks-Gunn et al., 1989; Brooks-Gunn & Warren, 1985; Hamilton et al., 1988; Hamilton et al., 1997; Hamilton et al., 1992; Mitchell et al., 2016; Walker, Nordin-Bates, & Redding, 2010).

Factors such as weight and BMI are closely related to pubertal development and different outcomes have been found relative to differences in maturity timing (Gay et al., 2014; Malina et al., 2004). Additionally, maladaptive psychological outcomes have been associated with differences in maturity timing (Brooks-Gunn et al., 1989; Brooks-Gunn & Warren, 1985; Ellis, 2004; Mendle et al., 2007) and also with negative experiences of puberty and negative perceptions of physical change (Moore et al., 2016). While study one of this thesis (Chapter 2) found that early maturing dancers were less likely to be represented at the adult level and they did not differ physically or psychologically from their late developing peers, early and on

time dancers growing up in dance may vary considerably in their experiences of puberty and how they adapt to pubertal changes compared to later maturing dancers (Brooks-Gunn et al., 1989; Moore et al., 2016). Moreover, qualitative differences in their lived experiences may point to strategies for overcoming any challenges associated with earlier maturation. Although current understanding of how this occurs is limited, available literature suggests that those who 'survive' within the ballet profession are likely to be qualitatively different from those who dropout.

Existing research suggests that it is difficult for earlier maturing individuals to succeed in ballet and therefore the aim of the present study is to understand more about characteristics associated with succeeding in the profession across individuals of varied maturity timing (Hamilton et al., 1997). Literature points to both physical and psychological implications of puberty for dancers and this study aims to explore how dancers negotiate the challenges of growing up in dance and ultimately how they succeed (Brooks-Gunn et al., 1989; Brooks-Gunn & Warren, 1985; Daniels et al., 2001; Mitchell et al., 2016). Understanding more about the traits and characteristics which contribute to success could inform approaches to encourage healthier adaptation at puberty for dancers of varying maturity timing.

Dance, in particular classical ballet, is highly stylized and subscribes to a very specific body type (Hergenroeder et al., 1993; Kadel et al., 2005; Liiv et al., 2013; White et al., 2004). While this is a requirement of the art, ballet is anaerobic meaning that the ideal physique cannot be achieved through dancing alone, thus being naturally thin is advantageous (Hamilton et al., 1997). As a performing art, and not simply an athletic activity, ballet is unique in its requirements; dancers are required to be both artists and athletes (Hamilton et al., 1992). Previous researchers have applied the concept 'survival of the fittest' when describing the physical and mental stresses inherent to attaining success in the profession (Hamilton et al., 1997; Hamilton et al., 1992). Existing literature stresses the importance of conforming to specific physical characteristics, suggesting that those who do not possess these attributes may incur both physical and psychological problems due to attempts to compensate for a less than ideal body (Hamilton et al., 1985). For example, ballet dancers who mature on time or early, have a negative body image, or who are not genetically thin, appear to be most vulnerable to disordered eating (Brooks-Gunn et al., 1989; Hamilton et al., 1988).

In terms of physical injury, research suggests that even minor anatomical and functional discrepancies can lead to injury due to the constant repetition of steps (Hamilton et al., 1997). Decreased plie and ankle motion and significantly less turnout have been associated with professional ballet dancers experiencing four or more previous injuries (Hamilton et al., 1992).

Moreover, several studies have examined the physical characteristics of successful professional ballet dancers. These characteristics include an average delay in menarche of two to three years, being below ideal weight (averages have been reported at between 11% and 15% below ideal weight), being naturally thin (reporting less familial obesity or eating problems), strong hips and ankles, equal leg length, symmetry in hip motion, increased external rotation of the hip and plantar flexion of the foot-ankle complex (Hamilton et al., 1988; Hamilton et al., 1992).

Although much research focuses on physical characteristics as opposed to the psychological, research has noted the interplay between the two. For example, in some cases psychological issues such as eating pathologies are thought to develop in order to compensate for suboptimal technique or physique (Hamilton et al., 1997).

Methods of selection have been highlighted as a way to ensure the 'survival of the fittest' within ballet training systems and subsequently in company dancers. Dancers who succeeded through a system of early selection (selection into full-time training as a child) and those who joined the profession through later selection (through audition at company level) report differences in psychological wellbeing. One study found associations between more highly selected ballet dancers, those who are selected for full-time training in childhood, and reduced incidence of disordered eating behaviours (Hamilton et al., 1988). These findings have been used to advocate stringent early selection processes throughout classical ballet training as opposed to later selection, whereby those with less amenable characteristics are 'weeded out' and those who remain within the system have 'survived' a strict process of formal selection throughout their developmental years (Hamilton et al., 1988). There is little evidence to support the contention that early selection ensures greater psychological wellbeing. Understanding the lived experiences of those who have made it into the profession may elucidate the relationship between training experiences, selection and wellbeing.

Little research exists which specifically identifies the psychological characteristics of successful ballet dancers. Existing studies report a high prevalence of perfectionism (Goodwin et al., 2014; Nordin-Bates & Abrahamsen, 2016; Penniment & Egan, 2012; Zoletić & Duraković-Belko, 2009) and the importance of perseverance (Chua, 2014a, 2014b), psychological skills (Brassington & Adam, 2003; Noh, Morris, & Andersen, 2007; Walker et al., 2010) and social support (Pickard, 2006; Walker et al., 2010). Mental toughness or resilience is also highlighted as important, though there is little research specifically examining the resilience of professional dancers (Moyle, 2013; Pickard & Bailey, 2009).

While there is not yet research in this area specific to dancers, extant literature highlights the importance of experiences of puberty for subsequent psychological wellbeing (Moore et al., 2016). Moore and colleagues' (2016) findings support the association between experiences and perceptions of puberty and disordered eating. How girls perceive pubertal experiences, in particular physical changes and preparedness, is associated with disordered eating symptoms; disliking physical changes of puberty and feeling unprepared relating to disordered eating symptoms, feelings of ineffectiveness and difficulties with interpersonal relationships (Moore et al., 2016). These negative recollections of puberty were found to outweigh protective factors such as self-esteem. This finding may be especially relevant to those who experience puberty in a ballet environment where puberty is perceived negatively and normal pubertal changes are heavily stigmatised (Mitchell et al., 2016). In addition, eating pathologies remain a prevalent issue in professional dancers and those in training (Arcelus et al., 2014). Therefore, experiences of puberty may be especially relevant to both general psychological wellbeing and disordered eating behaviours and, subsequently, to the ability of dancers to thrive in the ballet profession.

Research by Pickard (2009, 2012, 2013, 2015) explores the experiences of young ballet dancers in vocational training and acknowledges implications of puberty, though no research currently exists which looks specifically at dancers' experiences of puberty. Existing research suggests that experiences of growing up in ballet may amplify many of the challenges that are associated with puberty (Brooks-Gunn et al., 1989; Brooks-Gunn & Warren, 1985; Mitchell et al., 2016). In order to generate a greater understanding of these issues, this study aims to explore lived experiences of growing up in a ballet training context and to build a greater understanding of how individuals succeed in dance. Interviews will explore journeys into the dance profession, alongside perceptions of puberty and how dancers negotiate these developments during their training.

3.2 Methodology

This study applies a qualitative design utilising semi-structured interviews and interpretative phenomenological analysis (IPA). Semi-structured interviews were used to obtain experiential accounts from adult dancers about growing up in a ballet training context. A reflective approach was adopted prior to interviews and during the analysis process, with the researcher acknowledging her own experience in dance (Patton, 1990).

Interviews aimed to generate an understanding of what characterises elite ballet dancers' experiences of growing up in dance. Interviews explored experiences of growing up in dance, perceptions of change and responses to puberty, and subsequent implications (adaptive/maladaptive) in order to explore psychological factors and physical characteristics associated with success and healthy adaptation in adult ballet dancers. For example, 'How would you describe your overall experiences of growing up in dance?', 'How do you feel your own physique conforms to ballet ideals?', 'Do you feel any of these changes affected your dance training?'

More specifically, the interview schedule was designed to explore characteristics which enable individuals to adapt positively and to thrive within the dance profession, with particular interest in factors highlighted as problematic through study one, including thinness related learning experiences and body dissatisfaction. Other potential factors of interest included genetic suitability (i.e. whether perceived genetic suitability for ballet can 'cancel out' the more negative effects of being an early maturing ballet dancer) and perceptions of maturity timing and healthy adaptation compared to more objective measures.

Researcher's positionality

Factors such as the researcher's background in ballet and the qualitative approach utilised in this study directly influence the epistemological and ontological standpoints adopted. This research is framed by a social constructionist ontology, the view that society is actively and creatively produced by human beings (Bryman, 2016). That is, the researcher presents a specific version of social reality, rather than one that can be regarded as definitive (Bryman, 2016). Therefore, this perspective considers the roles of perception and cognition within an experiential account and acknowledges researcher effect upon data collection and analysis (Shaw, 2010; Storey, 2016). This requires the researcher to acknowledge her own experiences and perceptions of the ballet world in order to separate these from the views of participants. The researcher trained vocationally in ballet throughout adolescence and matured 'on time' relative to norms for dancers. These experiences may influence how the

researcher interacts with interview data in terms of potentially identifying with the experiences of those maturing on time and with her own experiences of the ballet training environment, its ideals and norms. This research maintains the epistemological standpoint of interpretivism which holds that reality is socially constructed and each individual creates their own reality, and therefore there are multiple interpretations and meanings which can be derived (Lewis-Beck, Bryman, & Futing Liao, 2004).

Sampling

A purposive approach to sampling is required for interpretative phenomenological analysis, whereby the researcher seeks a closely defined group of participants for whom the research question will be significant (Storey, 2016). Participants were recruited from the sample used in study one (Chapter 2), with selection criteria narrowed to ballet dancers only. Respondents who supplied an email address, expressed an interest in participating in further research and selected ballet as their main style of dance were contacted via email.

A sample size between six and ten is recommended for conducting IPA. This provides enough cases to examine the similarities and differences between participants without generating excessive amounts of data which may overwhelm the researcher (Turpin et al., 1997). Fifty-five dancers were contacted with the aim of generating a sample size of ten dancers to interview across a range of ages, physical and psychological characteristics.

Nine dancers responded and were willing to take part in an interview. The average age of participants was 22.8 with a range of 18-34 years. Fifty-five percent (55.5%) of participants were from the United States and 44.5% from the United Kingdom. In terms of ethnicity, all participants identified as white. All participants selected ballet as their main style of dance, with an average starting age of 4.8 years. All dancers were attending or had completed vocational training. The mean number of years in full-time training was 7.2 with 44.4% (n=4) of participants currently in full-time training, 33.3% (n=3) dancing professionally and 22.2% (n=2) semi-professional or recently graduated.

In terms of maturity timing characteristics, four participants were on time, three were late and two were early. Maturity timing was derived based on the average age of menarche in the total sample from study one, which was 13.1 years. Early maturing dancers were defined as those with onset of menarche occurring one year or more in advance of this age and late maturing dancers as one year or more in delay of this (Malina et al., 2004). The average height of participants was 160.7 centimetres and average weight was 54 kilograms.

Procedure

Data collection took place across several months. Initial contact was made with each participant via email with information provided about the nature and topic of the interview. Participants then had the opportunity to ask questions about the research before agreeing to participate.

The interview schedule (Appendix B) was piloted in advance of conducting interviews. This process prompted amendments to the vocabulary used (e.g. classmates instead of peers) to ensure the understanding of participants. Interviews were conducted via Skype due to the international nature of the participant group. Skype interviews using video enable an equal authenticity level to face to face interviews with access to both verbal and non-verbal cues (Bertrand & Bourdeau, 2010; Janghorban, Roudsari, & Taghipour, 2014; Sullivan, 2012). Each interview was a minimum of 30 minutes in duration (ranging from 30 minutes to 56 minutes) to allow for obtaining the rich and descriptive data necessary for conducting IPA (Shaw, 2010).

Ethics

The investigation of experiential accounts requires thorough consideration of ethics and a sensitive approach (Mitchell et al., 2016). Procedural ethics have been followed, with approval received from the University of Bath Research Ethics Approval Committee for Health (reference: EP 15/16 266) (Bath, 2014; Guillemin & Gillam, 2004).

Participants were presented with an information sheet via email (Appendix B) prior to agreeing to participate, with an opportunity to ask questions about the study and data collection process. Prior to the interview taking place each participant was emailed a consent form, this was discussed prior to the interview with an electronic signature indicating consent to take part.

Ethical issues were anticipated prior to the data collection phase, enabling any issues during data collection to be managed effectively (Guillemin & Gillam, 2004). For example, a participant becoming upset or emotional when describing their experiences. It was anticipated that this may be possible given the personal nature of the topic and an action plan was put into place, though was not needed. In this situation the interview would be paused and the participant given a few minutes to collect themselves. The interviewer would then ask if the participant would like to take a break, end the interview or to continue, if either of the former are requested the recording would be stopped. The two ethical dimensions, ethics in practice and procedural ethics, can be bridged by consideration of reflexivity: in reflexive research, the researcher regularly reflects upon her actions and role within the research process and within

the analysis of data (Guillemin & Gillam, 2004). In order to acknowledge and account for researcher effect and positionality, a reflexive stance has been adopted throughout.

Interpretative Phenomenological Analysis

Interpretative phenomenological analysis (IPA) is a qualitative method which draws on the theoretical traditions of phenomenology and hermeneutics. The focus of this method is based around phenomenology, with the aim to develop an understanding of the meaning of human experience and how individuals make sense of their personal and social world (Larkin, Watts, & Clifton, 2006). Hermeneutics contributes to the analytical approach of this method. The process is heavily interpretative and dynamic, with the researcher playing an active role (Shaw, 2010; Smith, Flowers, & Larkin, 2009; Storey, 2016).

In order to generate a greater understanding of lived experiences, an exploratory qualitative approach is recommended (Smith et al., 2009). Interpretative phenomenological analysis (IPA) is concerned with the detailed examination of personal lived experience, the meaning of experience to participants, and how participants make sense of that experience (Smith, 2011). IPA is a dynamic process which places an emphasis on the active role of the researcher, this is particularly apparent during the analysis stage which can be described as “engaging in a ‘double hermeneutic’” (Smith, 2011, p. 10). In this process, the researcher’s role is to make sense of the participant trying to make sense of what is happening to them (Smith, 1996; Smith, 2011; Storey, 2016).

IPA can be conducted using various types of experiential account, such as a diary or interview. This research sought to explore particular questions and therefore an interview method was deemed most appropriate (Smith et al., 2009; Storey, 2016). In utilising a phenomenological approach, the interviewer seeks to elicit rich, descriptive responses from participants. This is facilitated by a semi-structured interview format, with the interview guided by the schedule as a framework rather than dictated by it (Smith et al., 2009; Storey, 2016). A particular advantage of using an interview method is the face-to-face interaction which positions the researcher in real-time with the participant, a situation which enables the researcher to pursue topics of interest which may arise during the course of the interview (Storey, 2016). Further, a semi-structured interview format provides the researcher with the freedom to move away from set questions and creates opportunities to discover topics which had not been anticipated by the researcher, but which might be pertinent to the overarching questions of the research (Storey, 2016). As the aim is to explore the lived experiences of participants, the flexibility to follow the participant’s interests or concerns is central to an IPA approach (Smith et al., 2009). While this

approach may lead to lengthy responses which will be more time-consuming to transcribe, it aligns with the aim to understand each individual's experiences of growing up in dance.

Interview Schedule

The interview schedule was designed to explore characteristics which enable individuals to adapt positively and to thrive within the ballet profession, with particular interest in factors such as thinness related learning experiences and body dissatisfaction.

The design of the interview schedule is intended to ease the interviewee into the subject matter, asking for more general perceptions of the ballet world at the beginning such as 'Do you think there's an 'ideal body' to have for ballet? Can you describe it?' and 'For aspiring dancers, do you think puberty is seen as a good or bad thing? Helpful or not helpful for ballet?' before moving onto more personal questions pertaining to perceptions of their own experiences growing up in dance (Storey, 2016). This approach has been adopted in order to increase the success of capturing the data sought in the interviews as participants may be unwilling, or find it difficult, to talk about their own experiences.

The format of the semi-structured interview caters for variation in participants, allowing for the sequence of the schedule to be deviated from, questions to be omitted where necessary or to be phrased differently. The interviewer must decide what is appropriate for each participant (Storey, 2016). For example, in answering one question, a participant may answer several others in the process, while another participant may be happy to discuss their own perceptions immediately.

At the conclusion of each interview, the researcher allotted up to 30 minutes to reflect and note down any points of potential significance, these notes were then referred back to during the analysis process (Mitchell et al., 2016). The initial thoughts of the researcher may be crucial in identifying similarities or disparities between individuals (Storey, 2016).

Transcription

Interviews were recorded using two devices, a dictaphone and a mobile phone device, to ensure capture of data. Interviews were transcribed verbatim, with transcription undertaken by an external company due to the timeframe of the research and the volume of data. Transcription completed by an external party has both benefits and limitations. A potential limitation is that the researcher cannot use the transcription process as an opportunity to become more familiar with the data. This can be mitigated by written reflection at the close of each interview and a comprehensive approach to analysis. Benefits of transcription being

carried out by an external party include limiting researcher bias during the transcription process, as this process inherently entails both judgement and interpretation on the part of the transcriber (Marshall & Rossman, 2006).

To ensure anonymity, participants' names have been removed from interview transcripts (Bryman, 2004) and renamed, P1 – P9 for the purpose of presenting the findings (See Appendix C for participant details). The nature of conducting narrative based interviewing poses a risk to anonymity and confidentiality, for example, where places or names are referred to (Kvale & Brinkman, 2009). Subsequently, any identifying information such as this has been removed from the interview transcripts and any quotes presented in the findings. Data was stored on a password-protected external hard drive with no identifying information present.

Data Analysis

The process of IPA is highly interpretative and detailed, with the objective to make sense of people's experiences (Mitchell et al., 2016). The process of data analysis and the generation of themes from the data is heavily influenced by the researcher; her knowledge of surrounding literature and own experiences (Patton, 1990). Adopting a reflexive stance encourages the researcher to reduce bias where possible and to remain aware of her own role within the process of analysis (Guillemin & Gillam, 2004). In addition, reflexivity enables the researcher to demonstrate transparency in both the research process and subsequent findings. In qualitative research, in particular research which utilises interpretative phenomenological methods, it is impossible for the researcher to remain 'outside' of the research, making reflexive research an important tool for the qualitative researcher (Holland, 1999). Moreover, as a phenomenological approach actively acknowledges the role of the researcher, maintaining this stance throughout all phases of the research creates a consistency in the position and approach of the researcher (Patton, 1990).

The process of IPA analysis can be described in two phases. The first aim is to develop an understanding of the participants' world and to describe what it is like (Larkin et al., 2006). This involves focusing on participants' experiences of a specific event. It is acknowledged that access to 'experience' is complex and inherently partial (Smith, 1996); the account is always constructed by both the participant and the researcher (Larkin et al., 2006). The outcome of this first stage is to produce a psychologically informed description (Larkin et al., 2006). The second phase aims to develop an interpretative analysis of the data, positioning the description within a wider social, cultural and theoretical context (Larkin et al., 2006).

Within these two phases the data is analysed in steps: Summarising the experiences described by the participant; examining what this means; and examining an individual's self-reflections to explore what they make of their own experience (Smith & Eatough, 2016; Storey, 2016). In the first phase, several close readings of the interview transcript are required to ensure that any interpretations made in the latter stages of the analysis are grounded within participant accounts (Storey, 2016). During these readings, notes are made on any points of potential significance, for example, comments on initial ideas regarding meanings. At the end of this process a descriptive summary is formed of what the participant has said, the issues that have been identified, what events are relayed, and the feelings which are expressed (Shaw, 2010; Storey, 2016).

Initial ideas are transformed into more specific themes and phrases, which form the first stages of interpretation, where the researcher asks 'what interpretation can be drawn to answer the research question?' (Shaw, 2010). Themes are then organised into clusters, reducing the data by establishing connections between the preliminary themes and clustering them accordingly (Smith et al., 2009). From this, a table of final themes is presented for each individual participant. In IPA each case must be fully analysed before moving onto the next case. Once all cases have been analysed and allocated final themes, comparisons between cases across the group are made (Smith et al., 2009). In this analysis three superordinate themes emerged with sub-themes, and representative quotations were selected.

Reflexivity

Throughout the data analysis process the researcher is recommended to keep a reflective diary, where thoughts on how to interpret the meaning of issues, events and feelings are detailed (Shaw, 2010; Storey, 2016). Thus, the researcher builds an understanding of the participant's experience gradually, throughout the analysis. This active construction of interpretations is prominent in reflexive research; whereby the researcher simultaneously constructs interpretations ("what do I know?") and questions how those interpretations came about ("How do I know what I know?") (Guillemin & Gillam, 2004). This interpretative process, together with the identification of themes, culminates in the final stage of analysis; a narrative account of the interplay between the interpretative activity of the researcher and the participant's account of their experience in their own words (Mitchell et al., 2016; Smith et al., 2009; Storey, 2016). These stages of analysis form an audit trail to illustrate how the interpretations made are based in the data. This ensures that it is possible for someone else to track the analytic journey of the researcher, from the raw data to the final table of themes (Shaw, 2010; Storey, 2016).

Adopting a phenomenological approach to the data collection process necessitates acknowledgement of researcher bias and experiences. This approach requires the researcher to reflect on her experiences with the subject under study prior to data collection. Having trained vocationally as a ballet dancer, the researcher may have preconceptions which may bias her approach. This previous experience can be seen as an asset to the study as it enables the researcher access to the ballet world and to participants. However, it is acknowledged that this previous experience means that the researcher comes to the topic with her own experiences and assumptions. Prior to conducting the study, the researcher reflected on her own experiences, including her time in vocational ballet training as an adolescent and her experiences of maturing on time in this context. This phenomenological approach aids the researcher in separating the experiences of her interviewees from her own and crucially enables a reflexive stance to be taken (Patton, 1990; Seidman, 1998). This reflective process is ongoing and enables the researcher to gain perspective from her own preconceptions and to be aware of researcher effect when working with data (Patton, 1990; Seidman, 1998).

Member reflections were carried out with participants in order to explore the existence of any contradictions and differences in knowing (Schinke, McGannon, & Smith, 2013; Smith & McGannon, 2017). Due to time constraints, transcripts and interpretations were shared with participants via email and the researcher encouraged a dialogue with the aim to generate additional data or insight. However, it is noted that encouraging participants to critically engage in this dialogue may have been better facilitated in person or via skype.

3.3 Findings

Growing Up in Dance: An Exploration of the Lived Experiences of Elite Adult Ballet Dancers

Elite ballet dancers' experiences of growing up in dance were characterised by three key themes. (1) Conflict and struggle, three sub-themes describe factors which influenced the extent to which dancers experienced these struggles: the timing and extent of development, the dance context e.g. seriousness/level of training, and dance teacher behaviours and approach. (2) 'Coming to terms with it': adult dancers described 'coming to terms with' pubertal changes as a critical part of their experience. Within this, acceptance, adapting to or compensating for changes, and social support were described as pivotal. (3) 'Grit and Grace' describes the characteristics or behaviours adult ballet dancers acquired or already possessed in order to survive within the profession: learning to question teacher wisdom, a strong work ethic and having perspective. See Figure 4 for hierarchy of themes. Each theme is subsequently discussed and selected quotations from participants are presented. For further quotations see Appendix C.

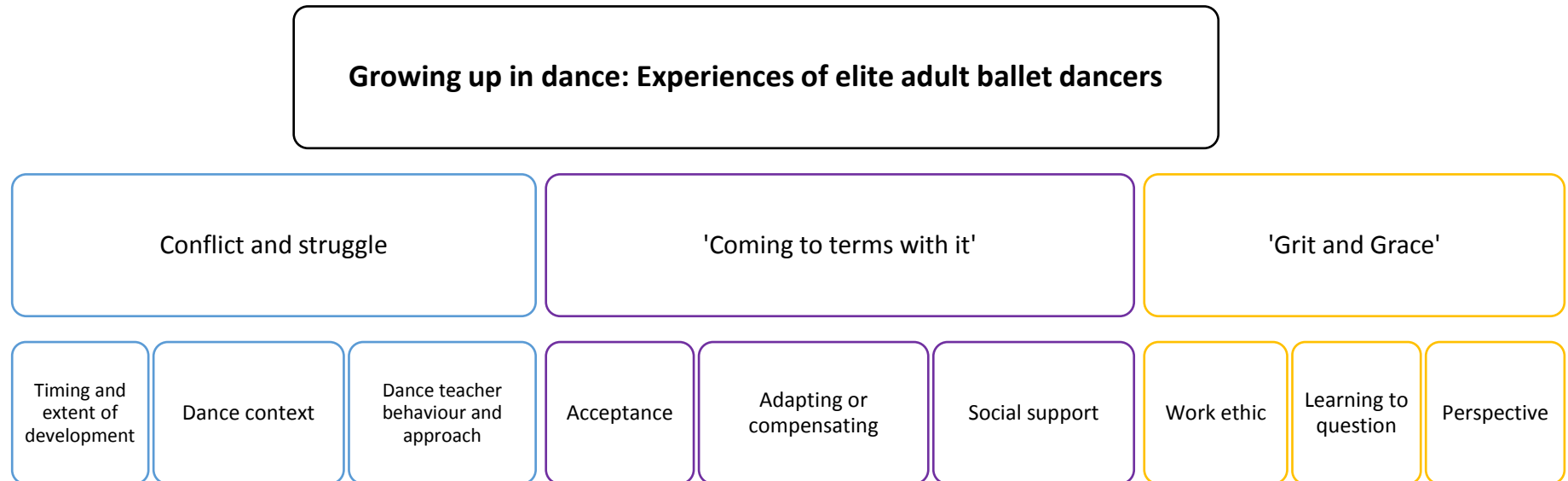


Figure 4. Hierarchy of themes characterising experiences of growing up in dance for elite adult ballet dancers

Conflict and struggle

In describing their experiences of growing up in dance, dancers outlined three key areas of conflict: the timing and extent of physical development, the dance context i.e. seriousness of training and style of dance, and dance teacher behaviour and approach. These factors appeared to influence the extent to which dancers struggled in their adolescent to young adult years.

Timing and extent of development

The timing and extent of physical development was described as pivotal in terms of experiences growing up in dance. Dancers described a conflict between normal physical development at puberty and the prescribed ideals of ballet "...I started to get curvy, and you're not supposed to be curvy, as a dancer; they want you to look like you have the body of a twelve or thirteen-year-old, for your whole life" (P1, p.3, line 83-86).

The extent of development was particularly important for ballet dancers. For earlier maturing dancers this was perceived as especially important; minimal physical development, perhaps mitigating key disadvantages associated with earlier maturation. Dancers who described a smaller growth spurt in height and minimal breast development experienced less difficulty adapting, due to relatively lesser functional and physical change.

I was fairly lucky in a lot of ways... my boobs didn't get that much bigger. I didn't have breasts too big for ballet and I didn't... I didn't gain a ton of weight or have a massive growth spurt that completely limited my flexibility.

P4, p. 7, line 203-213

The timing of puberty was important for two main reasons. Firstly, the seriousness and level of training at the time of puberty. For example, experiencing puberty in a less serious training context, outside of the context of vocational training, was described as beneficial. This could encompass both early and on time maturation depending upon whether the dancer began full-time training at an earlier or later age.

I think it didn't make it as difficult in dance as you might expect, because, since I was so young, I wasn't very serious. I mean, in life it was kind of hard because I had boobs and I got my period and I was twelve, but I think in dance it wasn't as big a deal, actually. I know that's kind of surprising.

P4, p. 4, line 71-74

While for later maturing dancers, puberty coincided with more serious training.

...for myself when I was taking dance very seriously I was just going through it and it wasn't really a concern until I was probably 16, and then, obviously, that's when all the dieting starts and you have to be very careful with what you're eating...

P9, p.3, line 87-90

Secondly, dancers were able to identify benefits for both early and late maturation. Dancers who experienced earlier maturation described advantages of having time to adjust and getting to know their body before more serious training commenced. In comparison, dancers who experienced later maturation described the benefits of 'seeing it happen to other people' and feeling more prepared.

I went through puberty fairly young. I was twelve, which, I think, was horrible at the time, but I think it was better because I had more time to adjust. I had more time to come to terms with what my body was after puberty. But I know girls who go through puberty at sixteen or seventeen and then they are, all of a sudden, dealing with a completely different body and they're like, "I don't know what to do with this."

P4, p.3, line 58-63

Dance context

The dance context was also described as critical when growing up in dance. The dance context includes factors such as the training context i.e. recreational or vocational, and demands of the dance style in terms of physique, and conventions of the dance training environment such as peer comparison and weighing. Dancers described how experiences in different training contexts during adolescence i.e. recreational or vocational and the age at which they specialised (began full-time training) in ballet, shaped expectations of their adult physique, influenced their feelings about puberty/pubertal change and helped or hindered their acceptance of those changes.

Some dancers described developing an almost distorted image of themselves where, in dance, they were 'fat' or 'overweight', yet objectively, they were not. One dancer describes coming to terms with this in adulthood, whereby 'fat' or 'strong and sturdy' becomes normal and 'petite'.

Before people told me I was fat, I thought of myself as strong and sturdy... prior to puberty I just thought of myself as strong and I was always proud of it. I was like, "I'm really strong." Then suddenly my idea of myself as being sturdy and stocky was a word my mother always used; "You're sturdy. You're stocky. You're not like other girls, you're

a stocky build," which is totally not true because now I'm the weight I should be as an adult woman and I'm what everyone calls petite.

P6, p.8-9, line 276-284

Dancers described their struggles in coming to terms with pubertal changes, and the realisation through experiencing different dance environments, of 'what I'm supposed to look like':

I think it took a long time to come to terms with it. I really didn't like it, and I would try and, yes, stop and think I needed to eat less because I was getting bigger and I really didn't like it... when I was training it was more ballet than anything else and especially if, at the weekend, I went to associate class for pre-vocational training so then it would be like... in my local dance school I wasn't really that bothered, but when I was there and it was more serious, it was like everyone was trying to get that physique and knew what they wanted. Aspiring to be a professional dancer it was like, "Oh, is that what I'm supposed to look like?"

P3, p.5, line 100-109

Equally, dancers described a self-awareness of 'right and wrong' physique from a very early age: "...it can be really detrimental when you're nine and you have an opinion about your thighs" (P6, p.4, line 110-111). Dancers who specialised later i.e. started full-time ballet training at age 16 upwards, described the benefits of having a 'normal childhood'.

Aspects of the ballet training environment facilitated feelings of struggle and conflict at puberty. In addition to mirrors and dance attire, one dancer reflected on being weighed.

...it would be announced, "We're weighing you all today. You all line up outside the office." We'd all try and go to the loo thinking if we had a wee then we'd be a bit lighter and the director would laugh at us and say, "That's not going to make any difference." He'd write down our weight, etc. That was the first time ever that anyone had ever told me that I need to lose weight, it was a bit of a shock.

P5, p. 8, line 272-275

Dance teacher behaviour and approach

Dancers described teacher behaviours and their interactions with the teacher as key. How teachers responded to pubertal changes, and any subsequent changes in the quality of their interactions with the teacher was described as a struggle for many of the dancers. In addition, the way in which dance teachers approached puberty and their actions around that time were perceived as important.

Dance teacher approaches to puberty were picked up on by dancers. Puberty was described almost as 'the elephant in the room' with many dancers describing a more passive teaching approach:

...It was like I knew, on a conscious level, that I was fine and that my body was just doing what it would normally do but I think, since there were girls who were just like, some were smaller than me because they hadn't gone through puberty yet... I guess it was a little upsetting and it definitely affected my confidence, and the fact that it was not acknowledged made it worse, because I knew it, but no-one just said it.

P4, p. 7, line 183-187

Where more direct approaches were used, these were generally described as negative. Many dancers described their teacher's responses in terms of being told to lose weight: "I think it did affect my training a little bit because my teachers were suddenly like, "You need to lose weight. You have to lose weight." I think it made me feel a little bit stressed out and confused about what was suddenly different" (P5, p.5, line 129-131). Others were threatened with losing roles in performances if they could not lose enough weight: "...They took parts away unless I could lose the weight. I was only 11 and I didn't know how to lose weight at 11 years old so I ended up losing the part in the show (P6, p.3, line 62-64).

Dancers also reflected on how pubertal changes led to changes in their interaction with the dance teacher: "...it became very clear, as soon as I got there, that they weren't going to treat me like they treated everybody else, because I had body-type issues...They started not even letting me learn things, and just kind of ignoring me altogether..." (P1, p.5, line 198-203).

...I was a little bit shocked, definitely taken aback when they pulled me into their office...from the end of the last year to over the summer and then to the beginning of that year, that the relationship between us, was not the same so I said, I want to talk to you, I want to see what's going on and their answer was literally, your body has changed and I'm like, this is what this is all about, are you kidding me? And they were like, you don't see this? ...It's also just to see someone that you thought you knew and I loved these teachers and they really liked me too and then to come back and be treated like that, made me feel really bad about myself. So, I had to work much harder, because they weren't going to look at me for my body, maybe they would look at me for my work ethic or whatever. So, that was hard.

P8, p.8-9, line 392-401

Coming to terms with it

Dancers described 'coming to terms' with pubertal changes as a critical part of their experience. Within this, acceptance, social support and adapting to or compensating for changes, were described as pivotal.

Acceptance

Dancers described acceptance of their adult physique as an important part of growing up in dance.

... you just have to learn to work with what you have, and when I was growing up I thought that I could change everything about myself, if I just tried hard enough. But, there are great things about having bigger body types, and I've been in ballet companies and they are all super slim, and I mean super muscular and everything, but they are all built completely differently, and you can see that they have all worked in totally different ways to get there. So, I don't think there is one set route to get to a professional career.

P1, p.9, line 386-396

One dancer described acceptance in terms of coming to the realisation, as an adult, that the prescribed ideal of a pre-pubescent physique may not be so desirable after all.

So, my feelings about my body, I would say that they were negative for a while and definitely not constructive but, I suppose, after... that was while puberty was happening, and then afterwards that's when they then changed to being more positive again and realising that, actually, it's not desirable to look like a child anyway, in dancing. That's not a great physique. So I think there are positives to going through puberty.

P3, p. 9, line 233-238

Adapting or compensating

While accepting pubertal changes, dancers described having to adapt or having to compensate for some of the aspects of their physical characteristics they perceived as less than ideal: "I just tried to pretend that they didn't exist. I just tried to push on through it, and like I said, make people forget that I had those flaws, by trying to make my assets greater" (P1, p.7, line 288-290) and "...I was always aware that I wasn't the girl with the really crazy extension and I didn't have the long legged, skinny ballet body but I was really determined to be good at everything else" (P6, p.6, line 185-187).

Social support

Social support from peers, parents and sometimes teachers, was described as pivotal in terms of 'coming to terms' with puberty and physical changes. In many cases this social support was described as critical in terms of preparing dancers for puberty, helping dancers to accept changes and to be realistic, and in supporting them to adapt.

For some dancers the realisation that their peers were experiencing the same changes was reassuring.

... my class was all girls, as well, I feel like in between lessons, kind of a group... because everyone was going through it about the same time, you would just chat with each other and you'd be like, "Oh, it's happening to everyone." So then, as a collective, it was okay. I feel that was the main, like, talking to your friends, "Oh yes, you're getting bigger too."

P2, p.5, line 82-86

Grit and Grace

The characteristics or behaviours adult dancers described acquiring or possessing in order to survive within the ballet profession can be summed up by the term 'Grit and Grace' which one of the dancers used to describe these qualities: "you have to have a little bit of luck on your side but you have to have that grit, you know, kind of, grit and grace at the same time to be able to sustain, to first get into the – to a company but then to be able to sustain it" (P9, p.3-4, line 150-153).

Work ethic, learning to question authority figures such as the dance teacher, and perspective, were described by dancers as critical to their success in ballet.

Work ethic

Possessing a good work ethic from an early stage was described by many of the dancers as integral to their success and to thriving in the ballet profession: "...going to my first summer programme. It was when I was about twelve, and I just figured out what being a serious dancer actually meant. I think had I not gone there and done that I wouldn't have gained the work ethic I needed to pursue dance more fully, later" (P5, p.4, line 105-108).

Within this, enjoyment of the process of improving without necessarily having an 'end point' was described as important.

But the thing is with ballet as well, you can never be like, "I'm ready," because you'll never be ready. You can always make something better and always make something more perfect. It's nice that you come to realise this and you just enjoy the process of improving yourself and not actually achieving any goals as such.

P7, p.3, line 60-63

Learning to question

Learning to question teacher and authority figure 'wisdom' was described as an important skill for survival in the ballet profession and as an important learning curve, in some cases pivotal, for coming to terms with changes "Just taking everything with a grain of salt and evaluating everything. Still listening and paying attention but knowing that one opinion isn't everything. Like, any correction you get, sometimes you're like, "That's a stupid correction. That just doesn't work for me, at all." Having that same perspective when people have opinions about you" (P4, p8, line 234-238).

Perspective

Perspective and the ability to cope with rejection was an important part of dancers' experiences: "You also have to never be, you know, take anything personally, because you're going to get a million 'no's' and a million, "You stand in the back line," you know, and you have to still be fine with it" (P9, p.7, line 314-316).

The majority of dancers placed great value on the ability to put things into perspective and not take yourself too seriously:

With negative things, you just have to take yourself back into the real world and be like, "No one's died. You're not in a war zone. You're still getting to dance." Generally, what I've learnt as well is sometimes the person who is saying the bad things or having that, it's the teacher who is actually having the bad day. It's not necessarily you. Maybe you did something a little bit but I think you get so many eccentric people as well in the dance world that it's almost entertaining. So I never really took it so seriously.

P7, p.6, line 171-178

3.4 Discussion

Experiences of growing up in dance were characterised by conflict and struggle, the tension between the normal processes of growing up and the demands of ballet; coming to terms with physical changes; a process of acceptance or adaptation in order to survive in the profession; and grit and grace, psychological and personal characteristics or skills which enable survival in the ballet profession. A number of factors were important within these experiences, including the timing and extent of pubertal development, the dance context, social support and dance teacher behaviours.

Theoretical Implications

In line with existing literature, possessing a physique which aligns with the aesthetic demands of ballet was deemed to be advantageous (Hamilton et al., 1997). However, dancers in this study felt strongly that a less ideal physique could be compensated for in other ways, through psychological or technical assets. Existing literature contends that this compensation comes at a cost, dancers with less ideal physical characteristics who succeed into the profession reporting poorer psychological wellbeing (Hamilton et al., 1988; Hamilton et al., 1985; Hamilton et al., 1997). Findings from the current study provide some evidence to support this. Dancers with physiques deemed less amenable to the requirements of ballet described a constant struggle to maintain an 'acceptable' physique.

Dancers described direct effects of puberty in terms of the effect of timing and extent of physical development. The effect of timing and extent of physical development could promote advantage or disadvantage to a dancer and although succeeding in the profession appears possible either way, this may be dependent upon moderating factors such as the dance teacher, and the dance context or environment. Genetic potential in terms of height, weight and maturity timing have a direct effect in terms of the physical characteristics of individuals, with certain characteristics deemed more negative than others in the context of ballet (Golden, 1981; Kaprio et al., 1995; Hamilton et al., 1997; Rowe, 2002; Treloar & Martin, 1990; Van den Akker et al., 1987). The extent of development appeared to be of particular importance to early and on time maturing ballet dancers; minimal physical development perhaps mitigating key disadvantages associated with earlier maturation. In line with literature, greater breast development, increased fat mass and widening of the hips were perceived negatively (Hamilton et al., 1997; Mitchell et al., 2016). The issue of height was highlighted by most of the dancers in relation to the extent of growth. Increased height was deemed desirable at puberty due to the aesthetic benefits of possessing longer limbs. However, smaller increases

in height at puberty were also perceived as beneficial in terms of causing less disruption to functional aspects such as flexibility.

In line with the Contextual Amplification Hypothesis (Ge et al., 2002; Ge et al., 2011), many of the advantages or disadvantages associated with the timing or extent of puberty appeared to be moderated, that is, accentuated or mitigated, by the dance environment. In this instance the context of ballet training, and whether the dancer was in recreational or more serious training at the time of puberty, was described as key. Consistent with existing literature, significant individuals such as the dance teacher were described as playing an important role in terms of their response to pubertal changes and subsequently how those changes were perceived by the individual (Mitchell et al., 2016; Petersen & Taylor, 1980).

Moderating factors within the dance environment such as the dance teacher and the specific dance training context, were described as pivotal in terms of adaptation at puberty. These factors were described relative to their potential to facilitate positive adaptation, such as the acceptance of pubertal changes, or equally, the potential to promote maladaptive responses. This finding is well-established in literature outside of the context of dance, with theories positing that the context in which an individual matures and develops can serve to amplify effects of maturity timing (Ge et al., 2002; Ge et al., 2011). Dancers described the pressure of developing in an environment with constant self-scrutiny through mirrors and peer comparison and being 'trained to look for flaws'. Existing literature acknowledges facets of the ballet environment, such as mirrors and ballet attire, which are known to be associated with less adaptive health outcomes including poorer body image, greater risk of eating pathology and lower self-esteem (Francisco et al., 2012; Oliver, 2008; Price & Pettijohn, 2006; Radell et al., 2002; Radell et al., 2011; Radell et al., 2014).

While most dancers experienced puberty in the context of vocational (full-time) ballet training, several of those interviewed (P3, P4, P7, P9) entered full-time training at a later age (from age 16 upwards). These dancers described the benefits of growing up outside of the context of more serious dance training, experiencing a 'normal childhood' and less pressure and scrutiny related to pubertal development. Existing research highlights the paradox of health outcomes in recreational and vocational dance training environments, recreational dance training being associated with more positive health outcomes, and vocational training being associated with more negative outcomes (Anshel, 2004; Buckroyd, 2000; Burkhardt & Rhodes, 2012; McEwen & Young, 2011; Quin et al., 2007; Smith, 1997, 1998; Wilson, 1994). That said, as supported by dancers in this study, it is likely that experiencing puberty in the context of less serious, recreational dance training will contribute to more adaptive health outcomes compared to

experiencing puberty in a vocational dance context. However, research in dance, although limited, advocates for early specialisation (selection into vocational ballet training from age ten or eleven), contending that better psychological wellbeing outcomes are facilitated through 'weeding out' those with less amenable physical and functional characteristics (Hamilton et al., 1988). Contrary to Hamilton and colleagues' assertion, findings from the current study would suggest that greater benefits may be associated with later specialisation. Dancers embarking on full-time ballet training at a later age described a less pressurised and generally easier period of adaptation to pubertal change, compared to those in a vocational training context. Dancers described the opportunity to have a 'normal childhood' and to benefit from wider experiences as facilitative to their success in the profession and noted that experiencing puberty in a less serious training environment was advantageous. Future research should utilise longitudinal studies in order to explore this more fully.

All of the dancers in this study described experiencing critical comments relating to their body shape or size, such as being told to lose weight or being threatened with the loss of performance roles if they could not lose enough weight. An association between critical comments and eating pathology development in ballet dancers has been established (Goodwin et al., 2014). Further, critical comments comprise an aspect of thinness related learning environments, also associated with eating disorder symptomology (Annus & Smith, 2009; Penniment & Egan, 2012). Findings from the current study provide further evidence for the prevalence of thinness related learning environments in ballet. Moreover, teacher comments to lose weight during the period of pubertal change highlight a lack of teacher understanding of normal, healthy human growth at this point in time, consistent with observations in another qualitative study with ballet teachers (Mitchell et al., 2016). In addition to critical comments, dancers reported being weighed, peer comparison of body shape and size, and peer modelling of dieting behaviours, all consistent with features of thinness related learning environments (Annus & Smith, 2009).

How significant others respond and react to physical developments at puberty can impact upon whether or not an individual adapts healthily in response to pubertal changes (Petersen & Taylor, 1980). Dancers described many negative responses with regard to pubertal changes, in particular from their dance teachers. Critical comments and encouragement from dance teachers to lose weight inferred to dancers that pubertal changes were negative. Existing research suggests that certain pubertal changes are associated with more negative social value, such as breast development and widening of the hips (Mitchell et al., 2016). Furthermore, dancers described how, subsequent to these initial responses to pubertal change, the quality and nature of their interactions with the dance teacher changed. In

particular, dancers described being ignored, with close relationships becoming distant and dancers looking for other ways to gain teacher approval. Similar findings have been reported in research with gymnasts, among whom greater body size was associated with negative interactions with coaches; taller and heavier girls reported less encouragement, reinforcement and instruction, and more punishment and ignoring of mistakes (Cumming et al., 2005). Some dancers described these teacher responses as pivotal to their subsequent disliking of physical changes at puberty. The ramifications of such responses may be significant for wellbeing, with existing literature reporting an association between the disliking of pubertal changes and the development of disordered eating behaviours (Moore et al., 2016). These findings necessitate a greater focus in research and practice upon dance teacher behaviours when working with adolescent dancers.

While the dance training context and teacher behaviours were described as pivotal in terms of how dancers perceived pubertal changes, social support was highlighted as a factor which was able to mitigate some of these struggles. Accordingly, social support is noted in existing theory as a key factor associated with the development of coping strategies in young athletes (Fergus & Zimmerman, 2005; White & Bennie, 2015). In addition, social support has also been acknowledged as a factor contributing to success in dance (Pickard, 2006; Walker et al., 2010). Dancers who described more positive overall experiences and easier adaptation at puberty described strong social support networks with parents, peers and, in some cases, dance teachers who acted as mentors. Research in dance has found social support to be an important determinant of wellbeing in adolescents (Francisco et al., 2012; Stark & Newton, 2014). Social support was described as pivotal in the experiences of elite adult dancers, as such, consideration of ways to facilitate greater social support for young dancers warrants further exploration.

In addition to social support, dancers described several personal characteristics such as perspective, learning to question and possessing a strong work ethic, as important to their survival and success in the profession. While further research would be needed to substantiate the role played by these characteristics, findings from the existing study suggest that these characteristics may mediate the effects of factors such as maturity timing and the dance context; thereby enabling dancers to overcome or to accept challenges associated with puberty and/or the dance training environment. Existing research supports the importance of these qualities for success in the profession (Brassington & Adam, 2003; Chua, 2014a, 2014b; Moyle, 2013; Noh et al., 2007; Pickard & Bailey, 2009; Walker et al., 2010) and provides evidence of psychological skills training being applied successfully in dance settings (Klockare, Gustafsson, & Nordin-Bates et al., 2011; Noh et al., 2007). Further research which

focuses on psychological skills training, its association with positive adaptation at puberty, and subsequent success in dance, is needed.

Practical Implications

Education

The experiences of dancers interviewed for this study highlight a need for dance teacher education to generate a greater understanding of child development, physically and psychologically. This may include information about normal pubertal development (e.g. weight gain, breast development), the timing of development and the extent of normal variation. Educating dance teachers on these topics would facilitate avoidance of thinness related learning behaviours such as comments on body weight and shape. Research shows that sports coaches can be taught to become more mastery involving, with positive outcomes in sport through coach education programmes (Smith, Smoll, & Cumming, 2007). These findings highlight the importance of teacher education and the need for further research to investigate the potential for a similar effect in dance teacher behaviours in relation to the reduction of thinness related learning.

Findings also point to a need for further education for young dancers. Many of the dancers in this study described their shock and unease in response to normal changes of puberty. Disliking of physical changes of puberty, alongside feeling unprepared, has been identified as a predictor of eating disorder symptoms; suggesting that how young women experience the pubertal transition can influence aspects of wellbeing in adulthood (Moore et al., 2016). Greater education for young dancers about normal changes and normal variation in these changes may enable greater preparedness and acceptance of these changes and subsequent benefits for psychological wellbeing.

Selection

Evidence from the four dancers who began their full-time ballet training post-16 (later specialisation) warrants further investigation. These dancers reported benefits of later specialisation for 'normal development' and psychological wellbeing. The potential for this approach to foster more adaptive responses at puberty and subsequently greater psychological wellbeing, while under-researched, goes against existing literature in ballet pertaining to wellbeing and selection age (Hamilton et al., 1988). Future studies should consider examining this association with a larger sample of dancers. Further support for the findings of the existing study could build a case for advocating later specialisation in ballet.

Limitations

This study is limited to the experiences of nine elite adult dancers, who can be considered as 'survivors' of the ballet training system. While the use of semi-structured interviews and interpretative phenomenological analysis has been used to generate rich, descriptive responses, these findings cannot be generalised to all dancers. In particular, interviews with those selected out of the training system would be likely to yield very different findings. The international nature of the sample, while still limited due to the small sample size, provides evidence of similar lived experiences and perhaps also, a homogeneity in ballet sub-culture across ballet dancers from the United Kingdom and the United States. Further research with a larger, more culturally and geographically diverse sample is needed to substantiate and advance these findings.

Many other qualitative approaches could have been utilised in this study. Approaches such as thematic analysis could have been used to develop themes, similarly to IPA. However, the focus of this study lies in lived experiences and how these experiences align with theory. IPA enables a richer analysis which supports the approach of using a small sample size and in-depth interviews and goes beyond thematic analysis (Brocki & Wearden, 2006). While other approaches, such as content analysis, could have been used to produce a more quantitative analysis of discrete categories from the qualitative data, use of IPA ensures that the narrative portrayal of lived experience is the focus (Brocki & Wearden, 2006).

The data collection method of interviewing via skype has the potential to provide the same level of authenticity as face to face interviews (Bertrand & Bourdeau, 2010; Janghorban et al., 2014; Sullivan, 2012). However, technical issues associated with video conferencing methods such as skype can create challenges such as dropped calls and loss of clear audio. In the case of this research, two interviews had to be restarted after technical issues but all audio was clear to transcribe. Technical issues were easily managed and the resulting data was unaffected.

Interviewing adult dancers and using IPA to explore lived experiences means that much of the data collected is retrospective. This has implications for some of the findings of the study and their application to the dance setting. For example, with advances in the field of dance medicine and science, dance teacher knowledge and behaviours are likely to have moved forward since this cohort of dancers was in training. While this does not make these findings redundant, it highlights the need for further research with adolescent dancers who are currently in training, in order to gain insight into training environments and learning experiences relevant to the young dancers of today.

3.5 Summary

Elite ballet dancers' experiences of growing up in dance were characterised by conflict and struggle, coming to terms with physical changes and possessing grit and grace in order to survive and succeed in the ballet world. The experiences of dancers with varying maturity timing and physical characteristics elucidate varying pathways and strategies for survival in the ballet profession. Accepting physical and aesthetic strengths and weaknesses and learning how to adapt or how to compensate for these, was described as pivotal. In addition, moderating and mediating factors such as social support, the timing and extent of pubertal changes, dance teacher behaviours and the dance training context, influenced the extent to which dancers experienced struggle and conflict and how easily they were able to come to terms with their adult physique. Further research is needed with adolescent dancers in order to explore the implications of maturing and developing within the context of vocational ballet training and to develop a greater understanding of the interaction between maturity timing, learning experiences and perceptions of wellbeing.

Chapter 4

Growing Up in Dance: Lived experiences of maturation in adolescent ballet dancers

4.1 Introduction

This series of four studies explores the maturity characteristics and lived experiences of maturation and wellbeing within the context of vocational ballet training. The first study describes the demographic and maturity characteristics of elite adolescent ballet dancers, while the subsequent three studies explore the lived experiences of a sample of those dancers, relative to their maturity timing. The exploration of lived experiences aims to capture some of the more complex interactions between the timing of biological maturation, the social context of dance training and psychological factors. Particular attention will be paid to the social stimulus value of pubertal change, and perceived maturation and wellbeing of young dancers in relation to these factors.

A more comprehensive understanding of the dancer's transition through puberty requires a biocultural approach, which considers the interactions of the biological and societal demands placed upon the maturing and developing individual (Cumming, et al., 2012; Malina, et al., 2004; Petersen & Taylor, 1980). Central to the biocultural approach is the assumption that the biological changes of puberty occur within a cultural context and can both directly and indirectly affect adolescent behaviours and experiences. Whereas direct effects describe any unmediated effects of biological maturation on behaviour, such as increased strength, speed, or power, or increased interest in sexual behaviour, indirect effects refer to those which are mediated by psychological constructs, such as self-perceptions, and/or are moderated by exogenous factors, such as social context or the perceptions of significant others (Cumming, et al., 2012). As such, the cultural context in which puberty occurs and the meanings and values ascribed to it are essential for a more complete understanding of puberty (Brooks-Gunn & Warren, 1985; Cumming, et al., 2012; Pickard, 2013; Summers-Effler, 2004; Tremblay & Lariviere, 2009).

Although direct effects models have become less popular in psychology, they may have greater relevance in the contexts of dance and physical activity. The biological processes underlying puberty not only effect physical and physiological changes, such as strength and flexibility, but also have a direct impact upon behaviours (Mitchell et al., 2017). Direct effects models view the effects of puberty on behaviours as universal. A direct effects

model would hypothesise that reduced flexibility and co-ordination are a result of underlying changes in biology – differential growth in skeletal lengths and associated soft tissues (Mitchell et al., 2017). Although direct effects models may explain some of the effects of pubertal changes on performance and brain development, the models are limited in their capacity to explain more complex psychological and social changes associated with puberty, such as changes in body image (Cumming, Sherar, Pindus, et al., 2012; Mitchell et al., 2017). Nevertheless, this does not discount the idea that maturation has the potential to both directly and indirectly impact adjustment during adolescence.

Indirect effects models, in contrast, describe the influence of puberty through personal and external factors and may therefore have greater relevance for young dancers in the context of vocational ballet training. Evidence addressing direct and indirect effects of variation in maturity status suggests that individual perception of change and the reactions and evaluations of others are important factors in physical activity and sport (Cumming, et al., 2012; Hunter Smart, et al., 2012). The need to evaluate the influence of the sub-cultures or environments of specific sports on the development of youth athletes has been recommended (Malina et al., 2013; Malina, Rogol, Cumming, Coelho-e-Silva, & Figueirido, 2015; Mitchell et al., 2016). This applies equally to ballet training (Figure 5) and requires consideration of interactions between the ballet sub-culture (moderating factors); self-perceptions, attitudes towards the body, among others (mediating factors); and the biological maturation of young dancers (Mitchell et al., 2017; Mitchell et al., 2016).

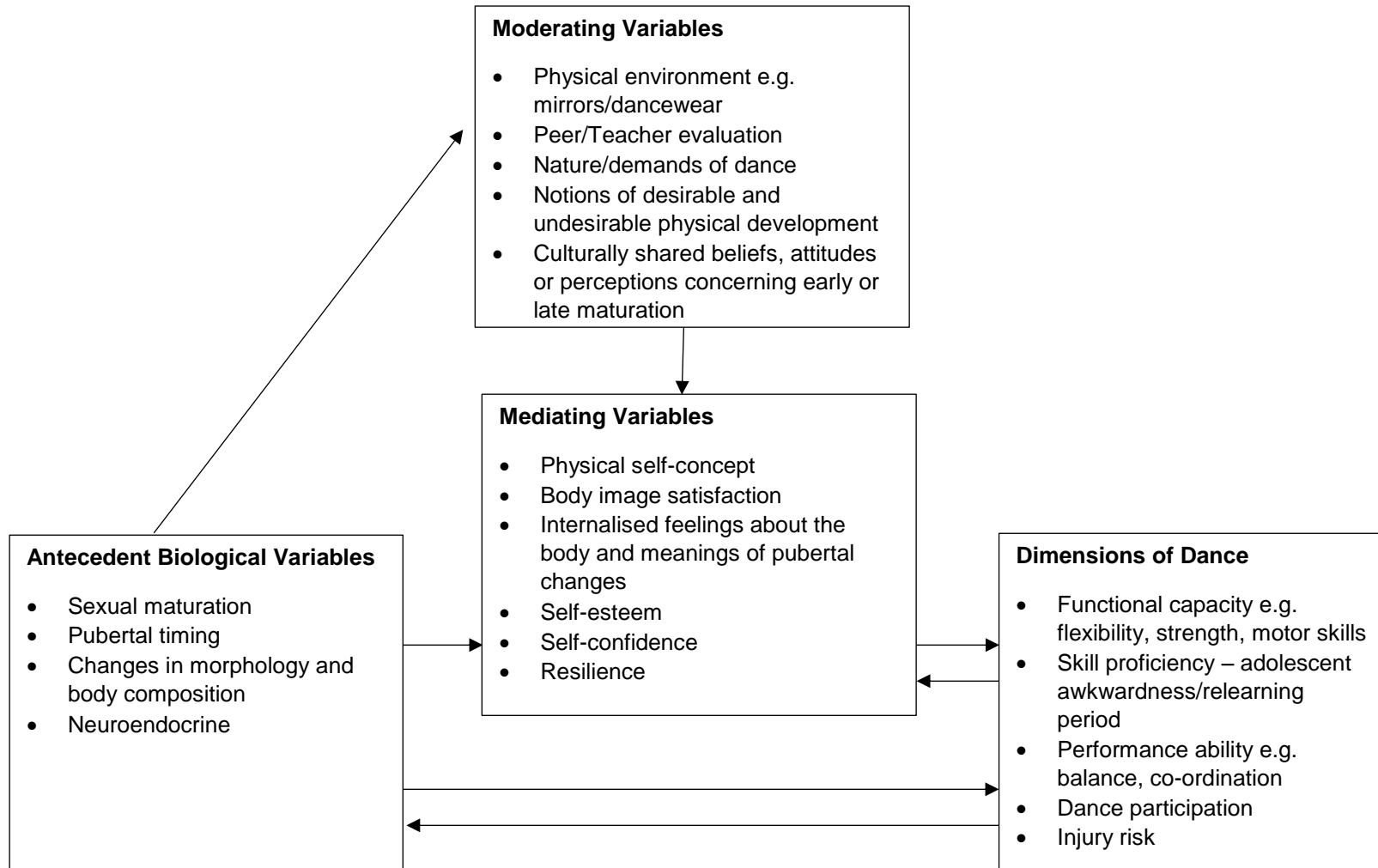


Figure 5. A biocultural model of maturity-associated variation in adolescent dancers, adapted for dance from Cumming, Sherar, Pindus et al., 2012 (Mitchell et al., 2017)

Growing up in dance

Although the psychological and social aspects of puberty within a dance (ballet and other dance styles) context have been examined (Pickard, 2013; Stark & Newton, 2014), few studies have considered interactions between biological changes and psychosocial adaptation at puberty. Research specifically exploring maturity timing and psychosocial outcomes in young dancers is limited to the work done by Brooks-Gunn and colleagues in the 1980s (1985, 1989). That said, existing research highlights the importance of social context regarding psychosocial outcomes and holds that the social context of ballet amplifies detriment to psychological wellbeing during puberty (Brooks-Gunn & Warren, 1985; Brooks-Gunn et al. 1989; Mendle et al., 2007).

Adolescent females are reported to be at greater risk than their male counterparts in terms of their psychological wellbeing (Tremblay & Lariviere, 2009; Vogt Yuan, 2007). Girls report greater peer pressure to lose weight and more negative comments about weight and appearance, and are reported to suffer these symptoms over a longer time period (Summers-Effler, 2004; Tremblay & Lariviere, 2009; Yuan, 2012). While existing studies have been conducted with non-dance populations, factors such as comments about weight and appearance, and peer pressure to lose weight, are arguably amplified within the social context of ballet (Anshel, 2004; Benn & Walters, 2001; Francisco, Narciso, & Alarcao, 2013a; Francisco, Narciso, & Alarcao, 2013b, Goodwin et al., 2014).

The timing of maturational events, such as menarche, are reported to influence behaviour, physical and psychological factors. Though susceptible to socio-environmental factors, timing is genetically driven (50-80%) (Golden, 1981; Kaprio et al., 1995; Rowe, 2002; Treloar & Martin, 1990; Van den Akker et al., 1987) and thus is a factor which young dancers have little control over. The timing of maturation can have an impact on physical, psychosocial, and athletic development and therefore has ramifications for the talent identification, selection and training of young ballet dancers (Malina et al., 2004).

While puberty is an interval during which risks to health and wellbeing are increased, experiencing puberty within the context of vocational ballet training has the potential to amplify any detriment to psychological wellbeing (Buckroyd, 2000; Brooks-Gunn & Warren, 1985). Moreover, how well individuals are able to adapt to changes at puberty has been highlighted as critical for psychological wellbeing (Ackard & Peterson, 2001; Tremblay & Frigon, 2005; Summers-Effler, 2004). For young dancers, positive and relatively rapid adaptation to changes is important, with key decisions made about

retention throughout the vocational training years. Research to date highlights the importance of key figures for adaptive responses at puberty (Raja et al., 1992; Stice & Whitenton, 2002), particularly in terms of their impact upon the social environment or learning climate (Cumming et al., 2005). In the context of ballet, key figures may include teachers, peers and parents. Their influence upon the environment in which a young dancer develops may have significant implications for psychosocial outcomes at puberty (Mitchell et al., 2016; Stark & Newton, 2014).

The social stimulus value of pubertal change within the context of vocational ballet training is also an important consideration. Consistent with the Puberty-Initiated Mediation Hypothesis, characteristics associated with later maturation hold greater social value in the social context of ballet. Brooks-Gunn and Warren (1989) describe a 'goodness of fit' between the demands of the social context and the attributes of the late maturing dancer. Late maturing girls tend to experience smaller pubertal gains in height, weight and fat mass; greater gains in relative lean mass and a more linear physique (Gay et al., 2014). Due to a greater period of time growing in childhood, these individuals develop longer limbs relative to a shorter torso; these characteristics describe the physique often sought after in ballet (Malina et al., 2004; Pickard, 2015). In terms of psychological characteristics, later maturing girls are reported to be more confident, assured, extroverted and to display reduced health risk behaviours, though there is not yet any evidence specific to dancers (Cumming, Sherar, Pindus et al., 2012; Jones, 1965).

While there is little research in this area, research from sport and physical activity generally supports the importance of significant others within student perceptions of training (Cumming et al., 2005). While the perceptions of ballet students have yet to be explored, research with ten UK ballet teachers suggests that the normative changes associated with puberty, such as widening of the hips, are not welcomed within the ballet world (Mitchell et al., 2016). Further, these findings suggest that there is an inclination towards different approaches with students who have these attributes and those who do not (Mitchell et al., 2016). Although ballet teachers identified that a lesser value is placed on more visible pubertal changes, often associated with earlier maturing individuals, perception of the advantages associated with different timing varied among teachers, with many perceiving late maturing dancers to be at a disadvantage (Mitchell et al., 2016). While the ballet teachers identified in Mitchell et al's study were representative of male and female teachers across the UK in both recreational and vocational contexts, further research with ballet teachers is needed to advance these findings.

Early maturing girls experience greater pubertal gains in size, absolute/relative fat mass and absolute lean mass (Malina et al., 2004). This more intensive growth spurt results in comparatively greater torso growth, relative to shorter leg length (Gay et al. 2014). Within the social context of ballet, these physical attributes are perceived as negative (Mitchell et al., 2016). Moreover, early menarche and greater breast development have been associated with dropout from ballet training (Hamilton et al., 1997).

Girls who enter puberty at an earlier age are, from a cognitive and socio-emotional perspective, less prepared to deal with the increased pressures and expectations that adulthood brings (Mendle et al., 2007; Sherar et al., 2010). This may be due to a greater asynchrony between emotional and cognitive development (Blakemore, 2014; Dahl, 2004). This disparity in timing between physical and cognitive development can lead to vulnerability in young dancers: while a dancer may be physically and sexually mature, with regard to the brain and the body, they may be relatively immature in terms of self-control and the ability to regulate feelings (Dahl, 2004). In addition, greater gains make early maturing individuals, both dance and non-dance, more susceptible to a range of negative psychosocial outcomes, such as negative body image and disordered eating, within environments that accentuate peer comparison and thinness (Brooks-Gunn & Warren, 1985; Brooks-Gunn et al., 1989; Fairclough & Ridgers, 2010; Sherar et al., 2010). As a consequence, early maturing girls are, as a group, more likely to engage in maladaptive coping behaviours and/or health risk behaviours, such as smoking and drinking (Magnusson et al., 1985; Wilson et al., 1994; Wiesner & Ittel, 2002). While research specific to dance populations has not been conducted in all of these areas, existing evidence holds that earlier maturing ballet dancers are at greater risk of disordered eating, psychopathology and poor body image compared to their later maturing peers (Brooks-Gunn & Warren, 1985). The degree to which these outcomes result directly or indirectly from biological change remains unclear.

Perceptions of pubertal change and timing

While there are clear physical and psychological implications relating to objective measures of maturity timing, there is a growing body of research which stresses the importance of perceptions of maturity timing alongside more objective measures of biological timing, particularly with reference to psychosocial outcomes (Conley & Rudolph, 2009; Graber et al., 1997; Graber et al., 2004; Moore et al., 2014). That is, how we perceive puberty may be as, if not more, important than puberty itself. In addition, the second study presented in this thesis (Chapter 3) points toward the potential importance of perceived timing, with perceptions of timing being central to adult ballet dancers' narratives of outcomes at puberty and subsequent perceptions of wellbeing.

An area requiring consideration is how young ballet dancers perceive pubertal changes. Research suggests that puberty and associated pubertal changes are perceived as negative within the ballet world (Mitchell et al, 2016). Young ballet dancers are attuned to the expectations and values of their social world and so valued conditions, such as late maturation, and less valued conditions, such as earlier maturation and greater breast development, may be of significance for young dancers (Pickard, 2013; Pickard, 2015). Further, how young women experience the pubertal transition can influence aspects of wellbeing in adulthood (Moore et al., 2016). For this reason, exploration of the lived experiences of girls maturing and developing within the context of vocational ballet training is warranted in order to begin to develop a greater understanding of how experiences of puberty in this specific setting relate to wellbeing. This study aims to address the paucity of research in these areas through exploring the experiences of young ballet dancers with varying maturity timing.

Summary

Brooks-Gunn and Warren's research provides a starting point for this series of studies which aim to investigate more fully, experiences surrounding the complex topic of maturity timing in ballet. With a lack of current data pertaining to maturity the characteristics of adolescent ballet dancers, study three (the first study presented in Section 1 of this chapter) will describe the demographic and pubertal characteristics of adolescent ballet dancers. This data is presented at the outset of the chapter in order to provide context, with an overview of the sample characteristics compared to existing data. Studies four to six comprise the rest of the chapter, exploring the experiences of young ballet dancers and addressing the following research questions: What are the experiences of adolescent dancers maturing and developing in the context of full-time ballet training? What are (if any) the differences between early, on time and late maturing individuals, in terms of perceptions of wellbeing, coping mechanisms and how they manage different learning experiences?

4.2 Section 1 - Descriptive characteristics of a sample of elite adolescent dancers

4.2.1 Methodology

Sampling

Three vocational ballet schools were recruited by contacting a number of dance schools within the researcher's network via email. A sample size of three to four schools was sought, enabling comparisons to be drawn between different school environments. While dancers study a range of dance styles in their training, the focus of all participating schools was ballet. All participating schools were in the United Kingdom. School one (n=44) is a full-time ballet school attached to a regular secondary school. Students complete their academic schooling alongside their dance training, taking academic classes at the secondary school. School two (n=66) is part of an associate programme where students continue regular schooling and complete their dance training around this. School three (n=78) is a full-time ballet school with academic classes taking place onsite. In schools one and three the majority of students are residential. All schools follow similar selection procedures (as outlined in the literature review, p.43-44), with key points for assessment out of training taking place in the third year of training (year nine of school) and the fifth year of training (RBS, 2018; Elmhurst Dance, 2018).

The inclusion criteria specified female dancers in vocational ballet training aged 11-17 years. In each school, female students from first year to final year were invited to complete the pubertal development scale. Consent was obtained from parents on an opt-out basis and from students at the time of the survey. All students within the inclusion criteria were invited to take part in the survey. Three students did not participate on the basis of parental non-consent or unwillingness to take part.

Procedure

The data collection process followed a series of steps with two key stages a.) Administer and analyse the screening survey, b.) Conduct interviews (discussed in Section 2 of this chapter). See Figure 6 for detailed illustration. This process was organised in conjunction with each school; the availability of the school, students and the researcher. Data collection began in November 2015 and was completed by March 2016.

Initial contact was made with each school via email, with information provided about the nature and topic of the research. If the response was positive, a research handbook (Appendix E), with full details of the process was then sent to the school. An initial data

collection date was arranged in order to administer surveys, answer any questions from the staff and students and to observe dance classes to build familiarity with the students. At this point a staff member was identified for any safeguarding/pastoral referral which may arise within the data collection process. Survey responses were analysed within two days of the initial visit.

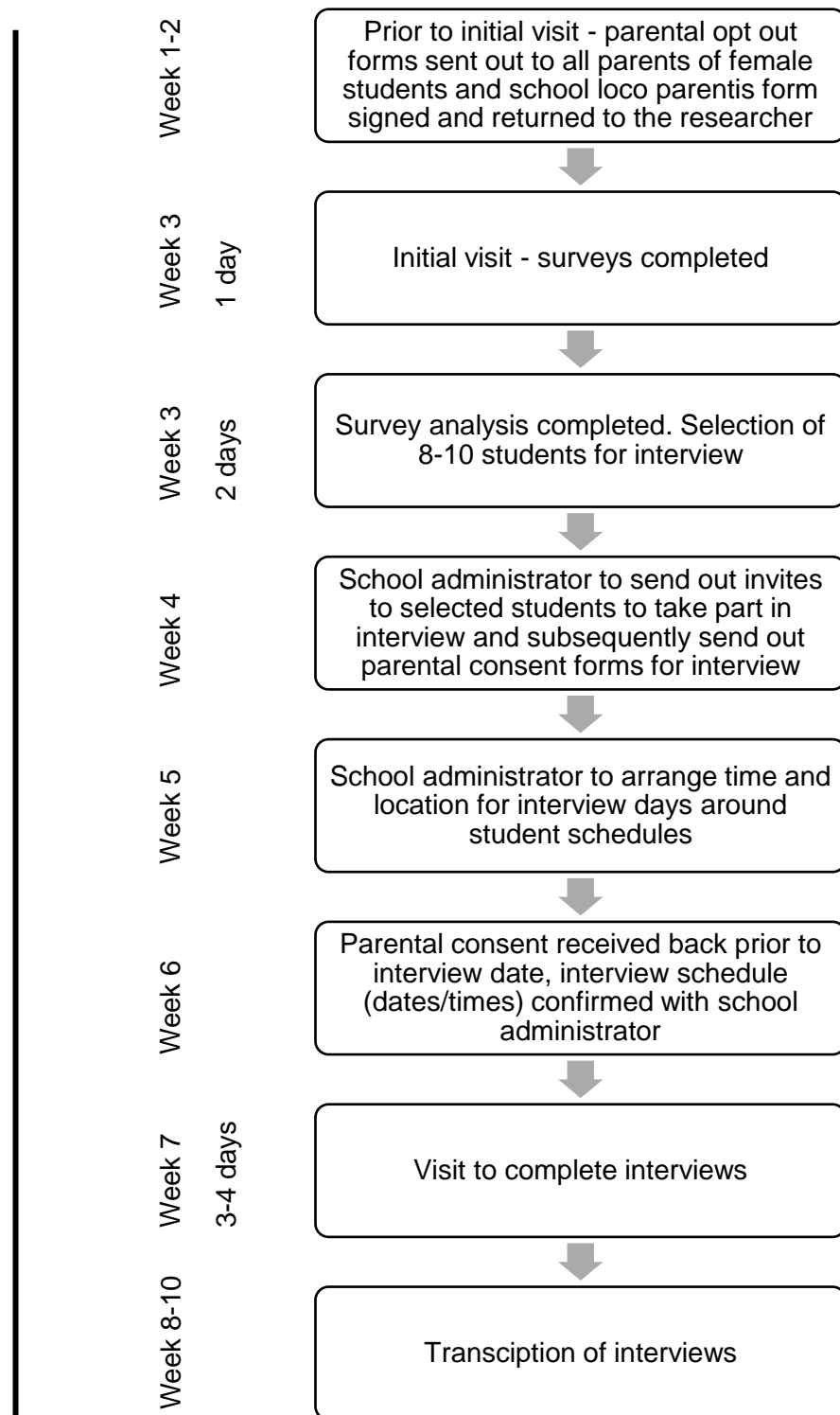


Figure 6. Data collection procedure

Ethics

Procedural ethics have been followed, with approval sought and received from the University of Bath Research Ethics Approval Committee for Health (reference: EP 15/16 70) (Bath, 2014; Guillemin & Gillam, 2004). Prior to any data collection taking place, the principal of each school signed and returned a loco parentis consent form and parents were sent opt-out consent forms for survey participation. Any opt-out forms were returned prior to the surveys taking place and those students did not participate. Written assent was also obtained from each student, this was administered alongside an information form at the same time as the survey. The researcher was present prior to and during survey completion to answer any questions. Data was anonymised and stored on a password-protected external hard drive. See Appendix D for full details.

Pubertal Development Scale

The pubertal development scale (PDS) was used both as a screening tool to select participants with differing maturation characteristics for interview and as a method to obtain data on the pubertal and demographic characteristics of the sample. The PDS is a validated scale (Carskadon & Acebo, 1993; Petersen, Crockett, Richards, & Boxer, 1988) adapted from an interview-based puberty rating scale by Petersen (1988). The PDS is a 5-item self-report instrument designed for use by adolescents to report on the development of five indices of pubertal growth: growth, body hair, skin changes, changes to the voice and growth of facial hair for males and breast development and age of menarche for females (Bond et al., 2006; Petersen et al., 1988). Individuals can respond on a four-point scale from 1 '*No, not yet started*', 2 '*yes (barely)*', 3 '*yes (definitely)*' to 4 '*development seems complete*'. If menarche has started, there is a further question for the year and month of first menstruation and age at onset. A revised version of the PDS (Cance et al., 2012) was used. This version includes a final question pertaining to self-perception of maturation timing in comparison to peers, answered on a 5-point Likert scale ranging from 1 '*Much earlier*' to 3 '*about the same*' to 5 '*Much later*'. Point values are averaged for all items to give a PDS score. Puberty Category Scores were computed using the criteria of Petersen et al (1988) by totalling the scale values (Petersen et al., 1988).

The PDS was developed as an alternative to more invasive measures of pubertal development (Carskadon & Acebo, 1993) and research has demonstrated this method to be more acceptable to adolescents and schools compared to pictorial representations and more invasive methods, such as physical examinations (Bond et al., 2006). In terms of reliability, the PDS has been reported to have internal consistency ranging from .68 to .83 (Petersen et al., 1988). In this study, internal consistency was reported at .72. Validity

for the PDS when compared to measurement by physical exam has been reported between .61 and .67 (Brooks-Gunn et al., 1987). In addition, the revised PDS asks the respondent to rate whether they feel their pubertal timing is early, on time, or late with respect to peers, offering a self-perceived categorisation of an individual's timing which can be beneficial (Dorn et al., 2006).

Data Analysis

Data were input into SPSS 22 Statistics Data Editor for analysis (SPSS, 2013). The data was cleaned for erroneous responses, missing values were labelled and assumptions were checked prior to running any analysis.

Descriptive statistics

A simple descriptive analysis with mean values and standard deviations was conducted to reflect the demographic and maturation characteristics of the sample. Data were then plotted relative to normal growth curves for height, weight and body mass index (BMI) (World-Health-Organisation, 2007). Trends across year groups for pubertal timing and year group size are illustrated in table and graph format. Pearson product moment correlations (1-tailed) were conducted to illustrate the relationships between self-perception of timing, scores from the pubertal development scale and age of menarche.

4.2.2 Results

Descriptive statistics

A total of 188 dancers completed the survey. Descriptive statistics are shown in Table 19, illustrating similar dancer characteristics across the three schools. The average age of menarche was 13.2 years. A mean sample t-test revealed that this was significantly different ($p = < .01$) from the average reported in the general population (12.4 years) (McDowell et al., 2007). School two has a slightly lower average age range and this is reflected in slightly lower means for height, weight, BMI and average score on the pubertal development scale. Lower sample sizes for age at onset of menarche across all schools are due to participants reporting as premenarcheal.

Table 19. Descriptive statistics for age, height, weight, BMI, age at onset of menarche and PDS average across the three schools

	School 1			School 2			School 3		
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>
Age (years)	14.3	1.7	44	13.5	1.3	66	14.1	1.8	78
Height (m)	1.61	9.1	41	1.58	10.3	61	1.60	8.1	74
Weight (kg)	46.7	8.3	34	42	8.5	44	44.9	6.9	69
BMI (kg/m²)	17.9	2.4	32	16.7	2.1	43	17.4	1.7	67
Age at onset of menarche (years)	13.1	1.2	29	13.3	1.2	35	13.2	1.3	47
PDS average	2.8	.67	44	2.5	.71	66	2.7	.79	78

M = Mean, SD = Standard Deviation

Descriptive statistics across different vocational training year groups, from year one to year six are illustrated in Table 20. Clear differences are seen in all variables as dancers mature across age groups; with a trend for increased mean values in body size and maturity with age.

Table 20. Descriptive statistics for age, height, weight, age at onset of menarche, PDS average and category score across training years 1 – 6.

Training year	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6	
	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>
Age (years)	11.8 (.43)	38	12.9 (.34)	38	13.8 (.47)	36	14.8 (.57)	32	15.7 (.49)	20	16.6 (.50)	24
Height (m)	1.51 (7.7)	38	1.55 (7.7)	36	1.63 (7.2)	31	1.66 (6.7)	30	1.64 (5.2)	18	1.63 (7.1)	23
Weight (kg)	35.5 (5.8)	27	41.0 (5.7)	33	45.3 (5.9)	22	47.3 (6.4)	22	50.6 (5.1)	20	51 (5.0)	23
Age at menarche (years)	11 (1.0)	3	12.5 (.66)	13	12.9 (.83)	26	13.4 (1.2)	26	13.2 (2.0)	20	14.0 (1.5)	23
PDS Average	1.8 (-.48)	38	2.3 (.59)	38	2.8 (.52)	36	2.9 (.53)	32	3.4 (.23)	20	3.4 (.41)	24
Category Score	3.8 (1.3)	38	5.3 (1.8)	38	6.0 (1.7)	36	6.9 (2.3)	32	8.8 (2.2)	20	7.9 (2.2)	24

M = Mean, SD = Standard Deviation

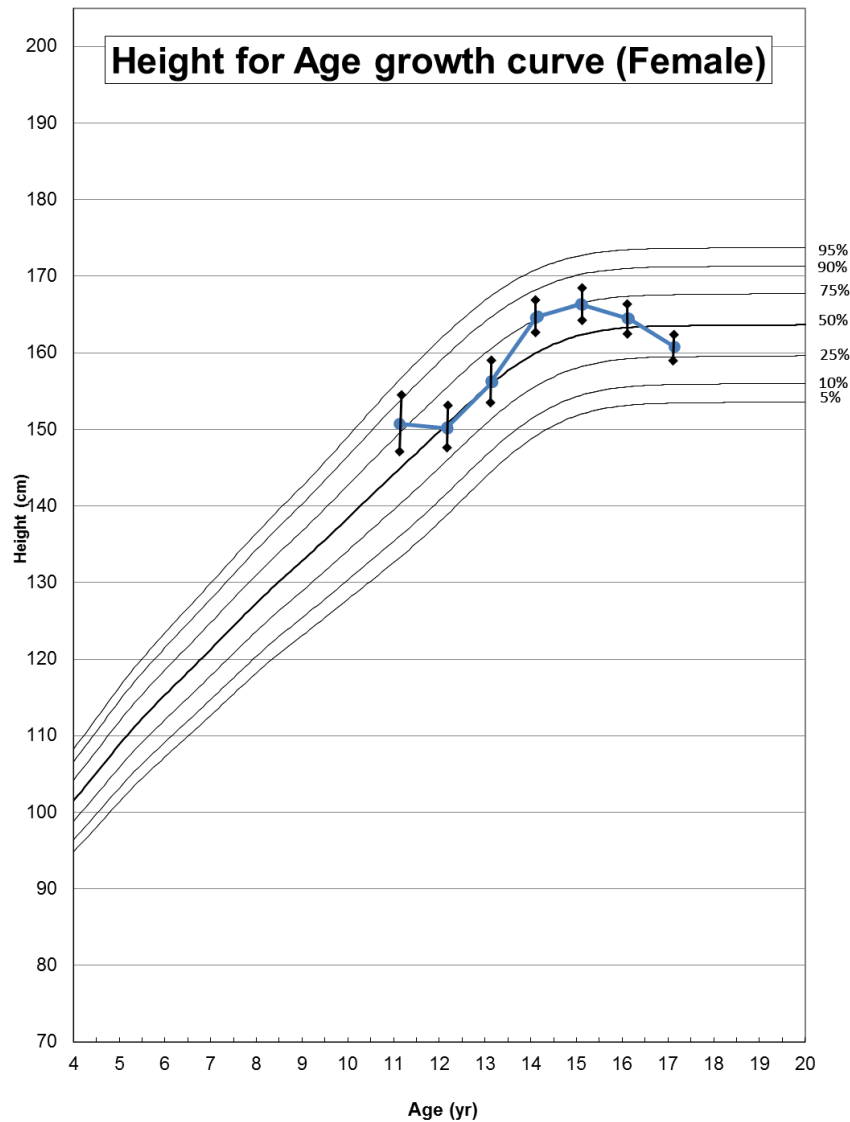


Figure 7. Height for age growth curve for females aged 4 – 20 years, mean data from dancers in this study shown in blue for ages 11 – 17. Error bars show standard deviation from each mean data point.

Growth curves for height, weight and BMI norms for females aged 4 - 20 years are shown in figures 7-9 alongside mean data from dancers aged 11 – 17 years. Mean height data from dancers in this study shows this sample to be between the 25th and 75th percentiles, which lies within the norm for females of the same age. Mean weight data for dancers suggests young ballet dancers, on average, have lower weight than most females of the same age, this is also reflected in BMI, where dancers are below the 50th percentile throughout ages 11-17.

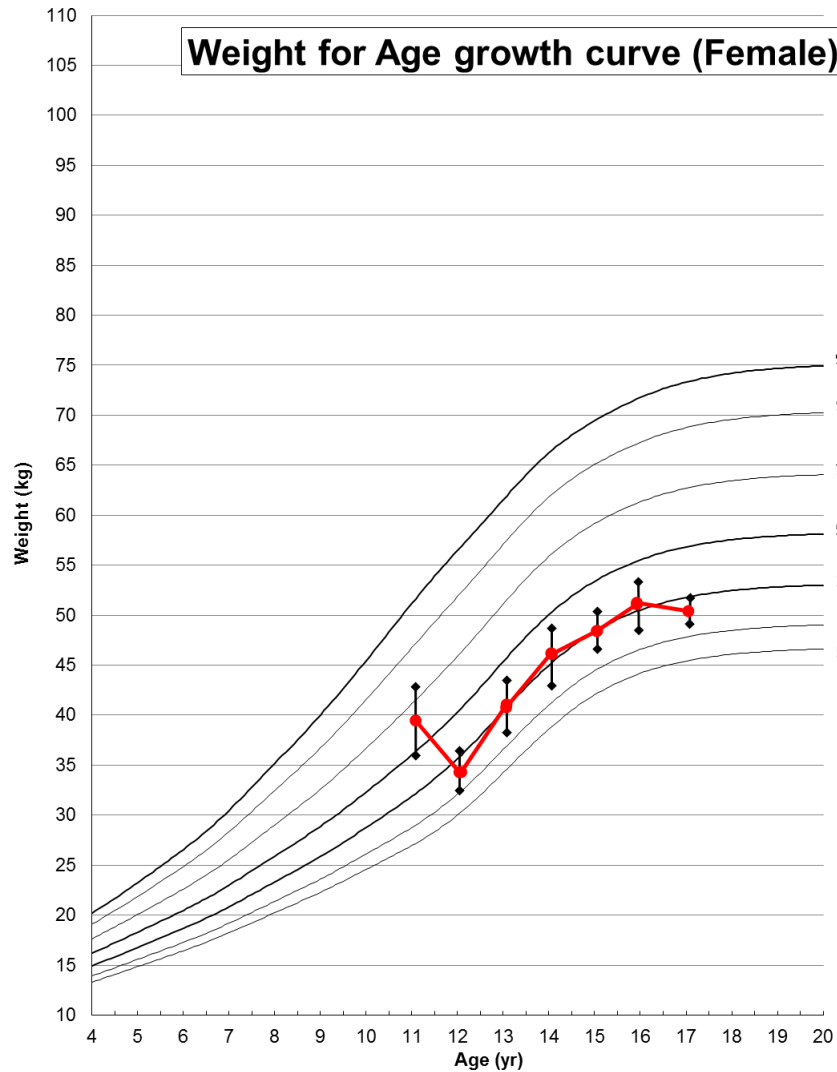


Figure 8. Weight for age growth curve for females aged 4 – 20 years, data from dancers in this study shown in red for ages 11 – 17. Error bars show standard deviation from each mean data point.

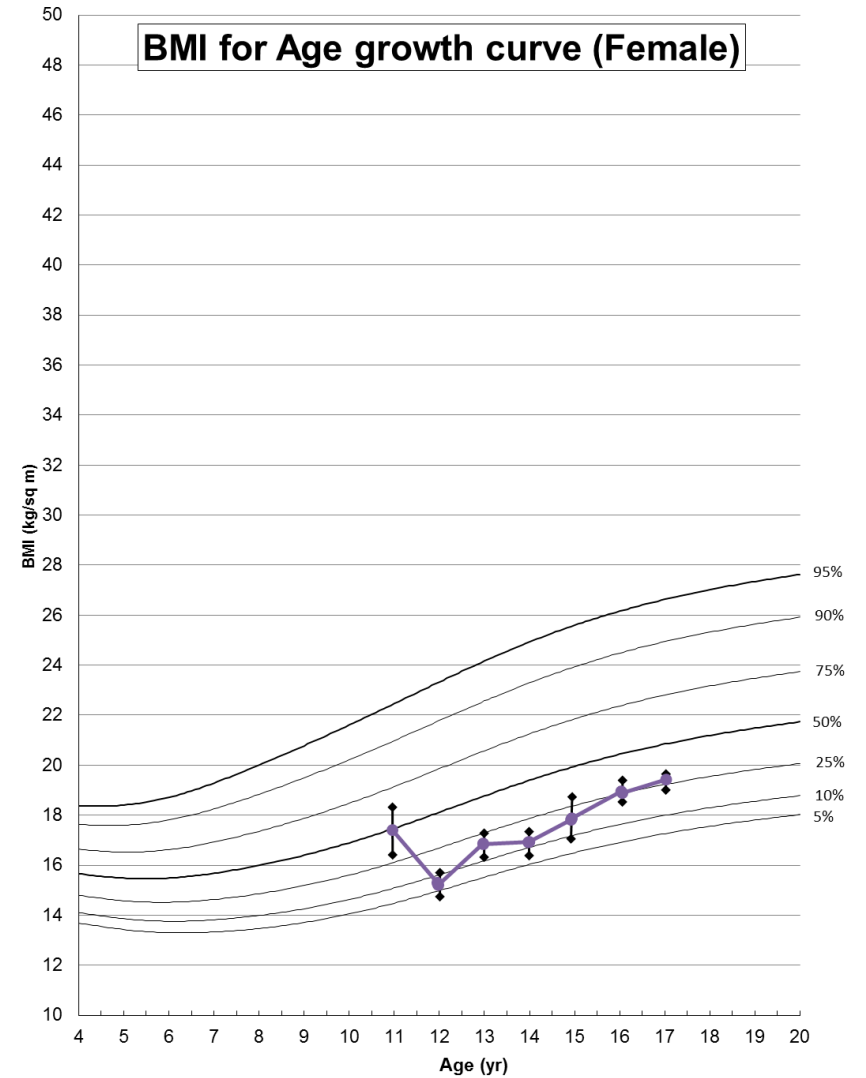
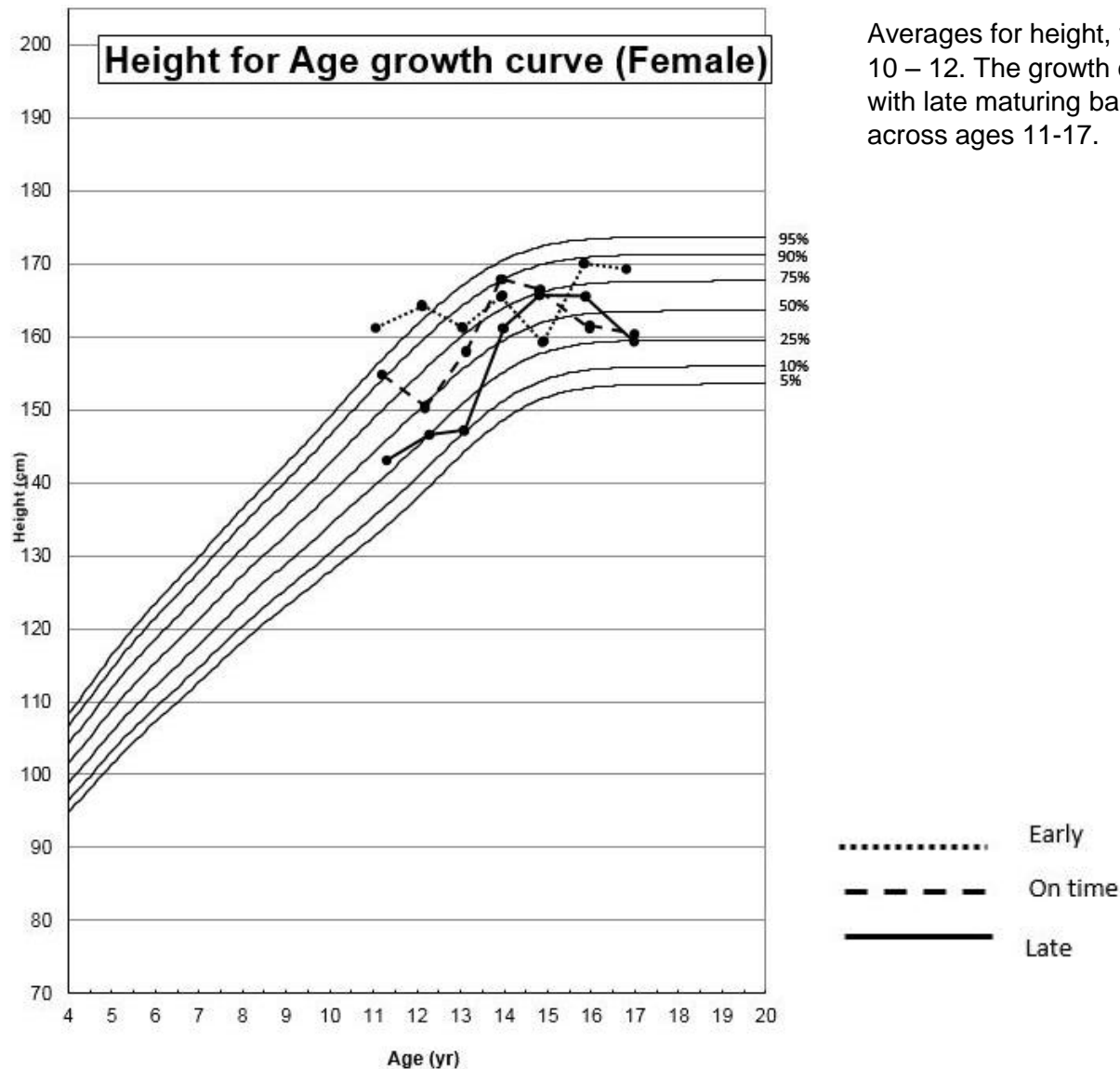


Figure 9. BMI for age growth curve for females aged 4 – 20 years, mean data from dancers in this study shown in purple for ages 11 – 17. Error bars show standard deviation from each mean data point.



Averages for height, weight and BMI by maturity group are illustrated in figures 10 – 12. The growth curves show clear differences between maturity groups with late maturing ballet dancers below the 50th percentile for weight and BMI across ages 11-17.

Figure 10. Height for age growth curve for females aged 4 – 20 years, mean data from dancers in this study shown for early, on time and late maturing dancers ages 11 – 17.

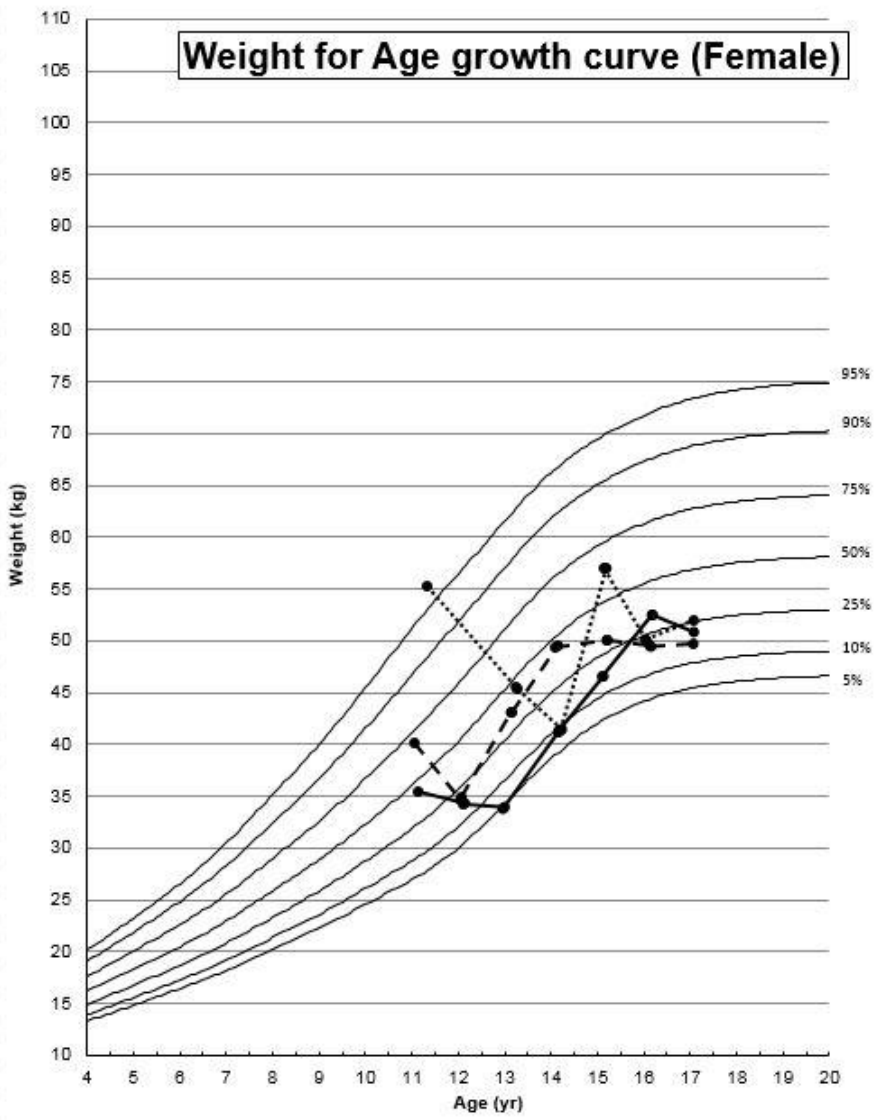


Figure 11. Weight for age growth curve for females aged 4 – 20 years, mean data from dancers in this study shown for early, on time and late maturing dancers ages 11 – 17.

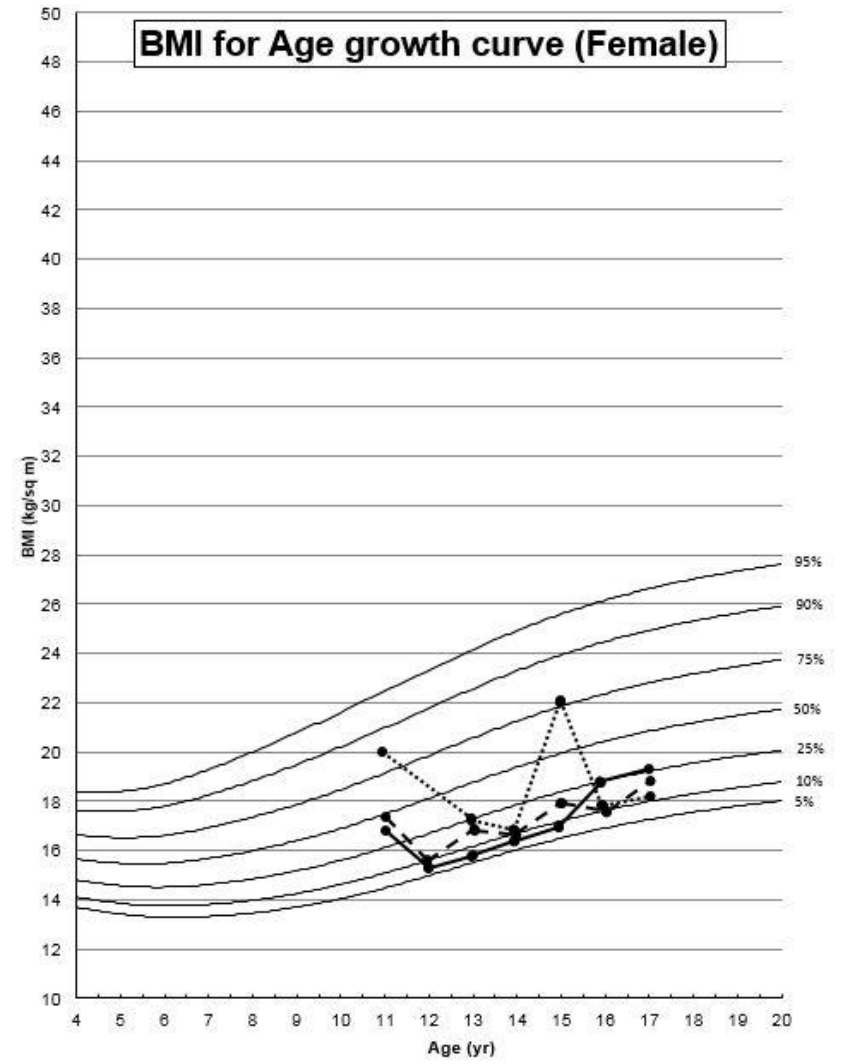


Figure 12. BMI for age growth curve for females aged 4 – 20 years, mean data from dancers in this study shown for early, on time and late maturing dancers ages 11 – 17.

Table 21. Pubertal timing of dancers (post-menarcheal sample) with age of menarche as a measure of early, on time or late maturation

Timing is derived from the average of this sample with ≤ 12.02 defined as early, 12.02 – 14.02 as on time, ≥ 14.02 as late.

Training year	Year 1	<i>M (SD)</i>	Year 2	<i>M (SD)</i>	Year 3	<i>M (SD)</i>	Year 4	<i>M (SD)</i>	Year 5	<i>M (SD)</i>	Year 6	<i>M (SD)</i>
Age of menarche		11.2 (1.2)		12.4 (.93)		12.9 (.83)		13.4 (1.2)		13.2 (1.2)		14.0 (1.5)
Early	2		2		4		3		1		1	
On time	1		12		18		11		11		7	
Late	-		-		4		12		8		15	
<i>n</i>	3		14		26		26		20		23	

M = Mean, SD = Standard Deviation

Pubertal timing with age of menarche as a measure of early, on time or late maturation for those who are post-menarcheal is shown in Table 21. Of note, the number of early maturing dancers reduces across the years, while the number of late maturing dancers increases as they are retained within the system, as shown in the final two columns for the final year students. The reduction in student numbers across the year groups reflects the formal selection process undertaken by each school (Figure 13).

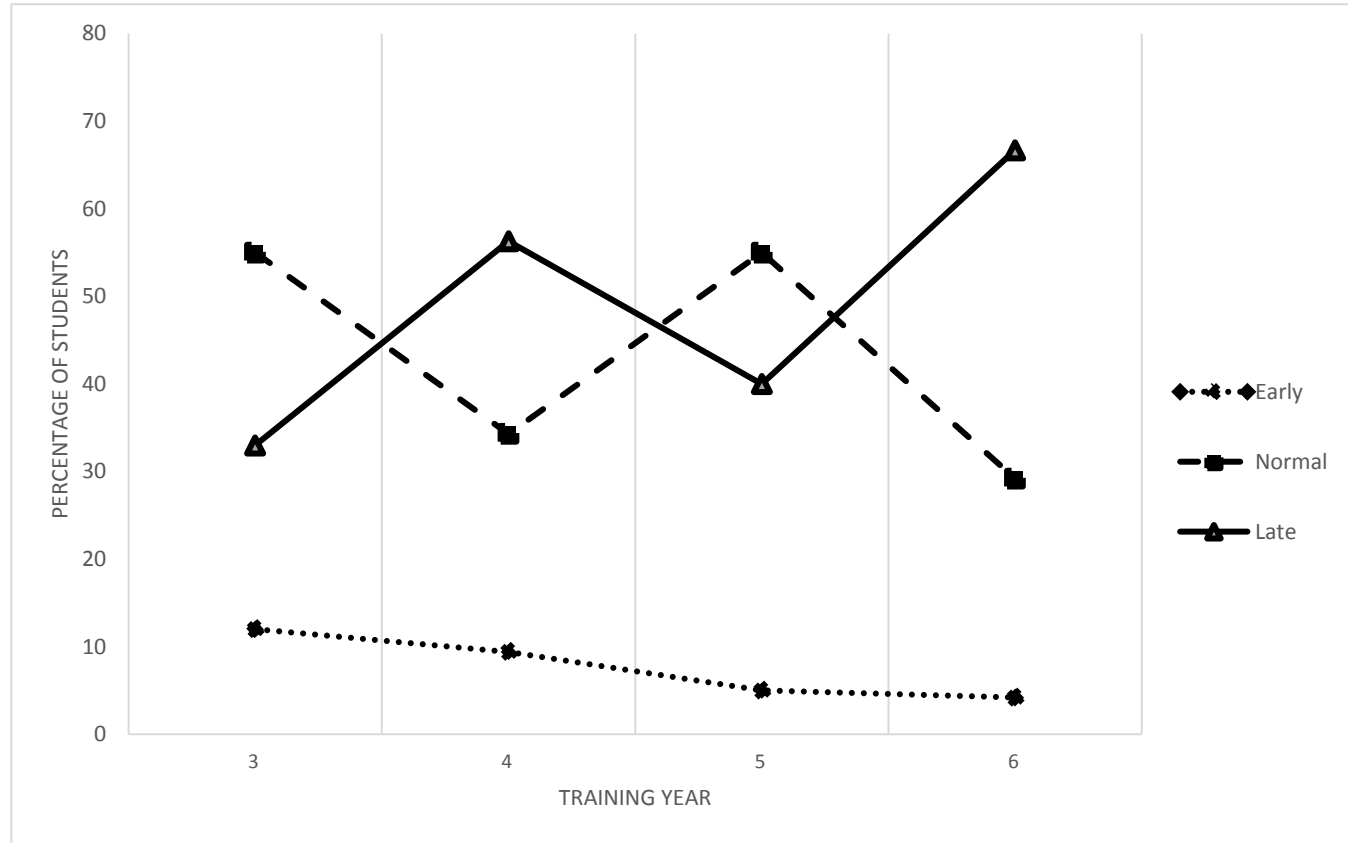


Figure 13. Trend in pubertal timing across year groups

Results show a significant positive relationship between self-perception of timing and age of menarche, a more objective measure of timing (Table 22). Dancers who experience menarche earlier, perceive themselves to be early maturing. Age of menarche appears to be the most significant factor influencing self-perception, with breast development, the growth spurt and body hair also having significant associations to self-perception of maturity timing, though at a lesser significance level.

Table 22. Pearson product moment correlations (1-tailed) between self-perception of timing, scores from the pubertal development scale and age of menarche, n=178, age of menarche n=110

Variables	1	2	3	4
1. Self-perception of maturity timing	–			
2. PDS Average	-.15*	–		
3. Category score	-.13*	.75**	–	
4. Menarche age	.69**	.04	-.01	–

**Correlation is significant at the .01 level (1-tailed). *Correlation is significant at the .05 level (1-tailed).

4.2.3 Discussion

The pubertal and demographic characteristics of young ballet dancers across schools are very similar, suggesting a homogeneity in the general characteristics of young ballet dancers, likely resulting from having similar formal selection processes and self-selection of similar individuals into full-time ballet training (Bowerman et al., 2015; Steinberg et al., 2008). School two has a slightly lower average age range and this is reflected in slightly lower means for height, weight, BMI and average score on the pubertal development scale.

The physical attributes of the dancers are perhaps best illustrated in the accompanying growth curve figures (Figures 3-8). While mean height data from dancers lies within the normal range for females of the same age (between the 25th and 75th percentiles), mean weight and BMI are lower than norms (World-Health-Organisation, 2007). The dancers in this study report lower weight than most females of the same age; dancers aged 12-17 chart between the 10th and 25th percentiles. This is also reflected in BMI, where dancers are below the 50th percentile throughout ages 11-17. This is in line with previous research which reports ballet dancers to be below average for weight and BMI (Brooks-Gunn & Warren, 1985; Burckhardt et al., 2011; Hamilton et al., 1988; Hamilton et al., Hamilton et al., 1992; Kadel et al., 2005; Toro, Guerrero, Sentis, Castro, & Puertolas, 2009; Zoletić & Duraković-Belko, 2009).

The growth curves also highlight differences in height, weight and BMI for ballet dancers of differing maturity groups. Consistent with existing literature, late maturers report the lowest values for weight and BMI (Gay et al., 2014). Late maturing dancers report weights below the 50th percentile across ages 11-17. For BMI, at ages 12-15, later maturing dancers lie between the 5th and 10th percentiles, for ages 16-17 around the 25th percentile; consistently below norms for age (World-Health-Organisation, 2007). On time dancers follow a similar pattern for BMI, with mean values lying between the 10th and 25th percentiles, still well below normal values for age. Early maturing dancers, on the other hand, show greater fluctuations in weight and BMI particularly between ages 11-15, aligning more closely with values of late and on time dancers for ages 16-17. This is likely a product of selection, whereby those who were not able to meet the lower weight and BMI required to fit in with later maturing dancers, did not remain in the system. However, the data from early maturing dancers should be interpreted with caution, as it represents a very small sample of dancers.

Recent research assessing the impact of adjusting for maturity in weight status classification may have relevance for this cohort in two key ways (Gillison et al., 2017). Firstly, weight is monitored and regularly measured in vocational dancers and can inform decisions to assess dancers out of training or recommendations for weight loss. For early maturing ballet dancers, comparing weight and BMI to maturity-adjusted values may enable a more accurate assessment of these dancers. Secondly, for those dancers delayed in puberty, comparing weight and BMI to maturity-adjusted values may better inform understanding of healthy or unhealthy weight, where many schools have policies on participation in training based on factors such as BMI (One Dance UK, 2015).

Age at onset of menarche is in line with other studies in ballet, where average age of menarche ranges from 13.1 – 13.9 (Burckhardt et al., 2011; Hamilton & Hamilton, 1990; Hamilton et al., 1997; Steinberg et al., 2008). The average age of menarche for this group of ballet dancers is 13.2 years, though a proportion (21.8%) of the dancers were pre-menarcheal. While this is average for dancers, it presents as delayed puberty when compared to general population norms which are between 12.4 and 12.8 (Baker et al., 2012; McDowell et al., 2007).

In terms of pubertal development, ballet dancers are generally delayed across all self-reported indices of growth and maturation compared to general population norms (Bond et al., 2006; Brooks-Gunn et al., 1987; Carskadon & Acebo, 1993). For example, in the second year dancers (age 12-13) the percentage of individuals categorised as pre-pubertal and in early puberty are greater than the number in non-dance samples of the same age (Bond et al., 2006; Carskadon & Acebo, 1993). The majority (52.6%) of these dancers were mid-pubertal compared to non-dancers, where mid-pubertal and late puberty categories were fairly evenly represented, 46.8% and 45.2% respectively (Bond et al., 2006). The mean pubertal stage for these dancers was 2.3 (± 0.59) and in non-dancers was reported at 3.4 (± 0.66) (Bond et al., 2006). Similarly, in fourth year dancers (age 14-16) a greater number (18.8%) were mid-pubertal compared to 4.7% in a non-dance sample. In addition, a lesser number of dancers were categorised as being in late puberty, 50% compared to 83.7% in non-dancers, with the mean pubertal stage in dancers at 2.9 (± 0.53) and in non-dancers at 4.1 (± 0.40) (Bond et al., 2006). While non-dance studies have much larger sample sizes, this basic comparison is consistent with dancers displaying comparatively delayed puberty. A greater sample size is needed to substantiate this.

Adolescent ballet dancers also report delays across other indices of pubertal development. When examining findings across indices of pubertal development by age,

averages are slightly below general population norms, particularly for breast development and menarche (Brooks-Gunn et al., 1987; Carskadon & Acebo, 1993; Petersen et al., 1988). These figures confirm delayed maturation in young ballet dancers across different indices of growth and maturation, though most markedly, onset of menarche and breast development. While little research exists on this topic, studies have presented evidence to support delayed puberty in indices other than menarche in ballet dancers (Hamilton et al., 1997). Hamilton and colleagues (1997) found that ballet dancers had not reached full maturation, as assessed according to Tanner levels of pubertal development. Dancers with a mean age of 14.92 (± 0.96) had average scores of 4.13 for pubic hair and 3.72 for breast development, with 15% of dancers yet to reach puberty (Hamilton et al., 1997). With a larger sample size than Hamilton et al, the current study aligns with the notion that the majority of dancers had not yet reached full maturation. Many of the dancers in the current study aged 13.96 – 15.96 had not reached full maturation, with 46% of these dancers still pre-menarcheal. Evidence from studies with non-dancers confirms comparatively delayed development for ballet dancers. At age 14.5 years, non-dance females attained an average score of 4.56 for breast development and 4.55 for pubic hair development (Marceau, Ram, Houts, Grimm, & Susman, 2011).

Pubertal characteristics change across age groups, as evidenced in increased mean values for height, weight, BMI and pubertal status, from the first year of training to the sixth year of training. Selection may play a key role, particularly in the characteristics of young ballet dancers in their fifth and sixth year of training where there are fewer dancers. This reflects the strict formal selection and high dropout rates associated with vocational ballet training (Dunning, 1985; Hamilton et al., 1997; Walker et al., 2012). Moreover, within these older year groups there is greater homogeneity, particularly in pubertal timing characteristics, likely associated with formal selection and/or dropout. For example, sixth year students have an average age of menarche of 14 and the majority of students (16 out of the 24) are very delayed in puberty with onset of menarche between 14 and 17 years.

Homogeneity in physical characteristics across the three different schools supports the formal selection and strict physical criteria sought for entry into the profession. A reduced number of students across training years aligns with research on low success rates in pre-professional dance, which report that less than 30% of students from nationally recognised ballet schools graduate (Dunning, 1985; Hamilton & Hamilton, 1990). Similarly, dropout rates of 53% to 55% have been reported in longitudinal studies (Hamilton et al., 1997; Walker et al., 2012). Factors associated with dropout vary with dance style and level of performance, but evidence consistently suggests that puberty is

a time period for increased risk of dropout (Cumming et al., 2012; Fairclough & Ridgers, 2010; Jackson et al., 2013; Sherar et al., 2010). This interval includes major changes in body size, proportions and composition, and physiological changes associated with sexual maturation and the growth spurt (Rosenfield, 1991; Tanner, 1962). With such factors, predominantly those which are more visible, such as changes in body size and shape, likely to align with characteristics vocational ballet schools may not deem to be conducive to a career in the profession (Mitchell et al., 2016; Pickard, 2015). For example, greater breast development has been associated with dropout from vocational ballet training (Hamilton et al., 1997).

These findings highlight patterns of formal selection, both in terms of general dropout and/or assessment out of training and more specifically, with a strong bias in terms of pubertal timing. A trend towards later maturing individuals is shown clearly across year groups with final year students being predominantly late maturing (16 out of 24, with onset of menarche between ages 14 and 17). Conversely, the number of early maturing dancers reduces across the years, though admittedly it is never large; at its greatest there are four early maturing individuals in the third year dancers group. While data is cross-sectional and therefore unable to provide evidence of trends across time, the data suggests a trend toward later maturation in the later training years. Further research is warranted using longitudinal data to examine trends across time.

There is little existing research on the topic of selection and menarche in ballet, and studies which have been conducted are limited by small sample sizes. This study provides further support for the findings of Hamilton et al (1997) which hold that greater breast development and earlier (early and on time) menarche are associated with dropout or being selected out of pre-professional ballet training (Hamilton et al., 1997). While the current study did not directly assess the characteristics of those who dropped out or were selected out of training, patterns in physical and pubertal characteristics across year groups support a trend towards minimal breast development and delayed onset of menarche in those who are retained.

These findings support the assertion that particular physical attributes, such as minimal breast development appear to hold social stimulus value for selectors. Within social contexts such as ballet training where a lean physique is sought after, late maturation and the physical characteristics associated with it may hold a more positive social stimulus value for teachers and peers than the physical characteristics, such as weight gain, which are more pronounced with early maturation (Brooks-Gunn & Warren, 1985; Mitchell et al., 2016; Pickard, 2013). This is consistent with the notion of 'physical capital'

whereby the desired physique accrues significant physical capital (Pickard, 2012, 2013). While existing literature pertains to the values held by dance teachers and dancers themselves, patterns in the maturity characteristics of adolescent ballet dancers found in this study suggest that these physical attributes may also hold social stimulus value for selectors.

Limitations

While this study has a larger sample size than all other studies of dancers on this topic, the sample size is still relatively small. Though these findings add support to the little research that currently exists, the limitations of cross-sectional data are acknowledged. Longitudinal research would be the most effective way to assess pubertal change across time, as the current study has been based upon different age groups across time rather than studying individuals across time.

The nature of self-reported data can be considered as a limitation of the study, yet is appropriate for use in this context. While self-report measures are associated with levels of error and reporting bias, self-reports are central to the aims of this research as they represent the perceptions of the individual (Dorn & Biro, 2011; Mendle, 2014). Further, personal perceptions of pubertal development are reported to be more relevant to psychological wellbeing than objective measures of puberty such as the Khamis-Roche method (Khamis & Roche, 1994). Moore and colleagues' (2014) hold that self-reports can reveal information about an individual's psychological development; self-reported data may reflect qualities such as mood, personality and cognitive style, in addition to more objective aspects of maturation (Moore et al., 2014). While no studies have directly compared self-perceptions with physical exams when predicting psychological outcomes, some studies suggest perceived pubertal timing to be more strongly associated with psychosocial outcomes, such as substance abuse, depression, anxiety and sexual risk taking, than more objective measures, such as age of menarche (Conley & Rudolph, 2009; Graber et al., 1997; Graber et al., 2004; Moore et al., 2014). Overall, more subjective measures such as self-report and self-perception data, regardless of accuracy, may inform research into adolescent behaviour and psychosocial outcomes. For example, these measures may contribute to assessing what leads individuals to seek out certain experiences or environments consistent with their perceptions of maturity or may influence how they behave in their relationships with parents and peers (Mendle, 2014).

Summary

This study provides evidence to of differences in physical characteristics, and perhaps also retention, of adolescent dancers of differing maturity timing. The characteristics of those represented in the later training years suggest a bias toward very late maturing individuals, which increases with age/level of training. This trend may be related to formal selection (e.g. audition panel preferences), self-selection or simply to differences in individuals applying to ballet schools in any given year. These findings lend support to arguments which emphasise a need to examine potential biases in more detail. If such a bias exists as a result of formal section, there are a number of ways in which schools can work to avoid such a strong bias, in favour of focusing on retaining the most talented dancers, whether early or late maturing. However, if for artistic or other reasons reducing such a bias is not possible, designing training systems which are more appropriate for the late maturing dancer could be of significant benefit. If late maturing individuals continue to account for the majority of those retained within training systems, evaluation, assessment points and the timing of increased intensity of training should be tailored appropriate to their growth and development. Differences noted between maturity groups in terms of physical characteristics, such as weight and BMI warrant further exploration in terms of their implications upon lived experiences. Differences in physical characteristics and the social value associated with possessing 'ideal' physical characteristics in the context of ballet, may result in the experiences of adolescent ballet dancers across maturity groups being qualitatively different.

4.3 Section 2 - An Exploration of Individual Experiences of Maturation in Adolescent Ballet Dancers

A qualitative design is employed in this series of studies, utilising semi-structured interviews and interpretative phenomenological analysis (IPA). Semi-structured interviews have been used to obtain experiential accounts from young dancers about maturing and developing within an intensive ballet training context. A reflective approach has been adopted prior to interviews and during the analysis process, with the researcher acknowledging her own experience in dance (Guillemin & Gillam, 2004; Holland, 1999).

Interviews explore experiences of growing up in dance, in particular, perceptions of development in comparison to peers and positive or negative experiences associated with the changes of puberty in the context of ballet. For example, 'How do you feel about physical changes/lack of in comparison to your peers?' 'How do you feel about these changes within the context of your ballet training? Have they changed anything?'

4.3.1 Methodology

Researcher's Positionality

Factors such as the researcher's background in ballet and the qualitative approach utilised in this study directly influence the epistemological and ontological standpoints adopted. This research is framed by a social constructionist ontology, the view that society is actively and creatively produced by human beings (Bryman, 2016). That is, the researcher presents a specific version of social reality, rather than one that can be regarded as definitive (Bryman, 2016). Therefore, this perspective considers the roles of perception and cognition within an experiential account and acknowledges researcher effect upon data collection and analysis (Shaw, 2010; Storey, 2016). This requires the researcher to acknowledge her own experiences and perceptions of the ballet world in order to separate these from the views of participants. The researcher trained vocationally in ballet throughout adolescence and matured 'on time' relative to norms for dancers. These experiences may influence how the researcher interacts with interview data in terms of potentially identifying with the experiences of those maturing on time and with her own experiences of the ballet training environment, its ideals and norms. This research maintains the epistemological standpoint of interpretivism which holds that reality is socially constructed and each individual creates their own reality, and therefore there are multiple interpretations and meanings which can be derived (Lewis-Beck, Bryman, & Futing Liao, 2004).

Sampling

The interview sample were selected from the cohort of participants described in the first section of this chapter. A sample size between six and ten is recommended for conducting IPA. This provides enough cases to examine the similarities and differences between participants without generating excessive amounts of data which may overwhelm the researcher (Turpin et al., 1997). Therefore, with the aim of examining similarities and differences between maturation groups, a sample size of eight to ten was sought for each maturity group. From those students who participated in the survey (N=188), eight to ten students from each school were invited to take part in an interview. A sample size of 28 interviews was achieved (early n=10, on time n=9 and late n=9), with each interview a minimum of 30 minutes in length (ranging from 30 to 60 minutes) to allow for obtaining the rich and descriptive data necessary for conducting interpretative phenomenological analysis (Shaw, 2010). Each group included dancers from each school and across a range of ages. In the early maturing group the age range was 11 to 17 years, school 1 (n=4), school 2 (n=3), school 3 (n=3). In the on time group the age range was 12 to 16 years, school 1 (n=3), school 2 (n=2), school 3 (n=4). In the late

maturing group the age range was 13 to 17 years, school 1 (n=3), school 2 (n=4), school 3 (n=2).

A purposive approach to sampling is required for interpretative phenomenological analysis, whereby the researcher seeks a closely defined group of participants for whom the research question will be significant (Smith et al., 2009; Storey, 2016). Interview participants were selected on the basis of differing maturation characteristics. Maturity timing was derived from the pubertal development scale scores and category scores, in addition to using age of menarche as an indicator of timing. For the latter, timing was derived from the average age of menarche in the overall sample, with ≤ 12.2 defined as early, $12.2 - 14.2$ as on time, ≥ 14.2 as late. The aim was to interview individuals with a range of maturity characteristics across the three schools with a minimum of eight interviews with individuals in each maturity category – early, average and late.

It is worth noting for future research with this population that the strategy of 'snowball sampling' may be effective to increase sample size (Lewis-Beck et al., 2004). Principals of the participating dance schools offered to ask their own contacts, who also ran vocational ballet training schools, if they were able to help, and offered to pass the researcher's details to these other schools. This strategy was used as a secondary recruitment strategy, as the principal of the first school offered to help recruit another school to take part in the research.

Procedure

After analysing the pubertal development scale responses discussed in section one, ten students were invited for interview based on differing maturation characteristics. This was repeated in each school. The aim was to conduct eight interviews per school, with ten students selected to account for those either unwilling to take part or unable to obtain parental consent. The administrator contacted these students and sent parental consent forms out via email. Interviews were arranged within two weeks of the survey analysis, with the deadline for the return of parental consent forms set two days prior to interviews commencing. The school administrator timetabled interviews around the school day for each student. Interviews were conducted in person, in a private room or area on the school premises.

Interviews took place across three to four days, with the researcher continuing to observe dance classes and maintain a presence at the school (See Section 1, Figure 2 for further details). This strategy was intended to promote familiarity, rapport and trust with the students, as much as was possible within the limited contact time, with the aim that this

would help students to feel comfortable during the interview. The main limitations of this approach were logistical. Firstly in terms of time; the schools were very limited in terms of the time they could allocate to taking part in this research. This was mitigated by the researcher remaining as flexible as possible to fit around the schedule of the school and by preparing a handbook of information and being very clear at each stage what was needed from the school. Secondly, the researcher used schools from a range of geographical locations, making this method of data collection more time-consuming, logistically challenging and financially costly. However, in this case, the advantages of visiting the schools in person and the necessity of using this method, justify these difficulties.

Ethics

The investigation of experiential accounts requires thorough consideration of ethics and a sensitive approach (Mitchell et al., 2016). Procedural ethics have been followed, with approval received from the University of Bath Research Ethics Approval Committee for Health (Bath, 2014; Guillemin & Gillam, 2004). Participating schools were presented with an information handbook via email (see Appendix E) prior to agreeing to participate, with an opportunity to ask questions about the study and data collection process. Prior to any data collection taking place, the principal of each school signed and returned a *loco parentis* consent form. For the students selected for interview, the school sent out a parental consent form which required written consent from a parent or guardian, these were returned before interviews commenced. Prior to interviews taking place, each student was provided with an information form and assent form, with the researcher present to answer any questions. Assent forms were kept by the participant for the duration of the interview, this procedure provided the participant control over consent, should they change their decision.

As students participating were under the age of 16, a DBS certificate was obtained by the researcher for the purpose of this research. Further, due to the age of the students participating, limits of confidentiality, in accordance with NCB guidelines (Shaw, Brady & Davey, 2011), were explained to participants: if an individual is indicated to be at risk (of harm to themselves or others), procedure put in place prior to the collection of data in accordance with the policies of participating schools would be followed, with an identified member of staff for referral (see Appendix D for details).

Ethical issues were anticipated prior to the data collection phase, enabling any issues during data collection to be managed effectively (Guillemin & Gillam, 2004). For example, procedures were put in place should any participant become upset or distressed during

the interview or should they disclose any information which suggests they may pose a risk to themselves or others. These procedures were developed in accordance with limits of confidentiality and with school policies (see Appendix D for details).

The two ethical dimensions, ethics in practice and procedural ethics, can be bridged by consideration of reflexivity: in reflexive research, the researcher regularly reflects upon her actions and role within the research process and within the analysis of data (Guillemin & Gillam, 2004). In order to acknowledge and account for researcher effect and positionality, a reflexive stance has been adopted throughout.

Interpretative Phenomenological Analysis

Interpretative phenomenological analysis (IPA) is a qualitative method which draws on the theoretical traditions of phenomenology and hermeneutics. The focus of this method is based around phenomenology, with the aim to develop an understanding of the meaning of human experience and how individuals make sense of their personal and social world (Larkin et al., 2006). Hermeneutics contributes to the analytical approach of this method. The process is heavily interpretative and dynamic, with the researcher playing an active role (Shaw, 2010; Smith et al., 2009; Storey, 2016).

In order to generate a greater understanding of the lived experiences of adolescent dancers in vocational ballet training, an exploratory qualitative approach is recommended (Smith et al., 2009). Interpretative phenomenological analysis (IPA) is concerned with the detailed examination of personal lived experience, the meaning of experience to participants and how participants make sense of that experience (Smith, 2011). IPA is a dynamic process which places an emphasis on the active role of the researcher, this is particularly apparent during the analysis stage which can be described as “engaging in a ‘double hermeneutic’” (Smith, 2011, p. 10). In this process, the researcher’s role is to make sense of the participant trying to make sense of what is happening to them (Smith, 1996; Smith, 2011; Storey, 2016).

IPA can be conducted using various types of experiential account, such as a diary or interview. This research sought to explore particular questions and therefore an interview method was deemed most appropriate (Smith et al., 2009; Storey, 2016). In utilising a phenomenological approach, the interviewer seeks to elicit rich, descriptive responses from participants. This is facilitated by a semi-structured interview format, with the interview guided by the schedule as a framework rather than dictated by it (Smith et al., 2009; Storey, 2016). A particular advantage of using an interview method is the face-to-face interaction which positions the researcher in real-time with the participant, a

situation which enables the researcher to pursue topics of interest which may arise during the course of the interview (Storey, 2016). Further, a semi-structured interview format provides the researcher with the freedom to move away from set questions and creates opportunities to discover topics which had not been anticipated by the researcher, but which might be pertinent to the overarching questions of the research (Storey, 2016). As the aim is to explore the lived experiences of participants, the flexibility to follow the participant's interests or concerns is central to an IPA approach (Smith et al., 2009). While this approach may lead to lengthy responses which will be more time-consuming to transcribe, it aligns with the aim to understand each individual's experiences of growing up in dance.

Interview Schedule

In order to refine the questions for the interview schedule (Appendix E), pilot interviews were conducted with three aspiring adolescent ballet dancers. This process highlighted the importance of additional 'ice breaker' questions in order to ease the participant into the interview topic. Ice breaker activities are recommended for use in research with children and young people, helping participants to feel at ease and to establish a relaxed environment (Gibson, 2007).

Each interview consisted of a 'warm up' section, with the aim to establish a conversational tone and to build rapport with the participant (Jacka, 2016; Smith & Eatough, 2016). This section included questions such as 'How long have you been dancing?', 'How did you get into dancing?' and 'What do you like most about ballet?' At this point, before the warm up questions, participants could ask any questions they had about the research, and terms such as 'maturation' were clarified (i.e. maturation was described as the process of growing and developing, to becoming an adult).

A similar approach is continued throughout the interview; asking more general questions and then gradually moving towards more personal questions. This approach has been adopted in order to increase the success of capturing the data sought in the interviews, as participants may be unwilling, or find it difficult, to talk about their own experiences.

The format of the semi-structured interview caters for the variation in participants allowing for the sequence of the schedule to be deviated from, questions to be omitted where necessary or to be phrased differently. The interviewer must decide what is appropriate for each participant (Smith & Eatough, 2016; Storey, 2016). For example, in answering one question, a participant may answer several others in the process, while another participant may be happy to discuss their own perceptions immediately, without

discussing more general perceptions. Additionally, this particular research involved individuals currently experiencing puberty, those who are pre-pubertal and those who are post-pubertal. With this in mind, different approaches to the interview questions were taken for each, allowing both those with little to no experience of puberty and those reflecting back on their experiences to talk around the subject matter in their own ways. For example, 'Do you feel your body is changing at the moment?', 'How do you feel about these changes/lack of changes?' and for post-pubertal individuals, 'How did you feel about those changes at the time' or 'How do you feel now you've gone through those changes?'

At the conclusion of each interview the researcher allotted up to 30 minutes to reflect upon and note down any points of potential significance. These notes were then referred back to during the analysis process. With 28 interviews to analyse, the initial thoughts of the researcher may be crucial in identifying similarities or disparities between individuals (Storey, 2016).

Transcription

Interviews were recorded using two devices, a dictaphone and a mobile phone device, to ensure capture of data. Interviews were separated by at least one hour, where possible, in order to develop a clear understanding and relationship with each narrative. This approach also increases the possibility of the researcher being able to recall any passages which are inaudible or unclear. Interviews were transcribed verbatim, with transcription undertaken by an external company due to the timeframe of the research and the volume of data. Transcription completed by an external party has both benefits and limitations. A potential limitation is that the researcher cannot use the transcription process as an opportunity to become more familiar with the data. This can be mitigated by written reflection at the close of each interview and a comprehensive approach to analysis. Benefits of transcription being carried out by an external party include limiting researcher bias during the transcription process, as this process inherently entails both judgement and interpretation on the part of the transcriber (Marshall & Rossman, 2006).

To ensure anonymity, participants' names have been removed from interview transcripts (Bryman, 2004) and renamed with two letters denoting their maturity status i.e. early maturing is EM, on time is OT and late maturing is LM and a participant number. For example, EM1, OT1, LM1, and so on. Schools have been renamed School 1, School 2 and School 3. The nature of conducting narrative based interviewing poses a risk to anonymity and confidentiality, for example, where places or names are referred to (Kvale & Brinkman, 2009). Subsequently, any identifying information such as this has been

removed from the interview transcripts and any quotes presented in the findings. Data was stored on a password-protected external hard drive with no identifying information present.

Data Analysis

The process of IPA is highly interpretative and detailed, with the objective to make sense of people's experiences (Mitchell et al., 2016). The process of data analysis and the generation of themes from the data is heavily influenced by the researcher; her knowledge of surrounding literature and own experiences (Patton, 1990). Adopting a reflexive stance encourages the researcher to reduce bias where possible and to remain aware of her own role within the process of analysis (Guillemin & Gillam, 2004). In addition, reflexivity enables the researcher to demonstrate transparency in both the research process and subsequent findings. In qualitative research, in particular research which utilises interpretative phenomenological methods, it is impossible for the researcher to remain 'outside' of the research, making reflexive research an important tool for the qualitative researcher (Holland, 1999). Moreover, as a phenomenological approach actively acknowledges the role of the researcher, maintaining this stance throughout all phases of the research creates a consistency in the position and approach of the researcher (Patton, 1990).

The process of IPA analysis can be described in two phases. The first aim is to develop an understanding of the participants' world and to describe what it is like (Larkin et al., 2006). This involves focusing on the participants' experiences of a specific event, in this instance maturing and developing. It is acknowledged that access to 'experience' is complex and inherently partial (Smith, 1996); the account is always constructed by both the participant and the researcher (Larkin et al., 2006). The outcome of this first stage is to produce a psychologically informed description (Larkin et al., 2006). The second phase aims to develop an interpretative analysis of the data, positioning the description within a wider social, cultural and theoretical context (Larkin et al., 2006).

Within these two phases the data is analysed in steps: Summarising the experiences described by the participant; examining what this means; and examining an individual's self-reflections to explore what they make of their own experience (Smith & Eatough, 2016; Storey, 2016). In the first phase several close readings of the interview transcript are required to ensure that any interpretations made in the latter stages of the analysis are grounded within the participant's accounts (Storey, 2016). During these readings, notes are made on any points of potential significance, for example, comments on initial ideas regarding meanings. At the end of this process a descriptive summary is formed

of what the participant has said, the issues that have been identified, what events are relayed, and the feelings which are expressed (Shaw, 2010; Storey, 2016).

Initial ideas are transformed into more specific themes and phrases, which forms the first stages of interpretation, where the researcher asks 'what interpretation can be drawn to answer the research question?' (Shaw, 2010). Themes are then organised into clusters, reducing the data by establishing connections between the preliminary themes and clustering them accordingly (Smith et al., 2009). From this, a table of final themes is presented for each individual participant. In IPA each case must be fully analysed before moving onto the next case. Data were analysed within maturity groups, once all cases for a particular group were analysed and allocated final themes, comparisons between cases across the group were made (Smith et al., 2009). Superordinate themes emerged with sub-themes and are presented with representative quotations.

Reflexivity

Throughout this process the researcher is recommended to keep a reflective diary, where thoughts on how to interpret the meaning of issues, events and feelings are detailed (Shaw, 2010; Storey, 2016). Thus, the researcher builds an understanding of the participant's experience gradually, throughout the analysis. This active construction of interpretations is prominent in reflexive research; whereby the researcher simultaneously constructs interpretations ("what do I know?") and questions how those interpretations came about ("How do I know what I know?") (Guillemin & Gillam, 2004). This interpretative process together with the identification of themes, culminates in the final analysis stage; a narrative account of the interplay between the interpretative activity of the researcher and the participant's account of their experience in their own words (Mitchell et al., 2016; Smith et al., 2009; Storey, 2016). These stages of analysis form an audit trail to illustrate how the interpretations made are based in the data. This ensures that it is possible for someone else to track the analytic journey of the researcher, from the raw data to the final table of themes (Shaw, 2010; Storey, 2016).

Adopting a phenomenological approach to the data collection process necessitates acknowledgement of researcher bias and experiences. This approach requires the researcher to reflect on her experiences with the subject under study prior to data collection. Having trained vocationally as a dancer, the researcher may have her own preconceptions which may bias her approach. This previous experience can be seen as an asset to the study as it enables the researcher access to the ballet world and to participants. However, it is acknowledged that this previous experience means that the researcher comes to the topic with her own experiences and assumptions. Prior to

conducting the study, the researcher reflected on her own experiences, including her time in vocational ballet training as an adolescent and her experiences of maturing on time in this context. A phenomenological approach aids the researcher in separating the experiences of her interviewees from her own and crucially enables a reflexive stance to be taken (Patton, 1990; Seidman, 1998). This reflective process is ongoing and enables the researcher to gain perspective from her own preconceptions and to be aware of researcher effect when working with data (Patton, 1990; Seidman, 1998).

A 'critical friends' process was utilised to encourage reflexivity (Cowan & Taylor, 2016). The process involved a critical dialogue with two senior researchers who listened and offered critical feedback in relation to the interpretations of the researcher (Smith & McGannon, 2017).

4.3.2 An Exploration of Individual Experiences of Early Maturation in Adolescent Ballet Dancers

Findings

Four themes emerged as central to the experiences of early maturing ballet dancers growing up in dance. (1) The benefits of early maturity: Early maturing dancers perceived a number of benefits relating to performance, physical and functional changes and having time to adjust. (2) Functional and aesthetic challenges: alongside perceived benefits early maturing dancers experienced challenges relating to physical growth and development, physical pain and injury and the feeling of 'being under a microscope'. (3) Being different was central to the experiences of early maturing dancers, who perceived the importance of visible changes and described coping alone. (4) Learning to cope was an important theme for early maturing dancers, describing the importance of support, adjusting and accepting. See Figure 14 for hierarchy of themes. Each theme is subsequently discussed; selected quotations of participants are presented. For further quotations see Appendix F.

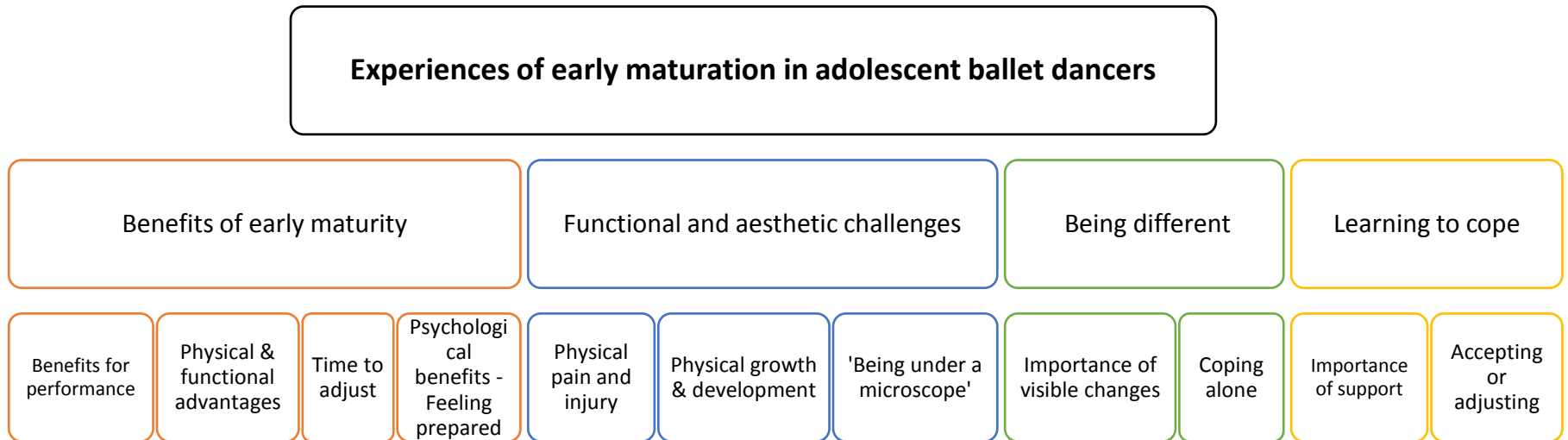


Figure 14. Hierarchy of themes characterising experiences of early maturing ballet dancers

Benefits of early maturity

Early maturing dancers perceived a number of benefits of early maturity: benefits for performance, physical and functional advantages, having time to adjust and psychological benefits related to feeling prepared.

Benefits for performance

Early maturing dancers felt that 'getting it [puberty] over and done with' benefitted their long term performance; as they would have overcome growth related injuries and regained flexibility and co-ordination and would have had time to adjust to their changing bodies, well in advance of crucial points of assessment and evaluation.

In year 9 we have our big appraisal and that's quite an important appraisal. It's where we either get assessed out or we can stay for the next few years. So the reason I think it's quite good at the moment that I'm growing now is because I'm getting it over and done with. I'm having all my injuries now because of my growth and so hopefully I won't have them in year 9 because I've started so early.

EM6 (age 13), p.8 line 263-270

Physical and functional advantages

Early maturing dancers also perceived advantages associated with aspects of physical changes such as developing muscle and a 'more womanly' body shape. In addition, they perceived an advantage in having greater proprioceptive awareness of their limbs compared to their later maturing peers: "I think that it's a positive thing because you develop muscle and you develop a body shape like a woman. Also, you need to know where your arm starts and finishes at times like that because when you're constantly growing you don't know where anything is" EM4 (age 16), p. 3 line 71-76

Time to adjust

Having time to adjust was a key benefit highlighted by early maturing dancers with earlier maturation providing them with a longer period of time to adjust and learn to cope psychologically and physically with changes at puberty. "...it's allowed me to learn how to cope with it, to be able to use it to my advantage...everyone else is around me saying, "Oh, this . . ." and I'm, like, I've totally gone past that, I'm fine now" (EM4, age 16, p.3, line 89-94).

Psychological benefits – feeling prepared

Closely linked with having time to adjust were psychological benefits and a sense of 'feeling prepared' reported by early maturing dancers: "...I think I'm more prepared now. Sixteen, you're already all into it; that's the centre part of you being a teenager, I think,

and, yeah, I'm pretty prepared, I'm fine with it" (EM10, age 16, p.4 line 173-178). While many described struggling and feeling unprepared initially, due to entering puberty at a relatively younger age, this enabled them to feel prepared for the next stage in their training or career. Early maturing dancers described feeling 'ready for that next step', perhaps as a result of this relatively greater period of time they had to adjust to changes at puberty before embarking on auditions/assessments at the completion of their training.

Functional and aesthetic challenges

Alongside the more positive aspects related to the benefits of maturity, early maturing dancers described functional and aesthetic challenges related to maturing at an earlier age. The challenges highlighted by the early maturing dancers included physical pain and injury, physical growth and development and 'being under a microscope'.

Physical pain and injury

Early maturing dancers described experiencing pain and growth related injuries such as Osgood Schlatters disease: "...when I was having my massive growth spurt I was in so much pain just on one side, and that definitely held me back a lot from improving, and getting my technique to where it should be" (EM7, age 17, p.7 line 340-342). For the older dancers, those who were reflecting back on these experiences, the emphasis was on overcoming these obstacles. Younger dancers currently experiencing these challenges noted how it was advantageous to deal with growth-related pain and injury at this point, 'getting the growing done' before the more crucial training years.

Physical growth and development

Physical growth and development was also important to the early maturing dancers, with early maturation often associated with greater pubertal gains in size and these individuals likely to experience more visible physical changes, such as breast development, in advance of the majority of their peers.

...I hated it. I hated it. As soon as, like, boobs started to grow and stuff I really didn't like it and, no, it was horrible... I still thought that the body of a twelve year old was how it was supposed to be forever and I was like, "What the hell is this?" but then, I don't know, I just really didn't like it and started to put on weight other places as well and it just wasn't nice.

EM3 (age 17), p.5, line 113-120

Early maturing dancers also described comparing themselves to their relatively smaller and less developed peers and implications of the growth spurt such as loss of flexibility.

I always think, with flexibility, when people are smaller they have less weight. Like, we were told to 'lift up' last week — if you've got longer legs and heavier bones, it's harder. So you always look less flexible than everyone else. I'm not really un-flexible, but I'm not as flexible as a lot of other people in my year because of how long my legs are, and weight and stuff...Also, with my weight, I'm really, really heavy but I'm not really fat...Yes, I'm just really tall and heavy bones and everyone else is just really slim.

EM1 (age 11), p.4, line 104-112

'Being under a microscope'

Lastly, early maturing dancers likened their experiences of puberty to 'Being under a microscope'.

It's stuff like being in a leotard and tights and you feel bloated, it's like, "Whoa" and then it's like you're under a microscope more, sort of thing, like it wasn't really anything I'd ever thought about before you came here and it becomes a bit more, like, at the front of what you are thinking about.

EM3 (age 17), p.4, line 97-103

Early maturing dancers described a keen awareness that they were physically different and that they 'stood out', with the dance environment making it 'difficult to hide'.

Because you're growing and some people weren't, I'm quite tall in my year and I'd feel definitely like a giant compared to my friends. Also, even if I wasn't growing outwards, I would feel like I was so I didn't particularly like being at the front, and even some movements I just didn't want to do. Because I'm meant to look pretty, I didn't feel good in myself in that way.

EM7 (age 17), p.9, line 431-435

Being different

Being different was central to the experiences of early maturing dancers who perceived the importance of visible changes and described coping alone. More specifically, visible differences in height, breast development and widening of the hips were described as troubling.

Importance of visible changes

Due to experiencing visible physical changes in advance of the majority of their peers early maturing dancers perceived themselves to be overtly different from their peers.

Through primary school I was always a giant compared to everyone else. I was head and shoulders taller than everyone. I think it was quite hard for me to be so much taller than everyone. . . I felt really self-conscious with that, which was a shame.

EM4 (age 16), p.6, line 190-194

While not all experiences were quite so negative, one dancer described being bullied and socially excluded due to physical differences associated with her early maturation. "...sometimes other places I get bullied for being more mature than everybody and everything...Sometimes people have cringed...And laughed." (EM5, age 11, p.3-4, line 84-100).

For the majority of early maturing dancers, being different was described negatively, with some suggesting visible changes, if deemed undesirable for ballet, could be make or break. References were made to a 'right' and 'wrong' way to grow "some of us end up growing the wrong shape" (EM6, age 13, p.9-10 line 307-308) and to the importance of physical development outcomes in terms of staying within vocational training systems "One of my friends in Year 9 was assessed out because she had bigger boobs than everyone and in Year 9 you're quite young still...And that was very difficult for her" (EM7, age 17, p.3, line 107-112).

Coping alone

As part of 'being different' early maturing dancers described how they initially felt as though they had to cope with the challenges of puberty independently. Due to the fact that these girls are experiencing puberty in advance of the majority of their peers, many described a lack of support and having to approach adults such as teachers or parents to support them.

...I started really young and it was hard and I didn't know what to do, and no-one around me was going through the same thing so I couldn't talk to anyone about it. It was more teachers — which I didn't want to know about it.

EM4 (age 16), p.4, line 126-129

Learning to cope

Learning to cope was an important theme for early maturing dancers, they highlighted the importance of support and accepting or adjusting to changes. While they experienced a lack of peer support, learning to cope entailed accessing other areas of social support such as parent and teacher support.

Accepting or adjusting

The narrative described by older dancers reflecting back on their experiences was shaped by initial feelings of 'not coping' and self-consciousness about physical changes and a gradual acceptance of or adjustment to changes both physically and psychologically.

I don't think I did really cope with it. I'm still really self-conscious about it but, I don't know, I've just sort of gotten over it a bit more. I've sort of grown up in the way that I don't really care as much. It's not the right word to use...it's more that I've, sort of, accepted that there is nothing I can do about it, that I am just going to have to work with the body I've got, which is fine...

EM3 (age 17), p.5, line 123-130

Having to learn to live with or deal with these changes at a young age, while challenging, tended to result in positive outcomes for the early maturing dancers. This included overcoming initial challenges such as injury and building confidence from this. Others described an approach which involved accepting these changes and making the best of them.

Importance of support

Support was a key theme for early maturing dancers. While some struggled to access support, those who were able to emphasised the importance of this. Support was often sought from parents, teachers and older peers, with early maturing girls perceiving their same age peers as unable to understand and thus to support them: "...my Mum has always helped me through things like that and I always talk to her about my problems. She's my best friend...Yes, she's really helped me through all of these tough times" (EM4, age 16, p.12, line 397-399).

Discussion

Existing research highlights the disadvantages associated with earlier maturation in ballet in terms of selection (Hamilton et al., 1997) and psychological wellbeing (Brooks-Gunn et al., 1989; Brooks-Gunn & Warren, 1985). While many of these disadvantages were also identified in this study, advantages of earlier maturation were also noted. Consistent with the perceptions of dance teachers (Mitchell et al., 2016), early maturing ballet dancers in the current study perceived a number of physical and developmental benefits to advanced maturation within the context of vocational ballet training. These benefits relate directly to the timing of physical growth and maturation relative to the training and evaluation systems of vocational ballet schooling in the UK.

Early maturing dancers experience physical changes early on in their training, at a point which is arguably less crucial in terms of evaluation and assessment. The timing of pubertal change, relative to training and evaluation, provides these individuals with time to adjust to the changing body, both physically and psychologically, in readiness for end of training evaluation and audition. Early maturing dancers described both direct and indirect effects relating to their experiences of puberty; direct effects, including loss of flexibility and co-ordination, and indirect effects, such as the social stimulus value associated with breast development.

Direct and indirect effects of puberty

Physically, the main direct benefit perceived by early maturing dancers in terms of training, is experiencing the most rapid period of growth during a less crucial training period. While these individuals may lose flexibility and co-ordination during this time, they are aware that they will benefit at a later date due to 'getting it over and done with' at an earlier stage. In theory, this may also help these dancers to be comparatively more ready than their on time or later maturing peers for appraisals which take place after the first few years of training. In terms of physical and functional performance, these dancers will have more time to adjust to biomechanical changes and may also benefit, both functionally and aesthetically, from increased muscle development at this time (Malina et al., 2004).

Due to the timing of physical change for early maturing dancers within the framework of vocational ballet training, direct effects of puberty such as loss of flexibility and co-ordination, while frustrating, were arguably less salient for these girls compared to indirect effects. Of particular importance was how the physical changes of puberty were perceived by significant others (teachers/peers). While certain physical developments

such as height or increased muscle mass were perceived as beneficial, other aspects of normal pubertal development were perceived more negatively. It should be acknowledged that while the system is more suited to earlier maturing individuals in terms of the timing of testing and evaluation, remaining in vocational training programmes is more challenging, due to visible physical changes which may not be considered conducive to a ballet career (Brooks-Gunn et al., 1989; Hamilton et al., 1997; Mitchell et al., 2016; Pickard, 2013; Pickard, 2015).

While there are fewer early maturing individuals in vocational training compared to on time and late individuals, existing literature confirms that this bias increases with age, with comparatively few early maturing dancers succeeding into the profession (Brooks-Gunn & Warren, 1985; Hamilton et al., 1997). This has been found in existing research where there is a high prevalence of delayed maturation in adult professional ballet dancers and in study one and study three of this thesis. Whether the low numbers of early maturing dancers derives mainly from assessment out of programmes, rejection at audition (particularly those auditioning for year 9 or post-16) or self-selection out of programmes, has yet to be studied. Hamilton and colleagues (1997) observed that the characteristics of those who dropped out of ballet training included greater breast development and early menarche, but did not differentiate between 'assessment out' of training and self-selection out of training. Importantly, consideration and understanding of varying maturity timing could be key to retaining talented earlier maturing ballet dancers. The findings in this study support existing research which holds that early physical development may be a contributing factor for selection out of programmes, either by the school or self-selection out of training by the student themselves (Hamilton et al., 1997). While of course not all individuals will possess the requisite physique for a professional career, changes at puberty may not represent the final adult physique and thus, selecting out on this basis may result in unnecessary loss of talent from vocational ballet programmes and unnecessary effects on wellbeing.

A recurring theme, both in existing literature and in the current study, is breast development. Breast development is perceived as a particularly negative aspect of physical development for young ballet dancers, which can be considered as 'make or break'. Greater breast development has been associated with those who dropped out of vocational ballet training (Hamilton et al., 1997). It is also a factor perceived negatively by dance teachers, who suggest that within the expectations of the wider ballet world, greater breast development is not conducive to a career in ballet (Mitchell et al., 2016). In the same study, teachers also describe observations of peers being rejected or assessed out due to greater breast development (Mitchell et al., 2016). Similarly, early

maturing dancers in this study made reference to experiences where peers had been rejected or assessed out on the basis of greater breast development or developing too early. Existing research supports the notion that social interactions which form a response to physical changes, such as breast development, can impact upon the subsequent meaning individuals attach to those changes (Summers-Effler, 2004). In this context, negative social interactions and responses to breast development may contribute to stigmatising normal pubertal changes, particularly those which are made more visible by the constraints of the ballet environment.

Experiences of breast development appear to be especially significant for young, early maturing dancers as visible change is impossible to hide and they experience these changes in advance of the majority of their peers. The experiences of early maturing dancers highlight the challenge of accepting normal pubertal changes within an environment where abnormal expectations are held with regard to physique. Young ballet dancers are attuned to the expectations of the ballet body physique and these notions of 'ideal' are applied to their own perceptions and understandings of their own bodies (Pickard, 2013; Pickard, 2015). Pickard (2013, 2015) discusses this using the term 'physical capital', whereby having the ideal ballet body accrues significant physical capital and those who do not conform to this ideal have diminished physical capital. This notion was supported by dancers in this study, with the majority being able to define an 'ideal body' for ballet and to identify certain physical attributes as valuable or less valuable. Early maturing dancers had an acute awareness of those attributes which were less valuable. This contributed to feelings of self-consciousness as they experienced these physical changes and in some cases, also impacted upon their social interactions with peers. Consistent with recent research conducted with dance teachers, these findings speak to the social stimulus value attached to specific physical characteristics within the social context of ballet. Physical characteristics associated with earlier maturation appear to hold a lesser social value for significant others within the environment, such as teachers and peers (Mitchell et al., 2016). Further, the social value of the adolescent body is magnified in its importance as dancers perceive it to have the potential to influence the interaction between dancer and training establishment as it can ultimately lead to 'rejection' from the system.

The experiences of early maturing dancers suggest that their understanding of the wider social value of particular physical characteristics, has implications for feelings of self-worth. The expectation that movements and dancers are meant to 'look pretty' conflicted with perceptions of physical change at puberty and was linked to being unable to 'feel good' about the body in that way. This feeling was accentuated by peer comparison, use

of the mirror and ballet attire. While perhaps amplified within the context of ballet training, existing research provides support for the association between early maturation and perceptions of attractiveness. Research holds that earlier maturing girls perceive themselves to be less attractive and less conditioned, compared to their on time or late maturing peers, with perceptions of attractiveness and sport competence predicting self-worth, which in turn predicted greater involvement in physical activity (Cumming et al., 2011). Given the high dropout rates reported in dance, this finding warrants further exploration.

In 'learning to cope', over time early maturing dancers responded positively to stressors in their environment, such as conflict between desired physical norms for ballet and pubertal change, and many described being able to adapt successfully. Being different, and the challenges inherent for those early maturing dancers remaining in the vocational training system, may promote resilience; those who remain in the system will have had to overcome a number of considerable challenges and adapted positively to those challenges, in order to be retained. Early maturing dancers have the potential to experience a greater number of challenges early on in their training and also have a relatively greater period of time to overcome challenges and setbacks associated with growth and maturation. Having this experience early on in their training may enable the development of strategies to cope and overcome these challenges and, through subsequent challenges, cope more easily (Brown, Arnold, Standage & Fletcher, 2017; Galli & Vealey, 2008).

Further, early maturing dancers complete this period of their development within the vocational training environment, which has the potential to offer support and to facilitate healthy adaptation. This could be important as social support is suggested to be a key factor associated with the development of coping strategies (Fergus & Zimmerman, 2005; White & Bennie, 2015). Later maturing dancers may not have the same opportunities to develop coping strategies, having comparatively more amenable physical characteristics for the majority of their training, thereby less opportunity to overcome challenges in the same way as their early maturing counterparts. Moreover, late maturing dancers experience growth and maturation in their later training years and have to adapt during their transition to further training or a professional career, potentially offering less social support and opportunity for the development of coping strategies. In addition, social context has been found to be a critical determinant of resilience versus vulnerability (Mendle et al., 2007). Accordingly, schools and teachers should look to facilitate greater resilience through providing an adaptive social context for the adolescent dancer.

Challenges related to advanced physical maturation may, in the wider scheme of things, be an advantage for psychological development and adaptive responses in the context of ballet. The earlier maturing dancers in this study tended to deal with this in one of two ways: accepting and 'putting up with it' or learning, changing and adapting – accept or adjust. It is possible that because early maturing dancers experience the challenges associated with physical changes at an early stage in their training, and as they may perceive some of these physical changes to be less than ideal, that this facilitates the development of further skills to mitigate perceived disadvantages. The Underdog Hypothesis (Gibbs et al, 2012) may apply to the early maturing dancer. In the same way that late maturing males in sport can excel if retained by training systems (Gibbs et al, 2012), the same may be true for the early maturing female ballet dancer. Physical disadvantage, such as early development, may encourage superior development in other areas, such as technique, musicality and artistry, in order to compensate for lacking the 'ideal' physique. In addition, the greater period of time to adjust to pubertal changes before embarking on a professional career or further training, may afford early maturing dancers greater psychological fortitude, enabling dancers to 'use it to their advantage'. However, it is important to acknowledge that only a small percentage of these 'underdogs' appear to survive or develop these skills (Gibbs, Jarvis, & Dufur, 2012).

In ballet, similarly to other sports, these strategies may not be enough to retain these individuals within the system, but perhaps aids those who are retained to thrive. A further consideration is that while some may develop these attributes, others who succeed into the profession may already possess these attributes. As well as these more adaptive responses, the acceptance of these changes and the mind-set that these characteristics are permanent and not controllable represents a less adaptive strategy (such as in learned helplessness) and yet, may also enable dancers to succeed, though perhaps not to thrive. Further research is needed to substantiate these theories, though the narratives outlined by early maturing dancers in this research lend greater support to the former theory, with early maturing dancers exhibiting positive psychological attributes, such as greater self-awareness, cognitive maturity and adaptive coping strategies.

Another factor which may promote greater psychological wellbeing in early maturing dancers is feeling 'grown up'. While this may be a natural progression for most at puberty, young dancers, who often remain pre-pubescent in appearance, continue to be referred to as 'boys and girls' throughout much of their career (Buckroyd, 2000; Fay, 1997). Thus, psychologically, perception of themselves as young adults appears important and was perceived as an advantage by early maturers, who look and feel more adult than their

late maturing peers. A further opportunity this seems to offer early maturing dancers is to be seen as someone who peers look to for advice and support. This role may also help these individuals to develop in terms of emotional and cognitive maturity. Further, residential students, as opposed to those who were day students, felt similarly in terms of developing self-reliance and independence. This was something which these dancers took a lot of confidence from and perhaps something which facilitates positive psychological development.

Biocultural models and hypotheses

Much existing research explores the disadvantages of early maturation, as framed by the Stage Termination Hypothesis (Petersen & Taylor, 1980), in terms of a relative lack of time to prepare for the changes of puberty, leading to greater risk for adjustment issues. However, there is less focus in current research on the potential benefits of early maturation, regarding a greater period of time to adjust to changes during adolescence. Although early maturation is thought to interrupt the acquisition and consolidation of adaptive skills in middle childhood, there is some research to support that the additional time early maturers have to adjust during adolescence, may compensate for this (Peskin, 1973; Peskin & Livson, 1972; Petersen & Crockett, 1985). This particular advantage may be specific to certain contexts, such as vocational ballet schooling, where the nature and timing of evaluation and testing may contribute to this condition being advantageous, as such, this is an area which warrants further investigation. Furthermore, research supports the premise that individuals who are forced to cope with multiple life transitions concurrently are at greater risk (Simmons, Burgeson, Carlton-Ford, & Blyth, 1987). Therefore, early maturing dancers who experience pubertal change, final school testing and the transition between vocational training and entering the ballet profession in sequence, as opposed to late maturers who may experience these concurrently, may experience advantages in terms of adjustment and adaptation.

The experience of early maturing dancers offers some support for the Puberty-Initiated Mediation Hypothesis (Ge & Natsuaki, 2009; Ge et al., 2011). This hypothesis holds that physical and functional characteristics related to earlier maturation hold social stimulus value for significant others such as peers and thus influence their perceptions of the individual and the nature and quality of social interactions with that individual (Ge & Natsuaki, 2009). While there seems to be a negative stigma attached to puberty in ballet, early maturation and the associated changes are described almost as taboo. One young dancer described being bullied for being more mature than her peers and recounted people cringing and laughing. Such social interactions may play a significant role in

generating meaning around physical changes such as breast development for young dancers (Summers-Effler, 2004).

Existing research supports the notion that social interactions which form a response to physical changes can impact upon the subsequent meaning individuals attach to those changes (Summers-Effler, 2004). In this context, negative social interactions and responses to changes at puberty may contribute to stigmatising normal pubertal changes, particularly those which are made more visible by the constraints of the ballet environment. Further, how individuals perceive pubertal changes is important for psychological wellbeing. Perceived breast development, for example, may be especially salient within this group. Greater perceived breast development, particularly if it occurs at a younger age, has been identified as a risk factor for poorer psychological wellbeing among adolescent girls (Yuan, 2012). Greater perceived breast development is associated with lower self-esteem and higher depressive symptoms (Yuan, 2012). While the current study did not seek to assess psychological wellbeing, negative perceptions of pubertal change were reflected upon by many of the early maturing dancers. In light of these findings, further exploration of the potential psychological implications attached to these negative perceptions is warranted.

In an environment where form-fitting attire is required and mirrors are heavily utilised, physical changes are difficult to hide. One dancer likened this to 'being under a microscope', illustrating how experiences of physical change within this environment can be intensified. Maturing well in advance of the majority of their peers, the more visible changes associated with puberty may be especially noticeable and may conflict with social and cultural norms. Early maturing dancers described their struggles with 'being different' and having to cope on their own initially, as they had no peers who they felt able to talk with. Dancers found different ways to access support, some more adaptive than others. For example, a few dancers mentioned how they had to talk to teachers, which they did not feel comfortable with, or described close relationships with parents, but on the whole they did not feel able to talk to their peers about this subject until much later on. Those who were able to access support from peers talked about friendships with older peer groups, strong bonds with other earlier maturing individuals and pre-established links with older girls through a 'buddy system' which was utilised in one school, whereby each dancer is given a 'buddy' who is older. Forming relationships with older peers is in line with Magnusson and colleagues' (1985, 1986) Peer Socialisation Hypothesis, whereby adolescents select peers of a similar maturity status and may exhibit behaviours relative to that older social group. While there is no evidence to

support the latter, the early maturing dancers from this study were able to access peer support by identifying individuals with a more similar maturity status in older year groups. Others described less adaptive forms of coping, such as going home to cry, as they were unable to seek support from peers or other figures. This sort of response may relate to the theory of learned helplessness, which describes the quitting response that follows from the belief of little or no control over life's defeats (Martinek, 1996). Essentially, for these young dancers, learned helplessness translates to just dealing with and accepting outcomes at puberty and their subsequent implications, succumbing to their lack of control over the situation.

Martinek (1996) posits a model for explaining learned helplessness in physical activity (Figure 15) which holds that all individuals need to gain control over outcomes, which is not always possible or adaptive when applied to the context of the early maturing dancer. A key moderator of control noted by Martinek (1996) was teacher expectations, which have been found to have a profound effect upon a students' sense of control. This may relate especially to the perception of lower teacher expectations and subsequently lower self-expectations of earlier maturing individuals due to less ideal physical attributes (Brooks-Gunn et al., 1989; Brooks-Gunn & Warren, 1985). Further, the social context of vocational ballet training offers little scope for greater control, due to the wider social context of the ballet world and its rigid physical and aesthetic ideals. Within this, the theory suggests that the pervasiveness and permanence of a particular attribute, in this instance the characteristics associated with early maturation, will determine the extent to which a person becomes 'learned helpless' (Martinek, 1996). Three explanatory styles are put forward: (a) temporary and situation specific, (b) permanent and situation specific, and (c) permanent and pervasive. In this sense, if a young dancer is able to see the implications of early maturation as temporary and situation specific, this explanatory style would promote more adaptive responses associated with mastery, rather than learned helplessness. On the other hand, perceiving the implications of early maturation as permanent and pervasive is associated with a higher degree of learned helplessness. Thus, the moderators of control, such as teacher expectations and the social context within which young dancers experience maturation, have a key role to play in promoting more adaptive responses to the implications of maturity timing.

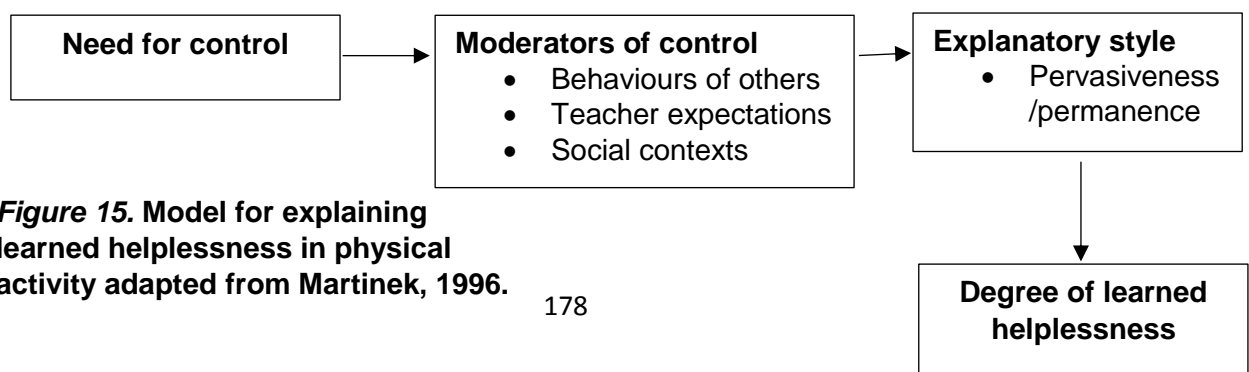


Figure 15. Model for explaining learned helplessness in physical activity adapted from Martinek, 1996.

Peer and parental support is noted as an important factor relating to psychological wellbeing during adolescence both generally (Raja et al., 1992; Stice & Whitenton, 2002) and within dance (Francisco et al., 2013b; Stark & Newton, 2014). Support from peers and parents was important to the dancers in this study and it was apparent that those who could not access support perceived greater difficulties than those who were able to access support. This ability to access support could be significant for subsequent psychological wellbeing in early maturing ballet dancers in particular; as they are out of synch with their peers they report greater difficulties in accessing support from them.

Existing literature holds that deficits in social support can predict increases in body dissatisfaction (Stice & Whitenton, 2002) and that perceived parental attachment is a critical variable in determining psychological wellbeing at adolescence (Raja et al., 1992) (Armsden & Greenberg, 1987). In addition, social support has also been found to be important to wellbeing, specifically in the context of dance, with quality relationships with peers and teachers contributing to wellbeing in adolescent dancers (Stark & Newton, 2014). Stark and Newton (2014) also investigated the climate for adolescent dancers and found task-involving and caring climates to promote better positive affect, body-esteem and relationships with teachers and peers. Therefore, ensuring optimal learning climates may be important to facilitating better social support for earlier maturing dancers.

The Contextual Amplification Hypothesis suggests that the negative effects of puberty are accentuated in contexts which are aversive, especially in early maturing girls (Allison & Hyde, 2013, Ge et al., 2002). Applied to ballet, the hypothesis suggests that an early maturing dancer who experiences visible changes in physique, will have negative experiences during puberty. More specifically, training for long hours in a learning environment which emphasises thinness would increase the likelihood of maladaptive responses in a pubertal dancer, such as issues with body image and self-esteem. Consistent with this hypothesis, the experiences of early maturing girls in vocational ballet training support the contention that early maturation is not always a valued condition, particularly in terms of physical characteristics, with subsequent negative implications for psychosocial outcomes (Allison & Hyde, 2013; Ge et al, 2002). The experiences of early maturers in this study support the perception of the increased challenge associated with being an early maturer in the context of elite ballet.

While negative effects of puberty do appear to be accentuated within this context, many early maturers in this study appeared to be psychologically robust, in contrast to what the Contextual Amplification Hypothesis might suggest; while initial outcomes may be

maladaptive, this appeared to change over time. It is important to consider that a lack of negative effects may be related to recruitment. Limitations in terms of recruitment (i.e. those schools who were willing to participate may represent more adaptive environments in that they were open to their students discussing puberty) may affect the findings. Future research should aim to engage harder to reach participants such as those who have dropped out of vocational ballet training, in order to advance our understanding in this area.

The challenges faced by early maturing dancers, such as experiencing visible changes in advance of the majority of their peers and feeling relatively unprepared and alone at puberty, may facilitate the development of (or utilisation of pre-existing) coping mechanisms. Further, a sub-theme within 'learning to cope' was the importance of support. While the overarching social context of ballet training may accentuate negative effects of puberty for early maturing dancers, those who can access support networks within their immediate social context, were perhaps able to mitigate this effect. Over time, 'being different' became a positive attribute for early maturing dancers. Many of the older dancers who were able to reflect back on their experience described how initial challenges and having to learn to cope alone helped them to develop their own coping skills, utilise support networks and increase self-reliance. These types of learning experiences and social support may underpin the mechanisms through which these young dancers deal with subsequent challenges and could perhaps facilitate greater capacity for psychological wellbeing.

For the early maturing ballet dancers in this study, experiences were permeated by a sense of being out of synch and disconnected with same age peers, instead, seeking support from older peers, teachers or parents. Visible development and the extent of this development, appear to be key to perceptions of puberty as negative. While physical pain is part of their experiences, it is clear that many early maturing dancers perceive themselves as advantaged, due to being able to 'get it [puberty] out of the way', before important auditions and evaluation points. Having time to adjust to your 'new body' seems important psychologically; adapting quickly and accepting the changing body seems key to adaptive psychological outcomes for these young dancers. All in all, a greater time to adjust and adapt to these changes, in advance of crucial selection and evaluation years, appears to enable the development of both psychological and physical readiness in earlier maturing individuals.

4.3.3 An Exploration of Individual Experiences of On Time Maturation in Adolescent Ballet Dancers

Findings

Three themes emerged as central to the experiences of on time maturing ballet dancers growing up in dance. (1) Coping with change: on time dancers perceived a number of important factors for coping with change at puberty, including social support from peers and parents, supporting others and seeking support from older peers. Acceptance and reassurance were also highlighted as key, in addition to dancer interactions with teachers and their environment (2) Advantages of on time maturation: on time dancers perceived a number of benefits to maturing earlier than many of their peers, this gave them a sense of 'fitting in', time to adjust and also to see puberty as an opportunity. (3) Alongside perceived benefits, on time dancers experienced challenges relating to growth and development, many of these challenges were aesthetic, including peer comparison, the notion of acceptable and unacceptable changes at puberty, the importance of tempo and order of physical changes and feeling judged. See Figure 16 for hierarchy of themes. Each theme is subsequently discussed; selected quotations of participants are presented. For further quotations see Appendix G.

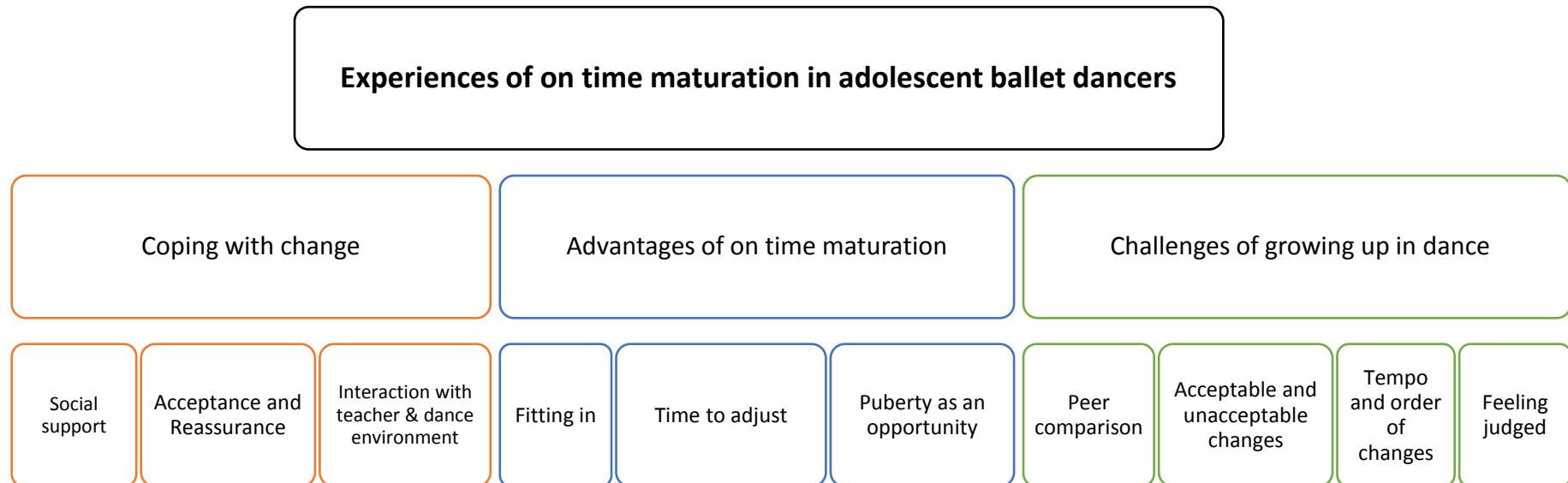


Figure 16. Hierarchy of themes characterising experiences of on time ballet dancers

Coping with change

On time dancers perceived a number of important factors for coping with change at puberty, including social support from peers and parents, supporting others and seeking support from older peers. Acceptance and reassurance were also highlighted as key, in addition to dancer interactions with teachers and their environment.

Social support

Social support was perceived to be very important by on time dancers as a way in which they were able to manage and cope with their experiences of change at puberty. Dancers described a broad range of social networks to which they had access, including same age peers, older peers, parents and teachers and many of their experiences described giving support as well as receiving it.

...it's just the fact that you can help others and be certainly more confident and make them confident because I'm not really one who is like super confident but I think I've now just got like a lot of more open about things because I'm one of the first and I should really be helping my year through it and stuff.

OT21 (age 13), p.9-10, line 330-334

Acceptance and reassurance

Reassurance from peers, parents and teachers was an important part of coping with changes at puberty. Many dancers described seeking reassurance of their future in ballet and of their changing body. "Just obviously in your own head you think, "Oh, goodness, I just don't look right at all." But the others see it differently, they're like, "No, you're actually okay.'" (OT22, age 15, p.9, Line 287-288)

Acceptance of physical changes appears to be closely linked to receiving reassurance from significant others and from the system. Still being at the school was seen as reassurance that they should still be there. On time dancers also described their role in reassuring others as they were beginning to go through puberty.

You're here for a reason so like if you weren't right then you wouldn't be here." And I've had many conversations with other teachers and they've been like, "Well, this teacher said this so this must be true..." You know, like just constant reassurance of... That I'm okay.

OT22 (age 15), p. 11, line 333-342

Interaction with teacher and dance environment

Dancers' interactions with their teachers and the dance environment were very significant to on time dancers. Dancers described these interactions and subsequently how they were able to cope or to manage.

Some dancers noted that dance teacher expectations suggest a lack of consideration or understanding of individual differences:

Sometimes in class the teacher can compare what you do to other people. Sometimes without meaning it, really. Sometimes they can go, "You've got to move your legs as fast as so-and-so," or, "You need to jump higher than so-and-so." Sometimes, if you've got a different, well, everyone has a different body shape, then that thing is... it's harder, so then you're just like, "Argh!" It's really hard.

OT20 (age 14), p.4, line 132-137

Dancers also perceived a lack of understanding of pubertal changes relating to teacher expectations of physical function and capacity. For example, the expectation that having long legs should relate to greater jump height and distance. However, rapid growth in limb length is likely to disrupt co-ordination in the short term (Daniels et al., 2001) and so perhaps such expectations are unfair at this point in training.

Well, they will say, 'Oh, you have got really long legs, you should be able to jump across the room,' and stuff like that, which sometimes makes me feel like others are not trying hard enough, because they think that I have just got naturally long legs that I'll be able to, like, jump really far...

OT24 (age 13), p.5, line 151-154

Dance teachers also used indirect interactions to negotiate changes at puberty, for example subtle suggestions to increase fitness, which young dancers inferred as a hint to get into 'better shape':

They could be like, "You need to be more fit. You need to keep running." You need to do all that kind of stuff, just like work out more, because they're making a subtle hint that you need to sort yourself out basically. As hard as it is, they try and say it subtly but you know exactly what they're trying to say to you.

OT22 (age 15), p.10, line 323-326

Advantages of on time maturation

On time dancers perceived a number of benefits to maturing earlier than many of their peers, this enabled them a sense of 'fitting in', time to adjust and also to see puberty as an opportunity.

Fitting in

A sense of 'fitting in' and being in synch with their peers enabled many on time dancers to feel confident and 'normal' as they experienced changes at puberty: "it feels good, yes, because you know that you are growing and you are fitting in with other people as well" (OT27, age 12, p.4, Line 120-121), "We are not small or we are not tall; we are like in between and we are like, "Yeah" because we fit in with everyone and things, no one makes fun of us because we are small or tall, so that is quite good, we get to fit in" (OT27, age 12, p.3 line 71-74) and "Yes, it is nice being at the same time not like after, or before anyone." (OT24, age 13, p.3, line 80).

Time to adjust

Having time to adjust to changes at puberty was seen as a benefit of maturing a little earlier. Dancers related this specifically to readiness for auditions:

Well, I've already gone through it all so now I can just focus on what I've got and focus on other things, whereas other people who haven't started, they've got so used to what they've got and suddenly it will all change for them. I'm more mature so they can notice it more, I guess, so that must be harder for them. So I guess it's easier for me because I know what I've got for the most of my life with dance now, so I can just focus.

OT20 (age 14), p.6, line 209-214

The benefit of having time to adjust was also related to knowing your body and getting comfortable with your body.

It was a bit embarrassing but I've, kind of, come out and everything has all evened out now so it's okay... I think it's better to mature a bit earlier just so you can get comfortable, you know, at an earlier stage and you know exactly how your body works and you know what you can and can't do... Instead of like... you could have a growth spurt like a week before your audition and you're like, "Oh, my goodness, what do I do?" And like your arms are too far away from the barre and stuff.

OT22, (age 15), p.4, line 91-105

Puberty as an opportunity

Lastly, on time dancers described puberty as an opportunity. Some dancers were able to see these changes as a way to improve and move forward with their dancing; experiencing puberty relatively earlier, providing them with time to adjust to physical changes and enabling them to capitalise on opportunities for improvement.

I think you can only get better and if you start like growing and stuff I think that's the only way you can get better, is if you keep like practising and stuff and try and work at it. Because, like I said, I was growing so much I was getting a lot tighter and stuff, so I tried to get my flexibility back and I think like... Yes, I just think it's really positive.

OT21 (age 13), p.9, line 320-324

Psychologically, experiencing some of the challenges associated with puberty such as growth-related injuries was also a benefit and was seen as something which helped them to improve.

I feel like there is a good side to it because it could also help you improve. I know another person who's had loads of injuries and stuff with growing, but I think that's probably what made me better, because it makes you want to work harder, because obviously you're off balance and you're not as good in turnout so you want to improve. And I've like been getting a lot of extra help because I know I've been growing so much so...

OT21, (age 13), p.3, line 68-75

Challenges of growing up in dance

Alongside perceived benefits, on time dancers experienced challenges relating to growth and development. Many of these challenges were aesthetic, including peer comparison, the notion of acceptable and unacceptable changes at puberty, the importance of timing, order and extent of physical changes and feeling judged.

Peer comparison

Peer comparison was an aspect perceived by many on time dancers in their experiences of puberty. On time dancers described being among the first to begin physical development and comparing themselves to peers not in terms of functional capacity but in terms of body shape and size.

On time dancers compared their relatively more adult body shapes to the pre-pubescent bodies of their peers: "...it is a bit scary. You just look at yourself and you're looking at someone next to you and you're like, "Oh, I don't look like them." (OT22, age 15, p.3, line 76-77).

Definitely maturing one of the first in my year, it can put you down, when you're in a class full of a load of really skinny people who haven't started developing yet. I've got quite an 'adulty' shape already. It's kind of depressing sometimes, but you get over it.

OT20 (age 14), p.3, line 99-102

They described how this feeling of being different also impacted upon their feelings of confidence, self-consciousness and subsequently on their dance performance.

I felt self-conscious and I wasn't too keen on wearing a full leotard as much as just I felt I was like, "Oh, I'm really different than all of my other friends," like because they were still very skinny and childlike and I was a bit more matured. So I was a bit self-conscious and just, kind of, lost a lot of the confidence in my dancing and I was like, "I just don't look right to do this, what's going on?" You know, I just wasn't really sure about what I wanted to do.

OT22 (age 15), p.6, line 178-183

Comparison of body shape and size with peers was described as something which could make you feel good, if you were skinnier than your peers and bad if they were skinnier than you. This notion of the importance of peer reference groups was important to a number of the on time dancers who had peer groups both in dance and outside of dance.

Well, there's a girl at my ballet school, and she's smaller and she's much thinner than me, and I always compare myself to her, but then there's girls at my school that I'm best friends with and they're much bigger than me, so then I look great compared to them... But it really depends on who's around you, what they're looking like. If they're much bigger than you then you feel good as well.

OT25 (age 14), p.5, line 217-230

While most of the dancers reported more than one reference group to be beneficial, one dancer described it as confusing:

I'd say one [perspective] would be better because then you'd know exactly how you feel about your body... And like everybody has the same opinion on it. So at dancing you've got the image of being like the classical ballerina, or the skinny, skinny, and then at school you're, kind of, just like a bit different... So you're, kind

of, confused, you're like, "Do I fit in here? Do I fit in here?" You just don't know... so I'd say having one perspective would be better than two.

OT22 (age 15), p.7-8, line 222-233

Acceptable and unacceptable changes

When describing changes at puberty, on time dancers described acceptable and unacceptable physical changes: growing taller (but not too tall) is good, but other pubertal changes which take you away from a more pre-pubescent physique such as breast development and widening of the hips, were described as negative. Often these expectations were seen as set by the teacher or school:

Well, it can be a bad thing if you develop the way that your teachers think you wouldn't. So if you develop in a way that you're not fit to do ballet anymore then that's bad. But if you develop in a way and you kind of stay the same, then it's good...

OT22 (age 15), p.3, line 65-69

Acceptable or ideal physical changes were described as staying as close to the pre-pubescent figure as possible, it was also described as acceptable to become taller and more muscular. "[Staying] More or less the same, yes. Or you've changed and morphed into more of an adult ballet dancer than a child ballet dancer... You get a bit taller, a bit more muscular, just that kind of stuff" (OT22, age 15, p.3, line 80-83).

Unacceptable changes at puberty were described as those which move you away from a more pre-pubescent physique: "Maybe like over growing in the chest or your legs become too big, hips are too wide. All that kind of stuff. Just -... You just don't look right doing ballet" (OT22, age 15, p.3, line 69-72).

These types of physical development were seen as make or break for a career in ballet: "Like, if I grow a lot taller, then maybe I could do ballet. I want to do ballet... Yes, and I need to get taller and not any wider" (OT28, age 13. p.7, line 233-235).

I was, kind of like, "Oh, I don't have the body to dance." I felt like weight had gone on in different areas. It didn't help that I had an injury at the time so I wasn't doing any exercise, I wasn't able to dance. So I was looking at myself, I was like, "Oh, what's going on here?" And I was like, "This is, I can't dance anymore."

OT22 (age 15), p.4, line 110-114

On time dancers were clear that different physical changes had different social values:

When my legs started growing I was happy...I have to say I was quite excited when I got my period because I was, like, grown up. But I do look back on how much of a pain it is. And, definitely, the breast development and growth — that really annoyed me and it still does... you just feel a bit out, and then you do look at the ballet body and the primas and you get a bit down.

OT26 (age 16), p.4, line 107-115

For peers in jazz dance breast development was perceived very differently:

When I did get breast development all the, kind of, jazzy people if they didn't have it, they were like jealous of me. They were always saying, "Oh, I want that, just for jazz." And I was kind of, "No, because of ballet." You can't take them away.

OT26 (age 16), p.5, line 138-141

Tempo and order of changes

The tempo and order of physical changes was highlighted by on time dancers as important. Dancers associated the tempo, more specifically fast growth, with injury, time away from dancing and functional implications "I just feel like, because I feel I am growing a lot faster, and I am getting less flexible so I have to work even harder to – get my flexibility ..." (OT24, age 13, p.3, line 70-72).

...my bones were growing too fast and my muscles were getting stretched and then it was up in my back and down in my knees and it was horrible... Yes. It was about over a year that everything had happened so I wasn't dancing really for a year.

OT22 (age 15), p.4, line 118-123

The order of physical changes was also experienced as problematic for young dancers. For example, experiencing breast development but little growth in height, though temporary, was a negative experience:

...you can grow and really elongate it and things. But I would say definitely for myself, you do begin to get breasts. I filled out when I went through puberty... For myself, it was a negative thing... Well I used to be quite short and, I guess, in proportion. But, yes, bits of my body didn't grow at the same time as others. My legs didn't grow but then my chest got bigger. But now it's, hopefully, balanced out.

OT26 (age 16), p.3, line 61-70

Feeling judged

On time dancers described feeling judged by peers or teachers regarding physical changes at puberty. “Like kind of getting judged constantly on how skinny you are, either way, whether you’re a dancer or not, whether it’s by your teacher, a panel or your friends... So you are always judged no matter what you do basically” (OT22, age 15, p.7, line 215-217) and “I remember at the start when I started having puberty I felt quite judged by the teacher. I don’t think she was but, because you did see yourself differently, so you were wondering if she saw you differently” (OT26, age 16, p.6, line 179-181).

This feeling was described as being accentuated by the dance environment and attire, having to wear leotard and tights.

...everyone can see everything but at school you’ve got your uniform on and no one knows what’s going on underneath it, but then, at dancing you’re stripped back, just in your leotard and tights, and everyone can see everything, so it’s quite, like, ‘judgy’ in that way...

OT25 (age 14), p.9, line 446-450

Discussion

Much research and the majority of conceptual models focus on individuals at the early or late extremes of maturity timing (Allison & Hyde, 2013; Brooks-Gunn & Warren, 1985; Ge & Natsuaki, 2009; Ge et al., 2011; Iversen, 1990; Summers-Effler, 2004). The individuals interviewed in the on time maturity group experienced puberty around the average time for ballet cohorts (around age 13.2 years); while this may be considered late in non-dance cohorts, this is average for young ballet dancers. Young on time dancers in this study experienced both benefits and disadvantages associated with their maturity timing.

Very few studies to date, have specifically discussed dancers who mature on time (Brooks-Gunn et al., 1989; Brooks-Gunn & Warren, 1985). Existing research suggests that maturing on time in the context of ballet is associated with similar disadvantages to those who mature early (Brooks-Gunn et al., 1989; Brooks-Gunn & Warren, 1985).

Direct and indirect effects of puberty

On time dancers described both direct and indirect effects of puberty. Direct effects, such as physical and functional changes associated with the tempo and timing of puberty, were mentioned. Dancers perceived fast growth spurts to be associated with injury, loss of flexibility and for some, time away from dance. However, on time dancers mostly described their experiences in terms of indirect effects of puberty, such as perceptions of acceptable and unacceptable physical changes, feelings of fitting in and not fitting in, and interactions with the teacher and/or dance environment.

Identity development is a key task of adolescence, with social and peer context playing a significant role (McAdams & Olson, 2010). Comparison to peers aids individuals in making sense of who they are and how they fit in the world (Adams & Marshall, 1996). Although these dancers matured on time, their maturation is still relatively early compared to their later maturing peers. As shown in the first section of this chapter, during the final training years late maturing dancers are in the majority. For many on time dancers, their relatively early physical maturation led to peer comparison, with dancers comparing their physically more developed bodies to the 'childlike', 'skinny' bodies of their later maturing peers. Peer comparison was facilitated by features of the ballet environment such as attire and use of mirrors. Young dancers linked this to subsequent experiences of loss of confidence and greater self-consciousness. The experience of on time dancers aligns with the existing theory that on time maturation may be perceived, relative to one's peers in ballet, as early (Brooks-Gunn & Warren, 1985). Kretsch et al

(2016) describe this as a peer contrast effect; a negative bias whereby individuals have a distorted perception of one's actual pubertal timing due to the actual, observable reference point being skewed (Kretsch et al., 2016).

The learning environment is dictated by the teacher and the wider social environment shared by students (Stark & Newton, 2014). Peer comparison is a component of particular learning contexts described as thinness related learning (TRL). A TRL environment focuses on and highly values thinness (Annus & Smith, 2009). Thinness related learning behaviours can include comments from teachers related to the benefits of dieting, social comparison between peers and observational learning of dieting and restriction through teacher or peer modelling (Penniment & Egan, 2012). The experiences of on time dancers suggest that earlier maturation in the context of ballet, can provide a basis for peer comparison. Experiences of peer comparison suggest that it can often be initiated or facilitated by the dance teacher. For example, comparing students to one another without accounting for individual differences. This also aligns with the theory of ego and mastery oriented learning climates, with comparison between students often a feature of ego-oriented climates (Carr & Wyon, 2003; de Bruin et al., 2009; Nordin-Bates et al., 2012; Nordin-Bates et al., 2014). Both TRL environments and ego-oriented climates have been associated with poorer psychological wellbeing in dance contexts (Annus & Smith, 2009; Carr & Wyon, 2003; de Bruin et al., 2009; Nordin-Bates et al., 2012; Penniment & Egan, 2012; Stark & Newton, 2014).

While the dance students within each school participating in this study were exposed to the same ballet context, there is potential for variation in terms of how early, late and on time dancers perceive their learning environment within this context. The findings of this study highlight perceptions of TRL and ego-oriented climates as particularly salient for on time dancers. Further research is needed to consider why on time dancers may be particularly sensitive. Initial findings are in line with theories posited in existing research, suggesting that on time and late maturing dancers will differ more than on time and late non-dancers; the late maturing dancers exhibiting more desirable physical and psychological attributes than those who are on time (Brooks-Gunn et al., 1989; Brooks-Gunn & Warren, 1985). This comparatively greater discrepancy between on time and late maturing dancers may amplify perceptions of less desirable body shape and size relative to peers who are very delayed in maturity.

Rather than focusing on comparison of functional capacity, such as flexibility, on time dancers' descriptions of peer comparison focused on body shape and size; being 'bigger' than peers and comparing the size of particular body parts, such as the legs and chest.

Peer comparisons were based on notions of acceptable and unacceptable changes at puberty; on time dancers described very clear ideas of positive and negative physical developments. Physical growth in height was a positive development, though extent of growth in height was also described as important: on time dancers subscribed to the notion of a 'perfect height'. In some cases, menarche was also seen as a positive development, a sign of being 'normal' and 'healthy'. Conversely, on time dancers perceived normal pubertal changes, which moved them away from the ideal of a more pre-pubescent physique, as negative; staying more or less 'the same' was perceived as good and physical developments, such as widening of the hips and breast development, as negative. These perceptions of acceptable and unacceptable physical characteristics align with ballet body ideals (Foster, 2003; Mitchell et al., 2016; Pickard, 2013; Pickard, 2015). The concept of positive and negative physical developments, specifically relating to puberty in ballet is underexplored. Existing research supports the contention that many normal developments of puberty, including widening of the hips and breast development are considered not to be conducive to a career in ballet (Mitchell et al., 2016). Moreover, breast development has been associated with the termination of pre-professional ballet training in young dancers (Hamilton et al., 1997).

Particular aspects of pubertal development hold significance for on time dancers and the order in which developments take place was perceived to amplify or minimise this effect. For example, if physical developments, such as 'filling out' and breast development, take place prior to a growth spurt in height, this was considered to be particularly negative and the 'evening out' of this growth caused great anxiety. Such concern over these physical developments appears to be driven by the judgment or perception of significant others; being seen as 'right' or 'not right' for ballet.

The social value of changes such as breast development was particularly salient for on time dancers. On time dancers described 'feeling judged' by dance teachers, audition panels and/or peers. These feelings were amplified by features of the dance environment, such as mirrors and wearing leotard and tights. The social value of such changes and subsequently how an individual perceives those changes has been associated with psychosocial outcomes (Moore et al., 2016; Summers-Effler, 2004; Yuan, 2012).

Dancer perceptions and the social value associated with specific pubertal changes, appear to be moderated by the dance teacher. In line with Mitchell et al (2016), the experiences of on time dancers suggest that notions of acceptable and unacceptable physical changes are driven by perceptions of teacher expectation and confirmed by

interactions with the teacher. Teacher interactions described by on time dancers appear to follow an indirect approach, whereby teachers infer the need for change based on pubertal development. For example, suggestions to increase fitness were perceived as suggestions to lose weight. In converse to the indirect approaches suggested in existing research, which seek to moderate the expectations of an ideal body, these indirect actions have the opposite effect (Mitchell et al., 2016). Equally, on time dancers described it as negative to develop in a way your teachers didn't think you would. In this sense, the opinion of the dance teacher is fundamental to perceptions of positive or negative change at puberty. This provides support for the theory that dance teachers have a central role to play in terms of encouraging positive perceptions of self and physical change at puberty, pleasing the teacher being of the utmost importance to young ballet dancers (Mitchell et al., 2016).

On time dancers also described positive experiences related to their maturity timing, such as fitting in, having time to adjust and viewing puberty as an opportunity. On time dancers felt that they benefited from time to adjust to their changing bodies before critical training evaluations and auditions. They described having time to become comfortable with physical changes, getting to know how the body works and its limitations and, subsequently, being able to focus on their dancing. The Stage Termination Hypothesis is based around the theory that earlier maturing individuals lack time to prepare for the changes of puberty, leading to greater risk for adjustment issues (Petersen & Taylor, 1980). This theory may have some application for on time dancers, who have a greater length of time to prepare for puberty compared to early maturing dancers and also a greater time to adjust to the changes of puberty compared to later maturing dancers. It is important to acknowledge that this was not perceived as a benefit to all of the on time dancers and that perhaps this may be perceived more clearly as an advantage for on time dancers who mature at the earlier end of the on time spectrum.

On time dancers were also able to view puberty as an opportunity, ultimately seeing growth as something they needed in order to improve in their dance training and in some cases, as an opportunity to attain particular assets, such as longer legs. This perspective contrasts with more widely espoused views of puberty as a threat for young ballet dancers and as a negative event (Mitchell et al., 2016; Pickard, 2013). How some on time dancers are able to perceive puberty in this way warrants further exploration, as positive perspectives on puberty within the context of ballet are limited and are suggested to be important for psychosocial wellbeing (Moore et al., 2016).

On time dancers described the benefits of 'fitting in' and being in synch with peers. While this was an experience shared by many of the on time dancers, perhaps more salient were their perceptions of not 'fitting in'. As aforementioned, on time dancers described experiences of peer comparison, particularly relating to body shape and size, in this sense they perceived significant physical differences from their peers, in stark contrast to the notion of 'fitting in'. While the experience of 'fitting in' in terms of physical development was not constant, on time dancers perceived more consistent benefits in terms of social support. Due to the fact that many of their peers were experiencing puberty around the same time, on time dancers perceived a high level of social support from same age peers, older peers and parents. Moreover, they described being able to offer support to their peers. Giving and receiving support was based around reassurance and acceptance of changes at puberty. Thus, although on time dancers struggled with perceptions of physical difference from their peers, they were able to access support networks which could provide reassurance and facilitate acceptance of these changes. This is consistent with the Contextual Amplification theory, whereby strong social support may moderate negative effects of pubertal change (Allison & Hyde, 2013; Ge et al., 2002).

Biocultural models and hypotheses

Within this particular social context, where it is normative for dancers to mature late, those who mature on time may experience the same psychosocial disadvantages as early maturing individuals in non-dance populations (Brooks-Gunn et al., 1989; Brooks-Gunn & Warren, 1985). On time ballet dancers have been reported to rate themselves as heavy and desired to lose weight (even though they were below their ideal weight), with higher dieting and bulimia scores than their later maturing counterparts (Brooks-Gunn & Warren, 1985). However, non-dancers who were on time had the most positive body image and fewer psychosocial issues (Brooks-Gunn & Warren, 1985). These findings are supported by a subsequent study where on time ballet dancers also reported less positive body image, rated themselves as heavier relative to others and reported more dieting in comparison to their later maturing counterparts (Brooks-Gunn et al., 1989). The experiences of on time dancers support the contention that maturing on time within a ballet context may not be a particularly valued condition and may be, in some ways, analogous to early maturation in terms of psychosocial implications. In line with Brooks-Gunn et al (1985, 1989), who reported poorer body image, perceptions of being 'heavy' and desire to lose weight in on time dancers, findings from the current study suggest that peer comparison and concern over body shape and size are particularly salient in the experiences of on time ballet dancers.

Brooks-Gunn and Warren applied a Goodness of Fit Model (Lerner, 1985) in their analysis of on time ballet dancers. In a context where later maturation is the norm, on time maturation may be perceived, relative to one's peers, as early and thus that individual may experience more similar psychosocial issues to that of an early maturing individual within a general context (Brooks-Gunn & Warren, 1985). Early and on time maturation within the context of ballet training, was found to result in higher incidences of eating pathologies than in early and average maturing non-dance students (Brooks-Gunn & Warren, 1985). It was suggested that on time and late maturing dancers will differ more than on time and late non-dancers; the late maturing dancers exhibiting more desirable physical and psychological attributes than those who are on time (Brooks-Gunn & Warren, 1985).

While the findings of the current study suggest that on time dancers experience similar struggles to their early maturing counterparts, in terms of comparing their relatively greater physical development with their later maturing peers, the experiences of individuals within these two groups are different. The experiences of on time dancers reflect greater sensitivity to their environment in terms of peer comparison, particularly in relation to body shape and size. In line with the Goodness of Fit Model, on time dancers experience both fitting in and not fitting in within their social context; perhaps the relatively greater complexity of this relationship for on time dancers and the fluctuation between fitting in and not fitting in contributes to a greater sensitivity. Further research is warranted to understand the complexities of on time dancers' experiences.

The Deviance Hypothesis (Petersen & Taylor, 1980) holds that early and late maturers differ in their adjustment as a result of their status relative to the rest of the peer group. Arguably, when applying this hypothesis to the context of ballet, on time maturation, though objectively average, shares many of the disadvantages of early maturation. The Deviance Hypothesis does not account for the fact that on time dancers may still be considered to deviate from the prescribed aesthetic ideals associated with late maturation. Maturing on time may hold some advantages, but equally appears to be disadvantageous in the context of ballet. The complex nature of the dance environment, its demands and the timing of these demands, means that more than one maturity group, at different points in training, may hold considerable disadvantage.

Many models, such as the Deviance Hypothesis, assume only one reference group for these individuals, where many of the dancers in this study have more than one. Two of the schools involved in this study were mixed with 'normal' schools, whereby those dancers have separate peer groups who are dance and non-dance. This was noted by

several of the on time dancers as something which they found conflicting; with one reference group there is a clear set of ideals but with more than one reference group ideals can be confusing, with young dancers unsure how to feel about their bodies. For example, in one context an individual may be perceived as 'too skinny' and in another, 'not skinny enough'. Each social context with its own meaning attached to different physical changes and subsequent positive or negative feelings (Pickard, 2013). This is the case for many young dancers who train non-residentially or in institutions linked to regular academic schooling and therefore is important to account for within models we apply to this context.

The Contextual Amplification Hypothesis (Ge et al., 2002) holds some relevance for the experiences of on time dancers. The hypothesis that negative effects of puberty are accentuated in contexts which are aversive, especially in early maturing girls, may have equal application to on time maturing girls in the context of ballet (Allison & Hyde, 2013, Ge et al., 2002). The experiences of on time ballet dancers show a sensitivity to expectations of the body within their social context. Their experiences suggest that this could be moderated by teacher and peer behaviours and the learning climate/environment. For example, teacher comments which infer a need to reduce body weight and teacher comments or aspects of the dance environment which facilitate peer comparison, appear to accentuate any negative effects of puberty. In contrast, social support and reassurance from significant others, was highlighted as a factor which enabled dancers to accept physical changes at puberty and thus, perhaps even to mitigate the negative effects of puberty. Further research is needed to substantiate these relationships.

4.3.4 An Exploration of Individual Experiences of Late Maturation in Adolescent Ballet Dancers

Findings

Three themes emerged as central to the experiences of late maturing dancers, maturing and developing in the context of vocational ballet training. (1) The advantages of late maturation: late maturing dancers perceived a number of advantages relating to aesthetic benefits, not having to deal with the ‘inconvenience’ of puberty, fitting in and feeling prepared for pubertal changes. (2) Feeling left behind: dancers experienced feeling ‘left behind’ this included physical injury, unknown outcomes, feelings of social embarrassment or exclusion and asynchrony between physical and mental feelings of maturity. (3) Seeking reassurance and support: this included being able to seek support and reassurance from both peers and teachers. See Figure 17 for hierarchy of themes. Each theme is subsequently discussed and selected quotations of participants are presented. For further quotations see Appendix H.

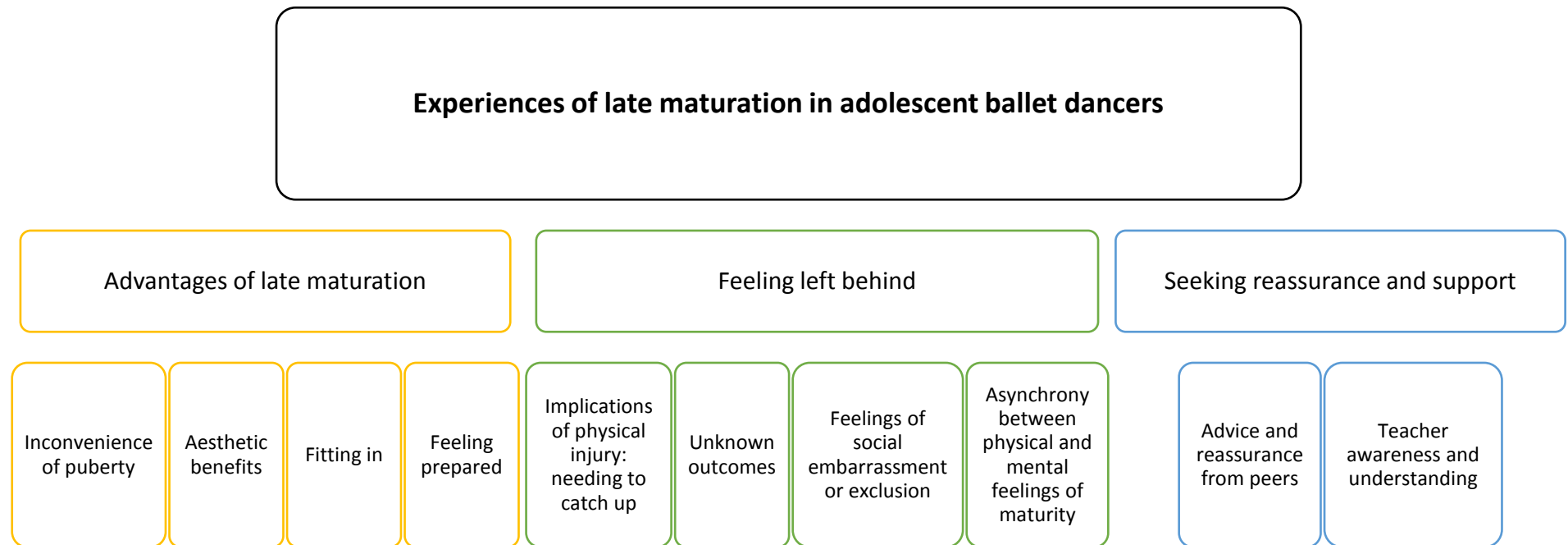


Figure 17. Hierarchy of themes characterising experiences of late maturing ballet dancers

Advantages of late maturation

Late maturing dancers perceived a number of benefits associated with delayed maturation, including aesthetic benefits, not having to deal with the 'inconvenience' of puberty, fitting in and feeling prepared for pubertal changes.

Inconvenience of puberty

Late maturing dancers perceived a marked advantage in not having to "...deal with that inconvenience [of puberty] yet" (LM16, age 13, p.2, line 70). They observed their peers who were already undergoing pubertal changes and felt pleased that they did not have to deal with these challenges yet: "I'm quite happy that I've not really grown up yet." (LM17, age 13, p.6, line 244) and "I like it because everybody moans about it. I just feel so happy because mine's not started yet." (LM12, age 13, p.3, line 67-68). Notably, dancers related this inconvenience to pubertal events such as menarche - being on your period when attending a ballet class - and experiencing visible changes such as breast development.

Aesthetic benefits

Late maturing dancers also experienced aesthetic benefits relating to delayed onset of puberty. They noticed how others may struggle due to changes in weight and shape and associated this with 'developing too quickly' or being 'overdeveloped':

You see a lot of people going to auditions being turned down for their body shape, in terms of they are overdeveloped for their age, and that kind of thing. I have got friends that that has happened to. They have not got in, with the reason being that they have developed too quickly.

LM14 (age 14), p.3, line 57-65

They observed that there were advantages to looking mature for ballet but suggested that the extent of physical development is key "For ballet, it's good to look older but you don't want bits, you know what I mean." (LM11, age 14, p.2, line 36-37).

Fitting in

Another benefit of later maturation was the feeling of 'fitting in' and being in synchrony with many of their peers where:

...it would be harder [in a non-dance school] then because no one really dances as well so I think development is, sort of, set back a bit through dancing so everyone would be like really developed and I'd just stand out loads whereas with here I feel like it doesn't matter because everyone knows that that's what happens and I definitely feel more accepted here.

LM19 (age 14), p.8, line 228-233

Feeling prepared

Later maturing dancers described benefitting from the experiences of their peers who had already gone through puberty and felt that this enabled them to feel more prepared and able to deal with it "...being around all my friends and things and they've been going through these changes.... I think, from watching them, and how they deal with it, I think I'll be able to deal with it" (LM16, age 13, p.3, line 118-121). Late maturing dancers also described advantages of getting advice and support from peers "I think it prepared me in a way to be honest, I got more advice on how to deal with it and you went along with it. I think it's a good thing when you obviously hear everyone else's experiences." (LM13, age 15, p.3, line 78-80).

Feeling left behind

While some of the outcomes associated with later maturation enabled these dancers to perceive benefits, this delay in maturation also led to dancers feeling left behind both in terms of their training and psychosocial factors. Late maturing dancers highlighted feelings of social exclusion, implications of physical injury and needing to 'catch up', anxiety over the 'unknown outcomes' of puberty and described an asynchrony between physical and psychological maturity.

Implications of physical injury: needing to catch up

Late maturing dancers perceived distinct disadvantages to their functional and physical capabilities and subsequently to their training. As their earlier maturing counterparts had gone through puberty and completed their most rapid period of growth, late maturing dancers were just beginning to experience this, meaning that as their peers experienced gains in flexibility and adjusted to physical changes, later maturing dancers were losing their flexibility and experiencing these physical changes and associated difficulties with balance, co-ordination and so on. "...everybody else has already grown and they have gotten really flexible, and I'm just starting to lose my flexibility" (LM14, age 14, p.4, line

97-99). Needing to 'catch up' was a source of anxiety for many of the late maturing dancers and for some, the need to 'catch up' was significant, meaning the continuation of training and the delaying of auditioning for a further year.

This period of rapid growth can also be associated with injury, with later maturing dancers experiencing these types of injury at a later, arguably more crucial, stage in their training. "I've grown a lot and I'm nowhere near as flexible as people in my year. I've got loads of injuries due to growth" (LM11, age 14, p.3, line 49-51). Loss of highly prized attributes, such as flexibility, at this stage in training were described as closely linked with confidence for later maturing dancers:

...you will be in class and everybody's legs will be at their ears, and you can't get past 90 degrees...And even though you know that you are growing, and that this is what is going to happen, it still definitely puts your confidence down. Because you are looking at everybody else and thinking, "Why can't I do that? I should be able to do that kind of thing.

LM14 (age 14), p.8-9, line 226-234

Unknown outcomes

Late maturing dancers described anxiety surrounding the unknown outcomes of puberty; these dancers finding out, at a very late point in their training, whether or not their adult bodies will conform to the requirements of professional ballet. "If you grow the wrong way then you just won't make it as a ballerina so it really depends on how you grow" (LM18, age 14, p.2, line 64-65). It was accepted by the majority of these dancers that these outcomes were somewhat 'make or break' and that they would have to 'come to reality' in terms of the potential for a career in ballet, should changes at puberty not be conducive to 'the right shape for ballet':

...I'm so focused on becoming a ballet dancer, that's all I want to do. Obviously, later these changes that I don't know if I'll end up getting big developed or if it's not the right shape for ballet, then that would affect it. I'd still be really focused and I'd have to come to reality

LM12 (age 13), p.4, line 111-114

There was a clear understanding that the extent of development is crucial: "...you don't want to grow too much or you don't want to get really tall, or you don't want to have breast development, and stuff, too much" (LM12, age 13, p.2, line 45-51).

Feelings of social embarrassment or exclusion

Late maturing dancers described feelings of social exclusion; lacking the experience to relate to their peers' narratives on puberty: "...everyone else seemed to be more developed and like they could talk, you know, they would talk about it and stuff and I would just be like "I have no idea because it has not happened to me yet"" (LM15, age 17, p.6, line 170-171). Lack of development was also described as 'embarrassing'. Just as early maturing dancers struggled to hide their development, late maturing dancers felt unable to conceal their lack of development: "Socially, it's embarrassing, because people notice it" (LM11, age 14, p.3, 71-77).

Asynchrony between physical and mental feelings of maturity

Late maturing dancers experienced asynchrony between their mental and physical feelings of maturity. These girls felt that their physically immature appearance restricted their access to peer narratives around puberty. Additionally, they felt that this had implications for how others perceived them and interacted with them: "It [puberty] would make you feel more mature, and like more grown up, which obviously is a good thing at this age...I guess it just makes you feel a bit more, like people take you more seriously, if you know what I mean?" (LM15, age 17, p.8, line 235-237). Furthermore, late maturing dancers felt that these factors inhibited feeling like a teenager:

...you still feel like a child. When other people talk about stuff you don't really understand because you don't have any experience. It's embarrassing...it just is because it makes me feel like I'm not a teenager

LM18 (age 14), p.7, line 207-212

Seeking reassurance and support

Finally, an important theme for late maturing dancers was seeking reassurance and support. This included being able to seek support and reassurance from both peers and teachers.

Advice and reassurance from peers

A benefit of delayed maturation relative to some of their peers and something which later maturing dancers highlighted as important to them was being able to seek support and advice from peers "...all my friends are really supportive of you, you can talk to them because they've been through it all." (LM12, age 13, p.7, 180-183). This was described as something which these dancers felt made it easier compared to earlier maturation; the benefit of learning from peer experiences "I think later it's easier to work with I think...Probably because you know what all your friends are doing and how they are coping with it and then it's more advice to be honest." (LM13, age 15, p.3, 84-87).

Teacher awareness and understanding

The awareness and understanding of teachers was also a key theme in terms of providing reassurance for later maturing dancers, particularly in terms of physical and functional changes. For example, demonstrating understanding when dancers lose their flexibility and recognising that this is not the dancer being lazy but a result of growth. This helped later maturing dancers to feel less anxious about these changes:

Like, if you start to lose your flexibility or whatever, then teachers recognise that that's why. You're not just stopping; you are...You are growing, and that kind of thing. Especially here, the teachers are really supportive and they understand. If you are struggling with something, then they will help you

LM14 (age 14), p.6, line 156-162

Discussion

There is a well-established bias toward late maturing females in the context of ballet training, with some studies reporting up to 70% of professionals with delayed maturation (Hamilton et al., 1988; Hamilton et al., 1985). Consistent with these findings, in the current study (as described in Section 1) 65% of final year ballet students were late maturing. In line with this observation, late maturing ballet dancers in this study perceived a number of aesthetic, functional and developmental advantages.

Direct and indirect effects of puberty

The aesthetic advantages noted by the dancers in this study are in line with the well-established bias toward a later maturing physique for ballet; being 'small' and not having 'bits' is advantageous for these dancers in terms of maintaining a more pre-pubescent look, and thereby conforming more easily to the expectations of the ballet world (Brooks-Gunn et al., 1989; Brooks-Gunn & Warren, 1985). While physical change may be a direct effect of puberty, the indirect social value of these physical attributes is of great significance. As described by Brooks-Gunn and colleagues (1985) there is a 'goodness of fit' between the requirements of the social context of ballet and the physical and behavioural characteristics of the later maturing dancer. These advantages have been shown to be quite significant in the context of professional ballet, with the majority of those retained in training systems and succeeding into the profession, being delayed in maturation (Hamilton et al., 1997). In addition to aesthetic benefits, late maturing dancers perceived more practical benefits associated with the inconveniences of experiencing puberty within a dance environment, such as the self-consciousness associated with menstruation, feeling bloated and breast development, when only wearing a leotard and tights. From this perspective, late maturing dancers described feeling 'lucky' and 'happy' that they did not yet have to deal with this.

While late maturation is initially associated with aesthetic advantages, late maturing dancers described a conflict between the delayed timing of maturation and the realisation of adult physical proportions. Delayed timing of maturation, in turn, delayed realisation of adult physique, which would determine whether or not a ballet career would be possible. Consequently, late maturing dancers felt anxiety over the unknown outcomes regarding their physical development; as these dancers mature late on in their pre-professional training, it only becomes apparent at a very late stage if physical changes are not considered conducive to a career in the ballet profession.

The extent of development was the main concern for these dancers who, on the whole, were keen to look more mature, but were also very aware that the extent of physical development would be critical to ensuring a future in ballet. This concern was founded by their experiences of peers being rejected at auditions or assessed out of training due to being perceived as 'overdeveloped'. The extent of breast development was an aspect many of the dancers focused on, particularly in terms of the extent of development. Breast development was perceived as a particularly negative aspect of pubertal development in relation to having a career in ballet. This is supported by research comparing dancers who continued into the ballet profession versus those who dropped out. Dancers with greater breast development were reported to be more likely to dropout or be assessed out of training (Hamilton et al., 1997).

The direct effects of loss of flexibility and co-ordination were particularly salient for late maturing dancers, due to the timing of physical change relative to testing and evaluation points in vocational ballet training. Despite their morphological advantages, later maturing dancers appear disadvantaged by the current training system, which sees them undertaking the most crucial training period during their most rapid period of growth; subsequent injury or adjustment to growth leading to feelings of being left behind and needing to catch up. There is little research to support the association between later maturation and injury incidence during later training years in ballet, though one study has documented a higher incidence of injury for later maturing ballet dancers in their final years of vocational training (Bradshaw & Karin, 2016). Furthermore, data on training load in both ballet and gymnastics shows a significantly higher training load at the time late maturers reach puberty, compared to their early maturing counterparts, exposing late developers to greater impact during growth and thus, potentially to greater injury risk (British Gymnastics, 2006; Caine et al., 2016; Ekegren et al., 2014; Kadel et al., 2005).

Late maturing dancers in this study described how growth and injury set them back at a crucial stage in their training. Research supports a greater potential for injury risk in late maturing females, where the incidence of fractures has been reported to rise with increasing age at menarche (Warren et al., 1986). Delayed growth and maturation leads to a prolongation of the vulnerable growing years, exposing the growth plates to the influence of adverse mechanical factors such as pressure, impact and microtrauma for a longer period (Horobeanu et al., 2017; Tanchev et al., 2000).

While late maturation is a preferred condition within the social context of ballet training, the current training system increases the intensity of training and evaluates dancers at a point which is not developmentally appropriate for late maturers, who make up the

majority of those in vocational training. Further, findings from this study suggest that this may have implications for psychological wellbeing. Late maturing dancers described a loss of confidence and self-esteem, relating to perceived loss of capability and skill in dance technique. Consideration of maturity timing within these training systems should encourage moderation of training intensity around this time and re-evaluation of when testing should occur. While it is acknowledged that there is a short period of time in which to complete vocational training and testing, small considerations regarding maturation may enable a greater retention of the most talented individuals, with a lower risk of injury to these dancers.

While growth related injuries were mentioned frequently by these dancers, another factor which led to these dancers feeling left behind was the loss of flexibility associated with the growth spurt, which was accentuated by peer comparison. Loss of flexibility appeared to be closely connected to feelings of confidence. Late maturing dancers described how they lacked confidence due to losing prized attributes, such as flexibility and co-ordination, just as many of their peers were excelling in these areas. Loss of confidence associated with these changes at this late stage in their training, in addition to the relatively minimal time these individuals have to adjust and adapt to these changes before the end of their pre-professional training, may leave them vulnerable in terms of their psychosocial wellbeing. Late maturing dancers described how they felt left behind and some even had to extend their training by a year in order to 'catch up'. Therefore, increased intensity and inflexible testing and evaluation points may be detrimental to overall development and wellbeing in late maturing dancers.

Late maturing dancers face several psychosocial challenges, in addition to their experiences of physical injury. Late maturing dancers in this study described the social issues they perceived as a result of being late to develop. While some of the dancers noted a feeling of 'fitting in' related to being in synch with many of their peers, for those who are very delayed in their maturation, this advantage was later perceived as detrimental, particularly in terms of social interactions. Late maturing dancers described feeling 'embarrassment' due to lack of physical development and also exclusion from narratives surrounding puberty, which they felt they had no access to. Immaturity of the body image can be associated with psychological distress such as embarrassment, anxiety and lack of self-confidence (Higham, 1980). While later maturation is the norm in ballet, those who are extremely late in maturation may still find themselves separated from their peers and normal social interaction (Higham, 1980). Moreover, positive reactions to development depend upon a goodness of fit between the individual and their social context or reference group (Brooks-Gunn et al., 1989; Brooks-Gunn & Warren,

1985; Iversen, 1990). Depending on their training context, late maturing dancers may have a narrow reference group, based only on ballet peers, a reference group which includes individuals from 'regular' schooling, or a reference group including those focusing on different dance genres, such as jazz. This study would suggest that those who felt most negatively about their delayed maturity were exposed to a wider reference group where greater, 'normal' physical development is valued.

Perceived asynchrony between physical and mental maturity frustrated some of the late maturing dancers, who felt that their lack of development restricted them from feeling like a teenager. These dancers were desperate to be seen as 'grown up', to be taken more seriously and to be considered mature, and they considered their lack of development to be a barrier. This may present a particular frustration for young ballet dancers who are often referred to as 'boys and girls' well into their adult lives (Fay, 1997; Buckroyd, 2000). While a lack of physical development is desirable for ballet, young dancers still desire to be physically developed, to an extent, in order to feel able to fulfil normal social expectations and roles related to being a teenager.

One factor which appeared to moderate the psychosocial issues experienced by later maturing individuals is teacher awareness and understanding of growth and maturation. Understanding and acknowledgment of the challenges these dancers were experiencing, relating to their growth, was highlighted as reassuring. When teachers showed a lack of understanding, perceiving a dancer as lazy instead of acknowledging that they were growing, late maturing dancers felt negative feelings about growth and a lack of confidence in their dance capabilities. However, when teachers showed understanding and encouraged these dancers, they felt reassured and supported. There is a lack of research on teacher interaction with adolescent dancers. However, evidence suggests that the teacher-student relationship is an important factor for dance student wellbeing (Stark & Newton, 2014).

Teaching climates are known to be important in many achievement domains, including dance (Carr & Wyon, 2003; de Bruin et al., 2009; Mageau & Vallerand, 2003; Quested & Duda, 2009). In dance, mastery and caring climates have been found to promote better positive effect, body-esteem and relationships with teachers and peers and to be associated with lower risk of disordered eating (de Bruin et al., 2009; Stark & Newton, 2014). Ballet teachers have been shown to adopt three main approaches: indirect, direct and passive (Mitchell et al., 2016). A direct approach involved the teacher engaging in relatively open strategies, such as adapting training in response to rapid pubertal changes, communicating with students about adjusting aspirations for a career in ballet,

and educating students about the changes. Indirect approaches were less formal and involved the use of more subtle strategies to help students adapt to and cope with the changes of puberty. This included the deliberate avoidance of career decisions at this time, addressing puberty privately/individually, and modifying the learning environment, removing or covering up mirrors, for example. Teachers applying a more passive approach believed that the best way to help students to negotiate pubertal changes was to 'not make a big deal of it' and to limit their interactions with the changes to the acknowledgment of growth spurts (Mitchell et al., 2016).

Late maturing dancers in this study perceived benefits from teachers adopting a more direct approach to puberty. Therefore, perhaps alongside creating appropriate climates for young dancers, the teacher's understanding and approach regarding pubertal changes may be important in promoting adaptive responses at puberty. Research within achievement contexts suggests that while teaching behaviours contribute to the learning environment and its subsequent health outcomes, teachers often have little awareness of their own behaviour and how it contributes to student experience (Smith, Smoll, & Hunt, 1977). Further, coach education programmes in sport have been shown to be effective (Smith, Smoll, & Cumming, 2007). This supports the need to explore educational interventions with dance teachers to promote greater understanding and consideration of growth and maturation and adaptive environments for the adolescent dancer. Further research is needed to develop such approaches in dance.

Biocultural models and hypotheses

Late maturing dancers in this study experienced numerous advantages associated with possessing a more pre-pubescent physique. While models such as the Goodness of Fit Model (Lerner, 1985) account for the social desirability of particular physical characteristics, a further complexity described in the experiences of late maturing dancers is a poor 'fit' between the timing of physical maturation and the timing of testing and evaluation. This conflict appears to have subsequent implications for psychosocial adjustment in several ways, such as lack of time to adjust physically and psychologically before completion of training and loss of confidence associated with reduced physical capability at a crucial point in training.

Late maturing dancers felt that they benefitted by learning from the experiences of their peers going through puberty, which helped them to feel prepared. Thus, late maturing dancers perceive benefits through vicariously experiencing puberty. Research suggests that vicarious experience can impact upon self-efficacy, an individual's belief in their ability to succeed in a specific situation, in this instance puberty (Bandura, 1977; Bandura

& Adams, 1977). Further, learning from peer experiences and feeling a sense of preparedness is consistent with the Stage Termination Hypothesis, which posits that differences between early and late maturers may be a result of the amount of time available for psychosocial development prior to the onset of puberty (Petersen & Taylor, 1980).

The experiences of late maturing dancers in this study suggest that this perceived advantage may only be transient. Greater time to prepare for the onset of puberty means that late maturers have limited or no time to adjust to pubertal changes before embarking on their professional career or further training. As one early maturing dancer explained: "Starting late it means you don't know what your body's going to be like...Well there are a couple of girls who are worrying about what they're going to look like and stuff but not that many people. Some people are, kind of, happy that they haven't started yet but they don't really realise what's going to happen because they haven't, kind of, started so yes...It feels like a good thing but it ended up not being that good" (EM6, p.8-9, line 272-280). Perhaps in the case of the late maturing dancer, what begins as an advantage may later be perceived as a disadvantage.

The assertion that some of the advantages of late maturation are transient for young dancers, with many experiences in later training years inferring significant disadvantages, conflicts with most theoretical models of psychosocial adjustment to puberty relative to maturity timing. Many theoretical models are based upon the effects of early puberty, with most holding the assumption that early maturation is the most disadvantaged deviant condition, while acknowledging that delayed maturation also deviates from the norm. While theories such as the Deviance Hypothesis hold some relevance for ballet dancers in the initial training years, this model may not be applicable to dancers at the later stages of their training; while being a late maturer is initially an advantage, later this condition can also be disadvantageous. Concurrently early maturers may also be disadvantaged. Hypotheses such as this do not take into account the social context of ballet, where more than one maturity group, at different points in training, may hold considerable disadvantage.

Late maturing ballet dancers appear to be at a natural advantage with a physique that conforms to the expectations of the ballet world. However, while late maturation is preferred in ballet, several facets of the vocational ballet training system appear to disadvantage these individuals. The timing of testing and increased intensity of training coincides with a particularly vulnerable period of time for late maturing dancers. Subsequent to experiencing a decline in their performance, as many of their peers

continue to improve, late maturing dancers in this study experienced a loss of confidence as they felt left behind. When puberty does occur, late maturing dancers are left with relatively little time to adjust and adapt to these changes, compared to their earlier maturing peers. Further to this, late maturing dancers experienced implications related to their social interactions with peers and their identity as a teenager, due to lack of physical development and, equally, felt anxiety about the unknown outcomes of physical development. While there is, in many ways, a natural bias toward later maturation in ballet, it appears that the current training system is not optimal for these individuals, both in terms of physical and psychological adaptation and subsequent wellbeing.

4.4 Discussion

Comparing Narratives and Theoretical Implications: Early, On Time and Late Maturing Dancers

A comparison of the lived experiences of early, on time and late maturing girls in vocational ballet training shows clear advantages and disadvantages for all conditions. In normal populations, both early and late maturing individuals deviate from the norm. However, in elite ballet there is a clear bias toward delayed maturation. Later maturation is the prescribed norm, while both early and on time maturation have the potential to be perceived as less valued conditions regarding physical development.

Initial vocational training years

In the initial vocational training years (during the first and second year of full-time training, age 10-13 years), early maturers experience being out of synch with their peers and identify as 'different' from their peers. Many early maturing dancers identified as the 'giant' in their peer group. This is also reflected in quantitative data which shows clear differences between early, on time and late maturing dancers in BMI, height and weight, with early maturing dancers reporting greater weight for height. This feeling of being different stems from being part of a minority of young dancers who mature early. These individuals are moving away from the more prepubescent ideal prescribed by their sub-culture and experience the initial changes of puberty alone. Research supports that few early maturing dancers are retained within vocational ballet training systems (Brooks-Gunn & Warren, 1985; Hamilton et al., 1997). Brooks-Gunn & Warren (1985) reported that only 6% of the girls in dance company schools they studied were early maturers. The authors suggested that early maturers may be selected out during the first few years of training, either by themselves or in auditions, as they will have breast buds and may also have more body fat than on time or late maturing nine or ten year olds (Brooks-Gunn & Warren, 1985). This is supported, to some extent, by the height and weight data of those dancers who are represented in the final year of training. With data for early maturing dancers aligning more closely with values for late and on time dancers at ages 16-17. While the data are cross-sectional and thus longitudinal research is needed to substantiate this, it is likely that those earlier maturing dancers retained in the final years of training are those who are able to conform to the requisite aesthetic requirements for ballet.

In contrast to early maturing girls, on time dancers perceive themselves to fit in with their peers during the initial training years but are sensitive to peer comparison with their later

maturing, relatively skinnier and more childlike peers. In comparison, experiences of initial training years for late maturing girls contrast greatly: these young dancers describe feeling in synchrony with their peers and have a sense of fitting in; their lack of physical development aligns with the prescribed ideals of a ballet body (Brooks-Gunn & Warren, 1985; Pickard, 2013; Pickard, 2015). BMI data for on time and late maturing girls in study three suggests a similar pattern for both groups. While interview data reveals the complexity of the issue, suggesting that it is likely that on time dancers perceive very subtle differences between themselves and their late maturing counterparts. Perception of these differences is sensitive to timing, order and extent of physical change and the nature of the ballet training environment (e.g. mirrors and ballet attire) which may amplify small changes and differences.

While early and on time maturing dancers face aesthetic and physical challenges, such as breast development, injury and disruption to physical capabilities during these initial training years, late maturing dancers benefit from aesthetic advantages. The experiences of early and late maturing dancers in these initial training years are consistent with the Deviance Hypothesis (Petersen & Taylor, 1980). While both groups deviate from general norms, early maturing dancers are markedly deviant in this social context. According to Petersen and Taylor's hypothesis, early maturation places these individuals in a socially 'deviant' category which may confer either social advantages or disadvantages, with early maturation in this context being a social disadvantage (Petersen & Taylor, 1980).

The social stimulus value associated with the physical characteristics of earlier maturation in ballet is generally negative. In this instance, the experiences of early, on time and late maturing dancers suggest that greater breast development and other normal pubertal developments, such as widening of the hips and increased fat mass, are particularly low value attributes for young ballet dancers. Furthermore, the timing of maturation appears to have a significant impact in this social context, as delayed maturation is the norm and is associated with the prescribed aesthetic, which favours a more prepubescent physique. Many early and on time maturing dancers described negative responses from dance teachers and peers, which inferred to them that earlier maturation was not in line with the social expectations of the ballet world; thus socially shared beliefs relating to when pubertal events should occur appear to be salient in this context (Brooks-Gunn & Warren, 1985; Neugarten, 1979). These social expectations confirmed to earlier maturing dancers their perceptions of being 'off time' (Petersen & Taylor, 1980).

There is also a contrast in perceptions of preparedness. Early maturing girls describe feeling inadequately prepared and supported as they enter puberty. On time girls report greater peer support and late maturing girls benefit from the experiences of others. Girls who enter puberty at an earlier age are, from a cognitive and socio-emotional perspective, less prepared to deal with the increased pressures and expectations that adulthood brings (Mendle et al., 2007; Sherar et al., 2010). These findings are consistent with the Stage Termination Hypothesis which emphasises the importance of the amount of time available for psychosocial development prior to the onset of puberty in relation to adaptive responses. Early maturation is associated with less time to prepare and, consequently, poorer psychosocial adaptation at puberty (Petersen & Taylor, 1980).

The Stage Termination Hypothesis is supported by Brooks-Gunn and Warren's research which found poorer psychological wellbeing in early and on time ballet dancers, compared to their later maturing peers. Earlier maturation was associated with having a greater desire to lose weight, higher dieting and bulimia scores, lower oral control scores, poorer body image and higher psychopathology (Brooks-Gunn et al., 1989; Brooks-Gunn & Warren, 1985). This is supported by differences in height and weight data in young ballet dancers from study three, with earlier maturing dancers reporting greater weight for height. Further, this has been supported to some extent by the early and on time maturing ballet dancers in this study, who frequently talked about weight concerns, peer comparison and having to 'make the best of' their bodies. Furthermore, self-expectations may be lower in early or on time maturing dancers, due to the more negative responses and subsequent lesser expectations placed on them by significant figures, such as the dance teacher (Brooks-Gunn & Warren, 1985). As perceptions of puberty and physical development are potentially more salient for psychosocial outcomes than objective measures, these interactions and how pubertal changes are perceived may be especially important for young ballet dancers (Moore et al., 2016).

Although earlier maturation is widely perceived as a negative condition, late maturing dancers were disadvantaged by their maturity timing in a different way. While the initial experiences of early and late maturing dancers in this study reflect a relationship between maturity timing and psychosocial adaptation, in which early maturers experience less adaptive psychosocial and behavioural outcomes, the experiences of dancers in this study suggest a reversal of roles during later training years. It appears that within the context of ballet, the interactions between biological maturation, sociocultural factors (i.e. social context) and psychological outcomes are highly complex, with a change in the trajectory of psychosocial outcomes for early and late maturing dancers (Figure 18). The narrative for on time dancers has not been included as while

there are similarities with early maturing dancers to an extent, the experiences of on time dancers suggest a less clear trajectory.

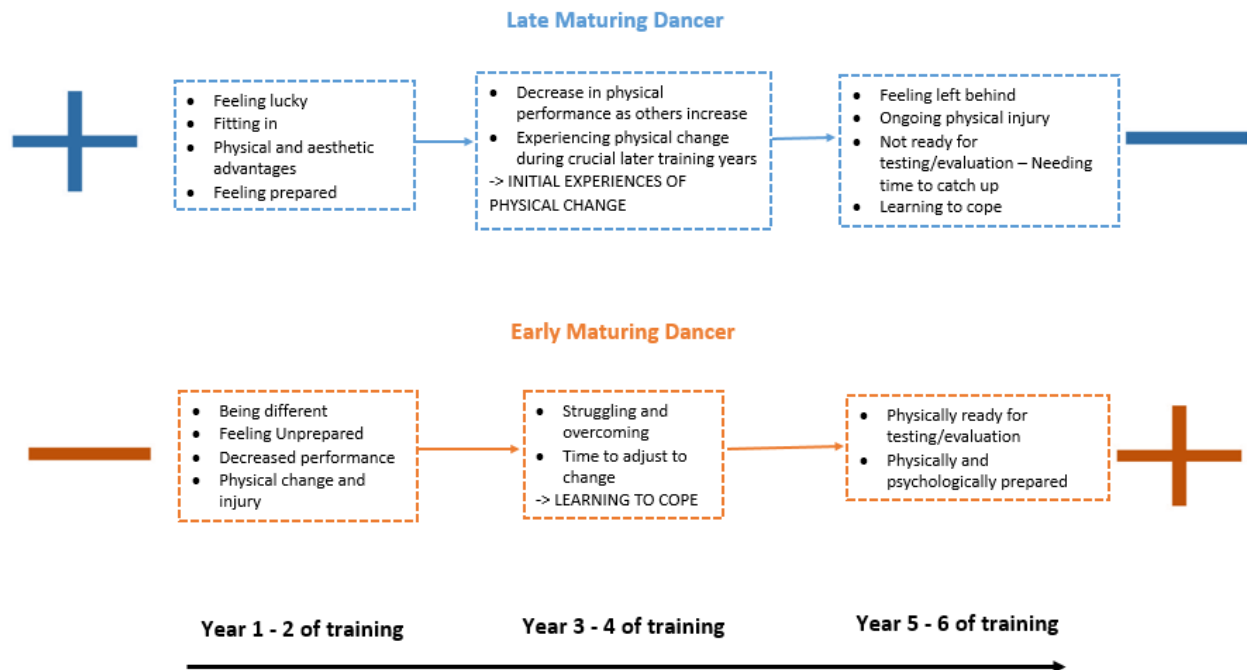


Figure 18. Narratives of early and late maturing ballet dancers derived from IPA themes

Middle and later training years

At the mid-point of their vocational training, early and late maturing dancers in this study appear to show a reversal of roles; with early and on time maturing dancers beginning to adjust and learn to cope with pubertal change and late maturing dancers experiencing initial physical changes and a subsequent decrease in physical performance (Figure 18). As these dancers reflected on their later training years, early maturing dancers perceived themselves to be physically ready for testing and evaluation, while later maturing dancers perceived themselves to be left behind; experiencing physical change and ongoing physical injury during the crucial later training years and needing time to ‘catch up’ before final evaluations and testing. At this point, late maturing dancers have to juggle learning to cope and adjust to physical change alongside the increasing pressure and demands of finishing their training, whereas early maturing dancers who have remained in the training system described feeling physically and psychologically prepared for the next step in their training or career. It is important to acknowledge that experiences of early maturing dancers in mid to late training years are heavily skewed, as this describes a small number who have been retained within the system (n=3 in the fourth year of training, n=1 in both fifth and sixth year of training). Therefore, this relatively more

positive trajectory may be either an adaptive trait of 'survival', in a system which has an inherent bias toward late maturers, or a personal trait, which has enabled their 'survival'. However, this does not lessen the significance of the change in trajectory for late maturing dancers.

While there are several conceptual models incorporating both internal and environmental factors which can be used to describe the experience of late maturing dancers, these models were not devised to analyse experiences of late development specific in their application to elite ballet (Iversen, 1990). Research into the psychosocial adaptation of very late maturing gymnasts suggests that current models need adapting in order to apply to these groups, or alternative models specific to this group need to be developed (Iversen, 1990). Of particular note in relation to the current study, Iversen (1990) highlights that such models should consider the specific timing framework of the competitive gymnast in the definition of maturation categories and a similar approach may be beneficial when considering the adolescent ballet dancer.

While the Deviance Hypothesis holds some relevance for ballet dancers in the initial training years, this model may not be applicable to dancers at the later stages of their training. While being an early maturer is initially a disadvantage, being 'on time' may also be disadvantageous in the context of elite ballet, and thus this model does not take into account the social context of ballet where more than one maturity group, at different points in training, may hold considerable disadvantage. Further, the deviance model assumes only one reference group for these individuals, where many of the dancers in this study have more than one. Two of the schools involved in this study were mixed with 'normal' schools, whereby these dancers have separate peer groups who are dance and non-dance. This is the case for many young dancers who train non-residentially or in institutions linked to regular academic schooling.

The Contextual Amplification Hypothesis (Ge et al., 2002), on the other hand, suggests that the negative effects of puberty are accentuated in contexts which are averse, especially in early maturing girls (Allison & Hyde, 2013; Ge et al., 2002). Applied to ballet, the hypothesis suggests that an early maturing dancer who experiences visible changes in physique, such as increased fat mass, widening of the hips and breast development, will have negative experiences during puberty. The experiences of early maturing dancers in this study support the increased challenge of being an early maturer in the context of elite ballet. However, while negative effects of puberty do appear to be accentuated within this context, many early maturers, particularly in the latter years of their training, appeared to be psychologically robust, in contrast to what the Contextual

Amplification Hypothesis might suggest; while initial outcomes may be maladaptive, this appeared to change over time. The Contextual Amplification Hypothesis does not account for this. While the overarching social context of ballet training may accentuate negative effects of puberty for early maturing dancers, this study provides some evidence to support that those who were able to access support networks within their immediate social context, or those who possessed or adopted adaptive psychological characteristics, were able to mitigate this effect.

Another explanation for the changing trajectory of narratives described by early maturing dancers is the effect of formal selection practices, whereby perhaps only those more resilient early developers 'survive' within the training system. While early maturing ballet dancers across an age range from 11 to 17 were interviewed, these dancers, particularly the older individuals, have 'survived' the training system and therefore represent a group who have either adapted to avoid selection out of training, or who may have had existing physical or psychological characteristics, which enabled them to be retained within the system. For example, in the early maturing group, while all interviewees were objectively early in their age of menarche, not all of them possess physical characteristics synonymous with early maturation. Being 'genetically lucky' in terms of stature or lesser breast development, may enable a more adaptive response within the context of vocational ballet training. Further, psychological characteristics enabling more positive adaptation within this social context may also be pre-existing and potentially the result of rigorous formal selection and self-selection. Therefore, the experiences of those who are not retained would be expected to be significantly different from the dancers in this study.

A Goodness of Fit Model has previously been applied to studies of adolescent ballet dancers (Brooks-Gunn & Warren, 1985). This perspective examines an individual's reaction to puberty in terms of the "goodness-of-fit" between the adolescent's individual characteristics and the demands, attitudes, values and expectations of significant others and their social context (Lerner, 1985). Thus, an individual's reaction to her pubertal development will depend on the particular requirements of her social context and how well she is able to conform to these expectations (Iversen, 1990). In other words, the effects of maturation timing may be moderated by social context, cultural beliefs, and individual beliefs about maturation.

A Goodness of Fit Model (Lerner, 1985) has been suggested between late maturation and the social context of ballet, whereby girls who have physical (lean, linear physique) and behavioural characteristics (greater control over eating, more positive body image) which align with the expectations of their social context, may be more satisfied with their

bodies and more emotionally healthy, than girls who develop on time or early (Brooks-Gunn et al., 1989; Brooks-Gunn & Warren, 1985). How young dancers perceive pubertal change is shaped by their own understanding of 'normal' and 'on time'; what may be perceived as early for a ballet dancer and thus associated with negative ramifications, may objectively be on time. Thus, positive reactions to development depend upon a goodness of fit between the individual and their social context or reference group (Brooks-Gunn et al., 1989; Brooks-Gunn & Warren, 1985; Iversen, 1990). The importance of breast development to young dancers in the current study indicates the influence of others' reactions to this development upon how that individual perceives their own breast development. For these more visible developments, a goodness of fit between these developments and the social context is critical to how they may be perceived by the individual and significant others. In line with the Goodness of Fit Model, on time dancers experience both fitting in and not fitting in within their social context; perhaps the relatively greater complexity of this relationship for on time dancers and the fluctuation between fitting in and not fitting in contributes to a greater sensitivity to environmental factors, such as dance teacher comments.

While the Goodness of Fit Model applies to the adolescent ballet dancer, in that it takes account of the social context and demands of elite ballet training, it does not necessarily cater to changes in the trajectory of psychological wellbeing. While this theory aligns with the notion that late maturation is advantageous in ballet, it does not account fully for the relationship between psychosocial adaptation and pubertal changes in later training. For example, in Brooks-Gunn and Warren's research, ballet dancers aged 14-18 were studied and psychosocial outcomes were measured. While many dancers may have experienced puberty, those who are delayed or very delayed in maturation may be yet to experience some of the more visible physical changes associated with puberty and thus the measured psychological outcomes at this point are positive (Brooks-Gunn & Warren, 1985). What this study fails to encompass is consideration of very late maturing individuals and their psychosocial adaptation to puberty when they eventually begin to experience physical changes and that this may not follow the trajectory posited by the Goodness of Fit theory.

The Puberty-Initiated Mediation hypothesis (Ge & Natsuaki, 2009) suggests that physical and functional characteristics related to variation in the timing of puberty hold social stimulus value for important others such as educators, peers and parents, and thus influences their perceptions of the individual and the nature and quality of social interactions with her (Ge & Natsuaki, 2009). Comparing the lived experiences of early and late maturing dancers, there is support for this hypothesis. Within the social context

of ballet training, where a linear physique is desired (Vincent, 1981), later maturation and associated physical characteristics, hold a more positive social stimulus value for young dancers and their peers than physical characteristics associated with stockiness in build, which are more pronounced with early maturation (Brooks-Gunn & Warren, 1985, Pickard, 2013). There is evidence to suggest that this is specific to ballet as a context, where dancers described peers who had aspirations in jazz to be jealous of greater physical development; where greater development is considered a hindrance in ballet and an asset in jazz. In line with research conducted with ballet teachers, specific changes associated with early maturation, such as widening of the hips, enhanced breast development and increase in fat stores, were generally viewed as not 'conducive' to a career in ballet (Mitchell et al., 2016).

Experiences of young dancers support the premise that physical and functional characteristics related to variation in the timing of puberty, hold social stimulus value for important others, such as peers. Furthermore, the experiences of early, on time and late maturing ballet dancers provide evidence for the manifestation of such values in the nature and quality of social interactions with peers. While early maturing girls experienced bullying and on time dancers struggled with peer comparison, late maturing girls felt excluded from peer narratives surrounding puberty. Early and late maturing dancers experienced social exclusion, with variation in pubertal timing impacting upon the nature and quality of interactions with peers. On time dancers benefit from being in synch with many of their peers and while they reported struggling with peer comparison, were advantaged in terms of peer support.

While many studies have applied this hypothesis to early maturing individuals, within the context of elite ballet training the Puberty-Initiated Mediation Hypothesis appears to have application for early, on time and late maturers. This is further consolidated by ballet selection practices which place significant social value to later maturing physical characteristics, through selecting for these attributes, and ascribe negative social value to characteristics associated with early maturation, rejecting the majority of these individuals from the system. Although the Puberty-Initiated Mediation Hypothesis is seemingly logical and consistent with limited observations, it requires further validation, particularly in the context of ballet. To this end, longitudinal observations of dancers from early adolescence, in the transition into and through puberty are needed.

The findings of this study support Iversen's (1990) assertion that late maturing individuals, who are otherwise advantaged within their social context, may have an equally difficult time adapting to changes at puberty. It appears that alongside the

Puberty-Initiated Mediation Hypothesis, the most appropriate theory for application to the adolescent dancer is the Stage Termination Hypothesis (Petersen & Taylor, 1980). The Stage Termination Hypothesis holds that early maturers undergo a crisis during puberty because latency comes to an abrupt end and puberty interrupts the developmental tasks of middle childhood, while late developers avoid going through this crisis. Late development, then, is seen as initially positive but as eventually psychologically detrimental (Iversen, 1990; Petersen & Crockett, 1985). Generally, research on the effects of pubertal timing on psychosocial development following the Stage Termination Hypothesis, indicate a linear relationship between timing and outcomes, such as self-esteem, thereby enforcing the desirability of late maturation. However, the Stage Termination Hypothesis also emphasises that crisis due to maturation is necessary in the long run. Thus, late maturing individuals, having avoided this up until a certain point, may struggle at a later developmental point (Peskin & Livson, 1972; Petersen & Crockett, 1985). This is supported by the narratives of late maturing dancers in this study who experienced greater struggles during their later years of training and appeared to be less well-adapted than their early maturing counterparts in terms of psychological and physical readiness for the completion of their training.

Iversen's suggestions for adjusting this theory to gymnasts may hold equal relevance for ballet dancers: adjusting the definition of early and late to the context of the late developing dancer, whereby early and late maturation should carry the same implications where the time frame for a dancer's rate of development has been adjusted for. While the timing of development relative to the timing of peak performance for young gymnasts requires parallels to be drawn between latency as a developmental stage in a gymnast's personal growth, and prepubescence as a developmental stage for a gymnast's prowess, a different approach is needed in order to apply this to the adolescent ballet dancer (Iversen, 1990). For the late maturing ballet dancer, prepubescence is a developmental stage for the advancement of technical ability and skill and the post-pubertal years are the prescribed stage for a dancer's peak performance. Further, the Stage Termination model applies to the late developing ballet dancer if we identify the inevitable later time of maladjustment as the period in which they may undergo pubertal changes (Iversen, 1990). In interpretations of the Stage Termination Hypothesis where later crisis is not acknowledged, the model may lack applicability to late maturing dancers; some studies have adhered to the linear dimension effects of puberty, ignoring the question of later crisis (Iversen, 1990; Petersen & Taylor, 1980; Petersen & Crockett, 1985).

A final theory which aligns with the narratives of early, on time and late maturing ballet dancers in this study is the Simultaneous Changes Model (Lerner, 1985). This model holds that coping with pubertal changes may be especially challenging when role changes associated with timing of maturation occur simultaneously with role changes related to contextual alterations (Lerner, 1985). For example, adolescents undergoing pubertal changes and changes in a school context at the same time have reported lower self-esteem and more negative perceptions of appearance (Blyth, Simmons, & Zakin, 1985). This framework can be applied to late maturing ballet dancers, who undergo pubertal changes concurrent with final school evaluations and auditions for further training or professional companies, and the subsequent transition to further training or company life.

A comparison of the experiences of late, on time and early maturing ballet dancers illustrates contrasting narratives. While further research is needed to provide empirical evidence to support these narratives, the lived experiences captured in this research suggest that late maturing dancers, while in the majority in vocational ballet schools, are disadvantaged by the current training and evaluation system. While early and on time maturing dancers experience challenges early on in their training, these challenges may facilitate the development of coping mechanisms. In addition, the timing of pubertal change relative to training and evaluation provides these individuals with time to adjust, both physically and psychologically, in readiness to move on from their vocational training. Late maturing dancers, while more physically suited to the requirements of professional ballet, experience physical changes and their most rapid period of growth during crucial later training years. While earlier maturing girls benefit from time to adjust to these changes, later maturing dancers have comparatively little time to adjust, physically and psychologically, to their changing bodies and, subsequently, may lack both physical and psychological readiness for progression from vocational training.

Limitations

The qualitative methods utilised in this study aim to develop a greater understanding of psychosocial adaptation to puberty through generating narratives surrounding each participant's experiences of growing up in dance. Narrative accounts are subject to researcher bias and rely on the accuracy of participant recall. It is acknowledged that approaches, such as ethnography, would have enabled these findings to be supplemented by observational data. While this would contribute further richness to the findings, IPA enables the researcher to be an 'outsider' and to bring a more objective perspective to each school environment and each interview (Brocki & Wearden, 2006). Additionally, a purely observational approach may not have enabled the focus on

individual lived experiences necessary for an in-depth analysis of how biological, sociocultural and psychological factors interact, relative to differences in pubertal timing (Brocki & Wearden, 2006; Larkin & Griffiths, 2002). Had a greater period of time been available to the researcher, supplementing semi-structured interviews with more observational data may have provided a basis for drawing comparisons between different environments across the three schools.

The sample sizes in these studies, while adequate relative to qualitative standards, are important to note. Sample sizes of 6-10 are recommended for each analysis group to enable rich and in depth data. However, when drawing conclusions about these findings and comparisons between groups it is important to acknowledge the relatively small pool of participants who contributed to these findings. Further, factors such as country, dance style and age will also impact upon generalisability of the findings. The data collected was restricted to UK dance schools with a ballet focus and therefore may lack generalisability to dance schools in other countries and cultures and to dancers whose focus is not ballet. In addition, this body of work focuses only on female dancers and therefore data are not generalisable to male dancers. The distinct differences in pubertal changes between females and males and the subsequent differences in measurement of pubertal status and timing necessitate consideration of each sex separately. In addition, within the social context of ballet, it is likely that overt changes for females have different social meaning and value compared to pubertal changes for males, and therefore experiences of puberty will likely be very different. It is acknowledged that similar research with males is also justified, though this was not possible within the scope of this PhD.

When exploring the experiences of late maturing ballet dancers, it is acknowledged that some dancers who had not yet had their own experiences of puberty, relayed their narratives based on their personal expectations and/or concerns and peer experience. Though unable to base their narrative entirely upon their own experiences, these narratives still capture lived experiences surrounding growing up in dance, as the process of puberty is only one aspect of this.

4.5 Summary

The experiences of adolescent dancers maturing and developing in the context of ballet, varies by maturity timing. Quantitative data from study three shows differences in height, weight and BMI across different maturity groups. This was supplemented by qualitative data where early, on time and late maturing dancers described differences in psychosocial adaptation at puberty, mechanisms for coping and in their learning experiences. Each maturity group experienced both benefits and challenges associated with their maturity timing, many of which have the potential to be mitigated through greater consideration of growth and maturation in the training and education of dancers and dance educators.

The interplay between biological, sociocultural and psychological factors is highly complex when applied to young ballet dancers. Many conceptual models are based upon the effects of early puberty, with most holding the assumption that early maturation is the most disadvantaged deviant condition, while acknowledging that delayed maturation also deviates from the norm. For example, while late maturation may be advantageous initially, it may present itself as disadvantageous in the latter stages of training. Similarly, early and on time dancers may also experience advantages and disadvantages during different phases of their training. Many hypotheses do not take into account the social context of ballet or the dynamic nature of the interactions between biological, psychological and sociocultural factors. Accordingly, researchers need to be aware that the advantages and disadvantages associated with pubertal timing may vary relative to dancer's phase of training and the demands and challenges they experience during these unique phases.

The Puberty-Initiated Mediation Hypothesis (Ge & Natsuaki, 2009) is best equipped to describe the complexities of growing up in ballet. As described by Summers-Effler (2004), and arguably with particular resonance in the context of ballet: "The body itself does not constitute the problem of early development; rather the social context in which the body changes determines the extent to which the body matters" (Summers-Effler, 2004, p. 30). Within the social context of ballet training, where a linear physique is desired (Vincent, 1981), later maturation and associated physical characteristics hold a more positive social stimulus value for young dancers and their peers than physical characteristics associated with stockiness in build, which are more pronounced with early or on time maturation (Brooks-Gunn & Warren, 1985; Pickard, 2013). Equally, as the social stimulus value of physical characteristics can be disadvantageous to early and on time dancers, the social value associated with functional changes can disadvantage late

maturing dancers at a crucial point in their training. While many studies have applied this hypothesis to early maturing individuals, within the context of elite ballet training, the Puberty-Initiated Mediation Hypothesis appears to have application for early, on time and late maturers. Although the Puberty-Initiated Mediation Hypothesis is seemingly logical and consistent with observations in this study, it requires further validation, particularly in the context of ballet. To this end, longitudinal observations of dancers from early adolescence, in the transition into and through puberty are needed.

While models such as the Puberty-Initiated Mediation Hypothesis and the Simultaneous Changes Model appear applicable to the context of ballet in some ways, other elements are lacking. In order to develop a true understanding of the implications of maturity timing in the context of ballet, a model or hypothesis would need to encompass several aspects: the social context and demands of elite ballet training, the social stimulus value of functional characteristics, simultaneous changes in maturity and social context and having more than one 'deviant' maturity group. In order for a model to fully account for the implications of maturity timing in the context of ballet, a more complex model is required. An integrated model which draws on the strengths of models, such as the Puberty-Initiated Mediation Hypothesis and the Simultaneous Changes Model, but which advances these concepts in terms of their applicability to ballet would be of value. Future research should consider applying Iversen's recommendations, such as adjusting the definitions of early and late maturation and the implications associated with them (Iversen, 1990).

Chapter 5

Discussion

5.1 Key Findings

The studies included within this thesis contribute both quantitative and qualitative data that support and advance existing findings relating to the importance of maturation in dance, and specifically, to ballet. Existing literature in this area, while limited, reports amplified effects of maturity timing in adolescent ballet dancers (Brooks-Gunn et al., 1989; Brooks-Gunn & Warren, 1985). While quantitative data suggested a lack of maturity associated differences in elite adult dancers, qualitative differences between dancers of differing maturity timing persist throughout the lived experiences of both adult and adolescent ballet dancers. The timing and extent of pubertal changes was a key theme for adult ballet dancers in terms of the conflict and struggle they experienced growing up in dance. Early, on time, and late maturing dancers described different pathways and strategies for survival in the ballet profession, relative to their maturity timing, their physical attributes and the demands of the activity. Further, the advantages and disadvantages associated with maturation timing appeared to vary relative to the stage of training and the varying demands that were placed upon the dancers. These findings contribute to a greater understanding of the implications of maturity timing at the adult professional level; while little variation in maturity timing is seen in the sample, likely due to formal and informal selection strategies, maturity timing has implications for the lived experience of the dancers within that population.

At a pre-professional level, there is evidence of clear differences in the physical characteristics of adolescent ballet dancers, relative to differing maturity timing. Consistent with existing literature in professional ballet dancers, quantitative data suggests a selection pattern with a preference toward late maturing dancers at the pre-professional level. Accordingly, the lived experiences of these young dancers appear to vary relative to maturity timing. Young dancers in different maturity groups described differences in terms of psychosocial adaptation to puberty, mechanisms for coping and in perceptions of wellbeing and the learning environment. These differences are important in terms of providing optimal support and developmentally appropriate training for young dancers, in addition to promoting a positive trajectory for psychological wellbeing. Findings from this body of work suggest that perceptions of thinness related learning may be of particular relevance; with thinness related learning experiences

predicting variance across a range of psychological issues, including self-esteem and eating pathologies, in adult dancers.

Findings are consistent with existing literature, which reports a selection bias toward later maturing ballet dancers (Brooks-Gunn & Warren, 1985; Hamilton et al., 1988; Hamilton et al., 1985; Hamilton et al., 1997). However, findings reported in this thesis challenge the well-established notions of earlier maturation as a solely disadvantageous condition in the context of ballet and late maturation as solely advantageous (Brooks-Gunn & Warren, 1985; Hamilton et al., 1997). While quantitative data suggests few early maturing dancers are retained in the final years of vocational training, the lived experiences of both adult and adolescent ballet dancers confirm that, if retained, there are several benefits associated with early maturation. Consistent with Mitchell et al (2016) dancers reported a number of benefits to maturing earlier in the context of ballet training, such as 'getting the growing done' before more serious training begins. Late maturing dancers, while acknowledging aesthetic benefits associated with later development, described challenges in the latter years of their training, such as ongoing injury and feeling left behind. These findings contribute to a greater understanding of the complexities associated with growing up in dance and how biological factors, such as the timing of puberty, interact with the social context of ballet training.

This body of work also advances our knowledge of dancers who mature on time, who are often overlooked, with the assumption that many maladaptive responses in psychosocial adaptation at puberty are only present in those at the extremes of early and late development (Allison & Hyde, 2013; Brooks-Gunn & Warren, 1985; Ge & Natsuaki, 2009; Ge et al., 2011; Iversen, 1990; Summers-Effler, 2004). In the context of ballet, on time dancers, instead of perceiving themselves as 'average' and experiencing a relatively easy pubertal transition, described unique challenges associated with a fluctuation between fitting in and not fitting in within their social context. While findings support Brooks-Gunn and Warren's (1985) assertion that maturing on time in the context of ballet is associated with similar disadvantages to those who mature early, present findings suggest that the implications of on time maturation are more complex; they do not appear to follow the same trajectory as the narratives of early maturing ballet dancers. Subsequently, on time dancers reported greater sensitivity to their environment in terms of peer comparison, particularly in relation to body shape and size. Further research is warranted to understand the complexities of on time dancers' experiences.

Existing knowledge relating to thinness related learning environments in dance has been advanced through this body of work (Annus & Smith, 2009; Penniment & Egan, 2012).

The present research confirms the salience of thinness related learning experiences for dancers, in particular, those participating in ballet at an elite level. While existing research establishes an association between thinness related learning and disordered eating behaviours in women who participate in ballet, this thesis extends this association to other aspects of psychosocial wellbeing. Thinness related learning environments were found to be associated with greater body dissatisfaction, disordered eating, thinness and restricting expectancies, poorer self-esteem and psychological wellbeing in adult ballet dancers. Thinness related learning experiences were also prominent in the narratives of adult and adolescent ballet dancers. Dancers described experiences such as critical comments from teachers and peer comparison. These factors may act as moderators as they were described as being integral to determining the extent of conflict and struggle in coming to terms with pubertal changes. These findings advance our knowledge of thinness related learning, extending the relevance of this phenomenon to adolescent dancers and their experiences of puberty. In addition, this thesis is the first body of work to present evidence of thinness related learning within a sample of contemporary dancers, with contemporary dancers reporting moderate levels of thinness related learning in their dance classes.

Studies highlight the importance of social context for adaptation to pubertal changes and an increased risk to psychosocial wellbeing in the context of ballet (Arcelus et al., 2014; Brooks-Gunn et al., 1989; Brooks-Gunn & Warren, 1985; Pickard, 2012, 2013, 2015; Piran, 1999). Of key importance within both adult and adolescent lived experiences of growing up in dance was the potential for moderation of outcomes at puberty within the dance environment. Important figures such as the dance teacher, facets of the environment such as use of mirrors, and the level of social support, were described as pivotal in coming to terms with changes at puberty; adult dancers described social support as fundamental to their success in the ballet profession. In adolescent dancers, access to social support was influenced by maturity timing, with earlier maturing dancers struggling to access support from peers, on time dancers benefiting from greater social support and late maturing dancers benefitting from the experiences of their peers.

The dance teacher was highlighted as having an important role to play in adaptive or maladaptive responses at puberty. Teachers who were understanding of pubertal change and engaged more openly with students about these issues, were described favourably in terms of dancers' perceptions of support and ability to accept and adapt to pubertal changes. In comparison, where teachers were perceived to have a lack of awareness and understanding of pubertal changes and responded to physical changes negatively (either through ignoring or confronting the dancer), these behaviours were

described as critical in terms of dancers' individual perceptions of pubertal changes and of themselves as a dancer.

The interplay between biological, sociocultural and psychological factors is highly complex when applied to ballet dancers. Many conceptual models are based upon the effects of early puberty, with most holding the assumption that early maturation is the most disadvantaged deviant condition, while acknowledging that delayed maturation also deviates from the norm. In the present work, however, while being a late maturer is initially an advantage, later this condition can also be disadvantageous, concurrently early and on time dancers may also be disadvantaged. Many hypotheses do not take into account the social context of ballet, where more than one maturity group, at different points in training, may hold considerable disadvantage.

In addition to the Puberty-Initiated Mediation Hypothesis, other theories such as the Simultaneous Changes Model (Lerner, 1985) and the Stage Termination Hypothesis (Petersen & Taylor, 1980) may have application to the adolescent ballet dancer. These theories have the potential to accommodate the narratives of ballet dancers across early, on time and late maturity timing. However, adjustment of the timeframes traditionally applied to conceptual models may be necessary in order to accommodate very delayed maturation (Iversen, 1990). Further, when applying the Stage Termination Hypothesis to late maturing dancers, it is imperative that later crisis is acknowledged. Where adherence to the linear dimension effects of puberty is upheld, ignoring the question of later crisis, this model may lack applicability to late maturing dancers (Iversen, 1990; Petersen & Taylor, 1980; Petersen & Crockett, 1985).

Findings from this body of work point toward a unique and complex interaction among biological, psychological and sociocultural factors involved in adolescent adaptation in the context of ballet, not accounted for in existing biocultural models of adolescent adaptation. In order for a model to fully account for the implications of maturity timing in the context of ballet, a more complex model is required. An integrated model which draws on the strengths of models, such as the Puberty-Initiated Mediation Hypothesis and the Simultaneous Changes Model, but which advances these concepts in terms of their applicability to ballet is needed. Future research should consider applying Iversen's recommendations, such as adjusting the definitions of early and late maturation and the implications associated with them (Iversen, 1990).

5.2 Application

Growing up in dance: Implications of maturity timing

The findings from these studies elucidate the complex interplay between maturity timing, the dance environment and perceptions of pubertal change. Furthermore, findings have enabled exploration of the direct and indirect relationships associated with these factors. The preceding sections have discussed the maturity characteristics of adult and adolescent ballet dancers, the experiences of early, on time and late maturing girls growing up in dance and have highlighted how each group negotiates and adapts to pubertal change and their learning and training experiences. This section aims to recommend areas for future research and to make suggestions for applied practice, to facilitate healthy adaptation at puberty within the context of ballet.

Pubertal timing effects are likely to be the product of an individual's reactions to the interaction between the timing of puberty, relative to that of peers, and the responses of significant others in her environment, such as peers and the dance teacher, to that development (Petersen, 1988). The experiences of early, on time and late maturing ballet dancers provide compelling evidence to suggest that the timing of maturation, in this context, has implications across a number of domains, including training, injury, selection and evaluation, psychosocial adaptation and peer and teacher relationships. The direction and extent of implications across each of these domains differs relative to early, on time or late maturation.

Dance training and injury

The experiences of adult and adolescent dancers illustrate the relationship between the timing of maturation and implications for ballet training. While dancers in all three maturity groups experienced direct implications of physical growth upon their physical and functional capacities, late maturing dancers were most adversely effected. Early and on time maturing dancers experienced loss of flexibility, co-ordination, balance and growth-related injuries in the earlier years of their training, whereas late maturing dancers described experiencing these implications of growth and maturation in their later training years, when training load and intensity is much higher and the pressure to improve and to perform is much greater (Caine et al., 2016; Ekegren et al., 2014; Kadel et al., 2005).

Experiences of injury, while prevalent among all dancers, were particularly salient for late maturing dancers. Late maturing dancers are at relatively greater risk physiologically (DePalma, 2006; Tanchev et al., 2000; Warren et al., 1986; Wyatt, 2015) and under greater physical stress, due to experiencing their most rapid period of growth when

training load and intensity are higher and testing and evaluation points arise (British Gymnastics, 2006; Caine et al., 2016; Ekegren et al., 2014; Kadel et al., 2005). As this occurs at a relatively late point in their training, late maturing dancers associated these experiences with a loss of confidence in their capabilities as a dancer. These findings highlight the need for both physical and psychological support for young dancers as they experience the changes of puberty.

Experiences of adult and adolescent dancers across all three maturity groups, support a need to address the conflict between growth and maturation and the ballet training system. In line with existing data on the prevalence of injury in adolescent ballet dancers, for all young dancers, experiences of injury and pain were considered as inevitable (Ekegren et al., 2011; Kenny et al., 2015). Consistent with Pickard's theory, experiences of pain and suffering in young ballet dancers are perceived as vital in the development of physical capital in the ballet world (Pickard, 2015). While pain and injury may be associated with accrual of physical capital, greater consideration of growth and maturation, such as modification of training load, could contribute to mitigating injuries associated with overuse during periods of rapid growth. Importantly, late maturing dancers accounted for over 65% of final year adolescent ballet dancers and around 70% of female dancers in the ballet profession (Hamilton et al., 1988). Therefore, safeguarding the physical wellbeing of late maturing dancers in particular should be a priority for training establishments, particularly in terms of the potential for long term health implications from injury. Monitoring growth and maturation and adapting training to account for this, or vocational ballet training systems should modify their training programmes and evaluation points to reflect the students they retain.

Assessment of growth and maturation

The experiences of late maturing dancers in particular provide a compelling case for assessing and monitoring growth and maturation. If schools can monitor or predict the most rapid periods of growth and adjust training load accordingly, late maturing girls may be at less risk of injury during this time.

The measurement and tracking of growth and maturation is currently utilised in sport in order to account for maturity associated variation. For example, in football and rugby, these measurements are being utilised to bio-band players relative to their biological maturity (Cumming, Llyod et al., 2017). In dance, height and weight measurements are currently taken, but not necessarily utilised to inform approaches to training. Methods for assessing and tracking growth and maturation in ballet would need to be established in order to implement approaches, such as bio-banding. Consideration of maturity timing

through approaches such as bio-banding creates the opportunity to provide more developmentally appropriate training.

Measurement and monitoring of growth and maturation would benefit young ballet dancers of all maturity groups. If schools can monitor or predict the most rapid periods of growth and adjust training load accordingly, dancers, and particularly late maturing girls, may be at less risk of injury during this time. This could minimise the notion of injury as inevitable around the time of most rapid growth (Cumming, Lloyd, et al., 2017; Horobeanu et al., 2017). In addition, assessment of growth and maturation can inform the tailoring of psychological skills support to benefit young dancers as they go through different phases of growth. For example, self-talk to enhance confidence associated with loss of flexibility during periods of peak growth (Noh et al., 2007). Psychological interventions may also help to enhance thriving and resilience in young dancers and in turn, promote healthy psychosocial adaptation. The promotion of resilience qualities and use of psychological skills has been associated with greater thriving in sports performers and may also have application in the context of ballet training (Brown et al., 2017).

Consideration of maturity timing within basic monitoring of height and weight, could also benefit dancers of all maturity groups. Accounting for differing maturation when weighing and measuring dancers, by comparing data to their biological age rather than their chronological age (Gillison et al., 2017), could enable early maturing and on time girls a better chance of being retained within training systems for longer. In addition, this approach could provide a more accurate understanding of whether late maturing girls are underweight or healthy for their stage of development.

Education specific to the measurement of growth and maturation

In order for measures of growth and maturation to be effective and reliable, it is paramount that individuals conducting measurements are educated and trained. Furthermore, in order for assessment of growth and maturation to have maximum impact for young dancers, teachers and support staff in vocational dance institutions need to understand how to interpret and apply this knowledge. For example, understanding the physical changes which indicate different stages of maturation, the potential physical and psychological implications of these changes, and how they may differ for individuals who mature early, on time and late. Taking this a step further, implementation of a bio-banding approach would necessitate greater teacher awareness of differing maturity and could facilitate a greater understanding of the necessity of differing approaches to training early and late maturing individuals.

Utilising measures of growth and maturation: Innovative approaches

Measurement of growth and maturation could also be used to implement approaches such as bio-banding, which could create opportunities for dance schools to provide more developmentally appropriate training for girls of early, on time and late maturation (Cumming, Lloyd, et al., 2017). Bio-banded classes could be used, not to replace year group classes, but as a supplement to existing training. Implementation of bio-banding could have both physical and psychological benefits for young dancers and provides an approach for negotiating some of the implications of maturity timing upon ballet training and injury. Research is beginning to document the benefits of this approach for young athletes in contributing towards their physical, psychological, and social development (Cumming, Brown, et al., 2017). For early maturing dancers, training with older girls of more similar biological maturity could enable greater opportunities for social support, which many early maturing girls seem to struggle with. Moreover, this may also provide them with an opportunity to capitalise on their earlier development relative to their progress in training; benefitting from the fact that the most rapid period of growth is finished, opportunities to dance with older peers could help to challenge earlier maturing dancers in terms of their dance technique. In addition, this approach could potentially offer earlier and on time maturing girls a more healthy point of reference in terms of body shape and size.

For late maturing dancers, bio-banding could be used to address experiences of feeling left behind. If grouped by maturity, dancers would be at a similar stage of growth and development, meaning that subsequent technical and functional capacity is also similar; these dancers would not be expected to keep up with the flexibility of their earlier maturing peers which could help to reduce risk of injury. This, in turn, may help to boost confidence that is dented by comparing these reduced capabilities to peers who are more advanced in maturity.

Selection and evaluation

Quantitative data suggests a selection pattern with a bias toward later maturation, with only one early maturing dancer present in the final year of training. The experiences of adult and adolescent ballet dancers support this, suggesting that maturity timing has implications for (early) selection and evaluation (between ages 10-15 years), with early maturing girls most adversely affected. Early and on time dancers are most likely to experience a conflict between normal pubertal developments and desired physical attributes for ballet (Brooks-Gunn & Warren, 1985). Greater breast development was of particular concern for both early and on time dancers, and has been associated with dropping out of vocational ballet training (Hamilton et al., 1997; Mitchell et al., 2016).

However, early and on time dancers who are retained or selected into training systems, appear to benefit from the timing of assessment and evaluation within those systems. While early maturers may struggle more to remain in the system, if retained, the timing of evaluation and assessment suits these dancers better than their later maturing peers.

Late maturing dancers have the most desirable physical characteristics for selection into, and retention within, vocational ballet training (Brooks-Gunn & Warren, 1985; Mitchell et al., 2016). This was evident in the height, weight and BMI characteristics of late maturing dancers which were lower than those reported for early and on time dancers, with low weight for height. The experiences of late maturing dancers suggest that selection and retention is not an issue in the first instance. Yet, later on in their training, these dancers struggle with the timing of key evaluations and assessments, which coincide with their most rapid period of growth and this may also have implications for their careers. Late maturing dancers may struggle more with auditions and selection following on from their vocational ballet training, due to limited time to adjust to changes at puberty and ongoing injuries. While the majority of dancers in the final year of training were identified as late maturing, the lived experiences of dancers across age groups suggests many may 'fall by the wayside' and raises the question of whether the current system may be hindering retention of the most talented dancers.

Consideration of maturity timing in selection and evaluation practices

Young dancers have a keen awareness of the characteristics which make the 'ideal body' for ballet. These characteristics are also key selection criteria for vocational schools and, importantly, some of the physical characteristics can be influenced by maturity timing. Thus, early selection is a significant barrier for many early maturing and some on time dancers. Raising awareness of the physical implications of differing maturity timing could better enable training establishments to retain the most talented dancers. For example, if biological maturity is considered alongside measurement of weight (commonly measured each term for dance students), early maturing dancers, who may look 'heavy', may be evaluated somewhat differently. Equally, there may be value in considering maturity timing when making retention decisions (usually around year 9 of school). During evaluation, early maturing dancers will be directly compared to their later maturing peers and their comparatively greater physical development at this point may be deemed less conducive to continued professional training. While it is acknowledged that there are many reasons to assess a dancer out of vocational training, if maturity timing is taken into consideration it could help to reduce unnecessary loss of talent from the system.

Application of the principles of bio-banding could benefit dancers across all maturity timing groups and enable retention of the most talented dancers. If late maturing dancers are banded by maturity, the timing of evaluation for these individuals should then be determined as appropriate for their physical development, rather than by year group. Further, while the preference for late maturing physiques is embedded within the cultural norms of ballet, consideration of the development of late maturing dancers is needed. In order for these dancers to complete their physical development within the school environment, extending training by a year may be a valid alternative.

Advocating later specialisation

Evidence from adult dancers who began their full-time ballet training post-16 (later specialisation) warrants further investigation. These dancers reported benefits of later specialisation for 'normal development' and psychological wellbeing. The potential for this approach to foster more adaptive responses at puberty and subsequently greater psychological wellbeing in ballet, while under-researched, goes against existing literature pertaining to wellbeing and selection age (Hamilton et al., 1988). Research in sport supports early diversification and later specialisation (Côté, Horton, MacDonald, & Wilkes, 2009; Côté, Lidor, & Hackfort, 2009; Côté & Vierimaa, 2014; Jean & Karl, 2015; Malina, 2010). Early specialisation has been associated with greater incidence of injury, burnout and less enjoyment, while earlier diversification and later specialisation is associated with more positive psychological outcomes and with setting a motivational, psychological, and social foundation for continued sport participation (Côté et al., 2009; Côté et al., 2009; Côté & Vierimaa, 2014; Jean & Karl, 2015; Malina, 2010; Strachan, Côté, & Deakin, 2016). Current recommendations advocate sampling sports during childhood and making decisions about specialisation from age 13, with more highly specialised training from age 16 onwards (Côté et al., 2009; Côté & Vierimaa, 2014). These recommendations are in line with the pathways taken by those dancers who specialised at a later age. Future studies should consider examining the association between later specialisation and greater perceptions of wellbeing with a larger sample of dancers. Increasing support and evidence for this model of long term athlete development in sport, coupled with further support for the findings of the existing study, could build a case for advocating later specialisation in ballet.

Psychosocial adaptation

The experiences of adult and adolescent ballet dancers of early, on time and late maturity timing suggest that growing up in dance has implications for healthy psychosocial adaptation at puberty. The experiences of dancers in each maturity group suggest that maturity timing has implications for social support, interaction with the environment and

time to prepare and adjust. These different narratives described the implications of maturity timing for dancers and the distinct benefits and challenges associated with belonging to different maturity groups.

Early maturing dancers experienced relatively little time to prepare for the changes of puberty and a lack of social support to help them to cope with these changes. On time dancers experienced good levels of social support, but described conflict between perceptions of physical change and the expectations of significant others, amplified by the dance environment. Late maturing dancers described positive experiences during their early to mid-training years but, subsequently, a relative lack of time to adjust to pubertal changes physically and psychologically. This resulted in feeling underprepared for the final stages of their training and the next step in their training or career. It is clear that different maturity groups may therefore require different types of support and different approaches to training.

Enhancing opportunities for social support

While we cannot provide early maturing dancers with more time in order to feel more prepared for changes at puberty, we can address education and social support. Bio-banding is one approach which groups young people by biological rather than chronological age. Adopting these principles within the context of ballet may enhance opportunities to build social support, particularly for early maturing girls. Research is beginning to document the benefits of this approach for young athletes in contributing towards their physical, psychological, and social development (Cumming, Brown, et al., 2017). Many of the early maturing adolescent dancers described the benefits of being paired with an older 'buddy' in terms of providing support and advice. Grouping these early maturing dancers with older peers could also be beneficial within the context of training, whereby if these dancers had regular opportunities to dance with those who are more comparable in terms of biological maturity (rather than with same age peers), there could be further benefits, similar to those described by dancers in this study. Such approaches could offer earlier maturing girls a more healthy point of reference in terms of body shape and size and, at a later stage, could also provide benefits in terms of technique; capitalising on the fact that the most rapid period of growth is finished, opportunities to dance with older peers could help to challenge earlier maturing dancers in terms of their dance technique. This could also facilitate more opportunities for early maturing dancers to build support networks with older peers, meaning that they may have access to more people they can talk to.

Education for dancers

Education for young dancers beyond the basics, and in a capacity which is applied to their context, could be of particular benefit to early maturing dancers, to help them to prepare for and manage changes at puberty. Additionally, an understanding of what is normal and changes that are temporary, may help dancers to better support each other.

Many of the adult ballet dancers described their shock and unease in response to normal changes of puberty. Disliking of physical changes of puberty, alongside feeling unprepared, has been identified as a predictor of eating disorder symptoms; suggesting that how young women experience the pubertal transition can influence aspects of wellbeing in adulthood (Moore et al., 2016). Greater education for young dancers about normal changes and normal variation in these changes may enable greater preparedness and acceptance of these changes and subsequent benefits for psychological wellbeing.

In particular, education for on time dancers could promote greater understanding of normal changes associated with puberty, and the differences associated with early, on time and late maturation may help to lessen the impact of peer comparison. In addition, many early and on time dancers had negative perceptions of puberty, which have been associated with eating disorder behaviours (Moore et al., 2016). Moreover, recollections of disliking development and feelings of unpreparedness were found to predict disordered eating (Moore et al., 2016). This may be of increased relevance in the context of ballet, where normal pubertal development is stigmatised and thus perceptions and subsequent experiences are more likely to be negative. In this sense, providing education for dancers and support for dance teachers to provide the most adaptive environment is important to promote more positive experiences of puberty. Additionally, many late maturing dancers described being concerned about a lack of pubertal changes. Education for these dancers about differences in maturity timing could enable them to understand normal variation and situations in which concern is warranted.

Education for dance teachers

Coping alone was central to the experience of many early maturing dancers and not having anyone they felt they could talk to about puberty was identified as a key issue. In addition to opportunities to mix with older peers, greater education for teachers may facilitate better support for these dancers. Generating greater understanding among dance teachers and professionals, in terms of normal pubertal development and differences in timing, could help in many ways. For example, puberty in ballet is heavily stigmatised as a negative event; if teachers had greater knowledge surrounding growth

and maturation, they could adapt their teaching practices to take advantage of those aspects which are strengthened by puberty. A further reason for this stigma is the lack of understanding of pubertal norms; if teachers are equipped with a greater understanding of these norms, the expectations of young dancers regarding normal pubertal development may also be better informed. Education alone may not be enough to facilitate behaviour change. To this end, knowledge translation activities such as supervised application of knowledge in a dance context or digital interventions utilising applications such as the Coaching Analysis Intervention System (Cushion, Harvey, Muir, to self-monitor teaching practices, warrant consideration.

The experiences of adult ballet dancers coupled with the salience of thinness related learning reported in ballet dancers highlight a need for dance teacher education to generate a greater understanding of child development, physically and psychologically. This may include information about normal pubertal development (e.g. weight gain, breast development) and also about the timing of development and the extent of normal variation. Educating dance teachers on these topics would facilitate avoidance of thinness related learning behaviours, such as comments on body weight and shape. Research shows that sports coaches can be taught to become more mastery involving, with positive outcomes in sport through coach education programmes (Smith et al., 2007). These findings demonstrate the potential for a similar change in dance teacher behaviours, relating to the reduction of thinness related learning environments in ballet.

The experiences of on time adolescent dancers suggest that education for dance teachers is still an important area to address. On time dancers in particular described more negative interactions with dance teachers. The experiences of on time dancers suggest a need for greater dance teacher understanding of individual differences in growth and development and the most adaptive ways to negotiate this within a teaching context. Education for dance teachers should address understanding of growth and maturation in general, how to avoid teaching behaviours which facilitate TRL and how to create optimal learning environments for the adolescent dancer. This could help to address many of the struggles on time dancers report in adjusting to changes at puberty and in promoting more positive perceptions of puberty and, subsequently, more adaptive responses. In addition, further exploration of dance teacher approaches to puberty regarding direct and indirect actions to moderate the effects of puberty in the context of ballet could enable more positive teacher-student interactions (Mitchell et al., 2016).

Late maturing dancers described positive interactions with dance teachers, in particular, teacher understanding and awareness was highlighted by late maturing dancers as

something which benefitted them both physically and psychologically. Generating greater understanding and awareness amongst teachers, and furthering this to include more specific approaches to accounting for differing maturity timing, could be of significant benefit to young dancers. Embedded within the wider context of the dance school, these concepts would be best facilitated by appropriate teaching climates. Educating dance teachers to create teaching climates which are most facilitative for adaptive responses at puberty across differing maturing timing would be beneficial (Piran, 1996; Piran, 1998; Piran, 1999).

5.3 Impact

Several key areas were highlighted throughout this thesis which necessitate application of existing knowledge to the training of young dancers. The experiences of adult and adolescent ballet dancers point to a need for greater education for both dance teachers and dancers, greater opportunities to build social support and to establish measurement and monitoring of growth and maturation. Consideration of growth and maturation in these ways may promote more positive experiences of growing up in dance, with the potential to positively influence physical and psychosocial wellbeing outcomes.

In addition to this programme of studies, a work placement with national dance organisation One Dance UK was undertaken. This experience provided an opportunity to address education opportunities on the topic of growth and maturation within the UK dance sector. One Dance UK is a national body representing the dance industry and working to promote dancers' health and wellbeing through the Healthier Dancer Programme. The Healthier Dancer Programme (HDP) aims to improve the physical and psychological health and wellbeing of dancers through providing advice and resources; providing healthier dancer talks and workshops for dancers and dance teachers (CPD accredited); holding events such as conferences; providing a healthcare practitioners directory; facilitating research into dancers' health, injury and performance; and advocating improved healthcare provision for dancers. My role with One Dance UK was to work in a research capacity, developing educational materials on the topic of growth and maturation for dance professionals.

The objectives of this three month placement included learning from a leading dance organisation about education provision in the dance industry, exploring ways to communicate educational materials to dance professionals, and developing resources to disseminate knowledge gained during the PhD to a wider audience. As part of this placement I undertook research to assess current provision of education and dance

teacher knowledge of growth and maturation (Summary report, Appendix I). The findings highlighted a lack of provision in this area of teacher training and, more specifically, a lack of knowledge in three key areas: biological changes at puberty and their effect on health and wellbeing, the impact of maturity timing on physiological/psychological development, and approaches to managing and monitoring puberty. As a result of this process, it was agreed that several educational resources would be developed. This included information sheets on physiological and psychological changes at puberty (Appendix I) and three workshops covering an introduction to growth and maturation in dance, maturity timing, and managing and monitoring growth and maturation.

This work is already helping to educate and guide instructors on how to better support their dancers through puberty. Since completing the placement, the information sheets have been published and shared with One Dance UK's membership. In addition, talks and workshops have been delivered, including an invitation to present at the International Association of Dance Medicine and Science (IADMS) regional meeting on the adolescent dancer (May, 2017). IADMS subsequently requested two blog posts on the topic to share with their membership. The educational resources have garnered international interest and reach, and resources are currently being developed for Healthy Dancer Canada, the Royal Academy of Dance and AusDance. The range of resources in terms of talks and workshops has also been extended to include dancers and parent/guardians of dancers.

Research findings have been disseminated to academic audiences, dance practitioners and the general public through international and national conferences, talks and presentations and the publication of two research articles (Mitchell et al., 2016, 2017). This included an overseas visit (December, 2016) presenting at the Royal Academy of Dance conference 'Dance Teaching for the 21st Century: Practice and Innovation' in Sydney and engaging with academics through seminar presentations at the University of Sydney and the Australian Catholic University in Melbourne. This visit has led to interest from Royal Academy of Dance (RAD) Australia and AusDance in future workshops and resources and to a collaboration with researchers from Griffith University and the RAD on a study relating to the 2016 Genée International Ballet Competition. More recently, research from this body of work was presented in Calgary, Canada at the Healthy Dancer Canada 10th Annual Conference, where I was the recipient of the Healthy Dancer Canada Annual Research Award in recognition of research quality and significance to Healthy Dancer Canada's mission to foster and facilitate communication and collaboration among the dance community, health professionals and researchers, with the aim to enhance the health, wellbeing and performance of all dancers. The research has also been disseminated to the general public through events at the

University of Bath, including a presentation as a finalist for the Ede and Ravenscroft prize (May, 2017) and through being shortlisted in the Images of Research Competition (May, 2017).

5.4 Conclusions and Recommendations for future research

Adopting an interdisciplinary approach and combining both quantitative and qualitative methods, this thesis contributes to a greater understanding of the experiences surrounding the complex topic of maturity timing in ballet. Embedded within the context of vocational ballet training, this body of work considers the complex interplay between biological and sociocultural factors, in this case the dance environment and psychological factors such as perceptions of pubertal change and pubertal timing. While earlier research has been limited to describing psychological outcomes at single time points, the qualitative methods utilised in this thesis serve to develop a greater understanding of psychosocial adaptation to puberty, through generating narratives surrounding each participant's experiences of growing up in dance. Further, the quantitative methods employed in this thesis contribute to gaps in existing literature pertaining to the maturity characteristics of adult and adolescent dancers and under researched concepts such as thinness related learning.

Contrary to previous research, findings from this body of work suggest that there are some benefits for early maturing dancers and that late maturing dancers, while in the majority in professional training, are disadvantaged by the timing of testing and evaluation. Maturity timing has implications for the physical and psychosocial adjustment of young ballet dancers and these implications appear to differ for early, on time and late maturing dancers. For later maturing dancers many of the issues stem from a conflict between growth, maturation and the timing of assessment and evaluation. While earlier and on time maturing dancers may struggle to be retained within the training system due to 'less conducive' physical changes, if retained they are better suited to the current training and the timing of assessment points.

The physical and psychosocial implications associated with the timing of pubertal change relative to training and evaluation in the ballet training context necessitate greater consideration by training institutions. Practical solutions include the implementation of teacher and dancer education, application of innovative approaches such as bio-banding and the measurement and monitoring of growth and maturation.

The exploratory nature of this research necessitates further study in order to substantiate and advance these findings. Future research should consider longitudinal and quantitative studies to support the narratives described in this thesis and the biocultural models recommended for application in the context of ballet. In addition, testing of the educational materials to understand their effect on dance teacher understanding of growth and maturation is recommended. Further, extending educational materials to encompass the creation of adaptive learning environments for adolescent dancers and educational programmes for dancers themselves may be beneficial.

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Appendix A – Study 1 Ethics Documentation and Questionnaire

REACH initial review Ref: EP 14/15 99

REACH approval Ref: EP 14/15 121

ANNEX ONE

Department for Health

Research Ethics Approval Committee for Health

Checklist for all researchers

The Department for Health requires all members of staff and students who are planning research projects to consider the ethical implications of the work which they undertake. This is important in all research projects, but is **essential** in those projects which involve human participants.

The Department has agreed on an ethical review process which has a fast track for those projects which either do not have ethical implications and thus do not require full scrutiny, or where scrutiny will be given by another body (in particular an NHS Research Ethics Committee [REC]). Projects that fall outside of these categories will need to make a full submission to the Research Ethics Approval Committee for Health.

Name	Siobhan Mitchell
Project Title	Thinness related learning and associated health outcomes in elite dancers

PART A: Determining the nature of your research and the route for ethical approval you need to follow (please tick the route you will follow for your ethical approval):

My proposal is currently at the stage of application for funding (tick box)

Please complete annex 1 & 2 for REACH audit purposes. Further approval may be required once funding is approved (please refer to relevant statement below)

My research project does not involve the use of human subjects or only involves secondary data analysis (**full consideration is not required, complete the checklist and the implications form for audit purposes and return to the Department Co-ordinator; Principal investigator, second reader and researcher to sign and return to the Department Co-ordinator (Annex 2 or 3)**)

My research meets the requirements for submission to an NHS REC (e.g. Involves human subjects, requires access to NHS patients or includes adults lacking capacity)
(full consideration is required by the appropriate NHS REC; complete the checklist and ethical implications form for audit purposes and return to the Department Co-ordinator (Annex 2 or 3) together with the evidence of NRES approval)
(Where NHS REC approval is required, please provide details of who is sponsoring this project)

My research has received approval from another department within the University of Bath or another UK University ethics committee. Complete the checklist, together with Annex 2 or 3 and submit with evidence of the institutions approval

My research involves human subjects and does not take place in an NHS context
(full consideration is required by REACH (Annex 2 or 3 and Annex 4))

My research involves human subjects and takes place outside of the UK, and for which particular consideration needs to be given
(full consideration is required by REACH - Annex 2 or 3 and Annex 4))

My research involves working with children and/or vulnerable adults
(a CRB check may also be required in addition to the above)

My research involves the collection and storage (not destroyed on day of collection) of human tissue. (Full consideration from an NRES approved committee is required in addition to the above)

ANNEX TWO

Department for Health

Research Ethics Approval Committee for Health

ETHICAL IMPLICATIONS OF POSTGRADUATE RESEARCH PROJECT

This template should accompany the postgraduate research student application for candidature form submitted to the Board of Studies.

(Additional departmental information may be incorporated as appropriate).

Please note that this procedure is intended to help student and supervisor consider ethical implications of the proposed research project, and as such is a 'light-touch' approach. Supervisors are responsible for deciding whether a more extensive ethical review is necessary (such as submission to an NHS REC).

Brief Title of Project	Thinness related learning and associated health outcomes in elite dancers
Student	Siobhan Mitchell
Supervisor (s)	Dr Sean Cumming and Dr Anne Haase

Are there ethical implications concerned with the following general issues?

	Comments from Supervisor
Source of the funding	The student is funded by the ESRC, the terms of the funding do not present ethical implications.
What steps will or have been taken to ensure competency of the student?	Completed research methods training as part of an MRes year, continued research skills training (through PGSkills sessions).
Are there any data storage issues? (including confidentiality, availability, length of storage, etc)	All participant information will be anonymous and will be kept for the duration of the PhD. Data will be stored on an external hard drive and secure

	server with no identifying information present, data will be kept securely, and only the researcher and her supervisory team will have access to it.
Dissemination of results: 1. Are any ethical issues likely to arise? 2. Are dissemination plans appropriate?	Results may be disseminated in the form of a publication or presentation, anonymity and confidentiality agreed with participants at the point of data collection will be upheld. This study will be used to inform further studies within the student's PhD.
Effect on/damage to the environment	n/a
In which aspects of the research process have you actively involved, or will you involve patients, service users, or members of the public? (as stakeholders in the research and not participants)	Please tick all that apply <input type="checkbox"/> Design of the research <input type="checkbox"/> Management of the research <input type="checkbox"/> Undertaking the research <input type="checkbox"/> Analysis of results <input type="checkbox"/> Dissemination of findings <input checked="" type="checkbox"/> None of the above
Give details of patient, service users or public involvement, or if none please justify the absence of involvement.	Participants will be involved only in the data collection phase of this study.
Demonstration of Ethical Considerations Please provide a paragraph describing the ethical issues which will need to be managed during the course of the activity.	Various ethical issues will need to be considered including data storage, age of participants and informing participants about the nature of the study. Survey monkey will be used to collect data, no names will be requested and participants will be allocated participant ID numbers ensuring anonymity. Resulting data will be stored on an external hard drive and will be kept securely. Only the researcher and her supervisory team will have access to it.


	<p>Date of birth will be used as an 'access question' in the survey – whereby if potential participants are under the age of 16 access to the survey will not be possible. This should ensure that all participants are an appropriate age to provide their consent as adults.</p> <p>It is understood that thinness related learning and body related disorders such as disordered eating may be a sensitive topic. Appropriate, validated subscales will be used to form the questionnaire to ensure that the probing of these types of questions is sensitive.</p> <p>The nature of the project will be disclosed on an introductory page prior to asking for consent to participate.</p>
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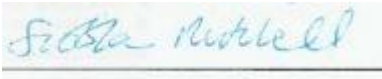
Issues for additional consideration: (This list is indicative and is not necessarily exclusive). Please tick which categories apply to your research

	Yes	No
1. Does the study involve participants who are particularly vulnerable or unable to give informed consent? (eg children, people with learning disabilities)		X
2. Will the study require the co-operation of a gatekeeper for initial access to the groups or individuals to be recruited? (eg students at school, members of self-help group, residents of a nursing home)	X	
3. Will it be necessary for participants to take part in the study without their knowledge and consent at the time? (eg covert observation of people in non-public places)		X
4. Will the study involve discussion of sensitive topics? (eg sexual activity, drug use)	X	
5. Are drugs, placebos or other substances (eg food substances, vitamins) to be administered to the study participants or will the study involve invasive, intrusive or potentially harmful procedures of any kind?		X

6. Will blood or tissue samples be obtained from participants?		X
7. Is pain or more than mild discomfort likely to result from the study?		X
8. Could the study induce psychological stress or anxiety or cause harm or negative consequences beyond the risks encountered in normal life?		X
9. Will the study involve prolonged or repetitive testing?		X
10. Will financial inducements (or other reasonable expenses and compensation for time) be offered to participants?		X
11. Will the study involve recruitment of patients through the NHS? (Note: If the answer to this question is 'yes' you will need to submit an application to appropriate NHS Research Ethics Committee.)		X
12. Will the study involve obtaining or processing personal data relating to living individuals, (eg involve recording interviews with subjects even if the findings will subsequently be made anonymous)? (Note: If the answer to this question is 'yes' you will need to ensure that the provisions of the Data Protection Act are complied with. In particular you will need to seek advice to ensure that the subjects provide sufficient consent and that the personal data will be properly stored, for an appropriate period of time). Information is available from the University Data Protection Website and dataprotection-queries@bath.ac.uk	X	
13. Will the study involve the use of animals?		X
14. Does the study raise any other ethical issues which you wish to be raised and reviewed by the Research Ethics Approval Committee for Health? If yes, what are they, please expand here:		X

I confirm that the statements above describe the ethical issues which will need to be managed during the course of this research activity.

Principal Supervisor/Project Supervisor	Investigator/	Signature: 
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	Date: 02/01/15
Second reader(PhD/DHealth/MPHil/MD only)(normally external to the project team)	Signature:  Date: 02/01/15
Researcher/Student	Signature:  Date: 29/12/14

Please submit this form to the Department Co-ordinator

ANNEX FOUR – Application form for full submission for research ethics approval

Department for Health

Research Ethics Approval Committee for Health

Title of study	Thinness related learning and associated health outcomes in elite dancers
Chief investigator (for research student projects, put supervisor name here) (for undergraduate projects, put project supervisors name here)	Name: Dr. Sean Cumming, Dr Anne Haase e-mail: S.Cumming@bath.ac.uk Anne.Haase@bristol.ac.uk Telephone: +44(0)1225 386251
Other investigators (for research student projects, put students name here) (for undergraduate projects, put student(s) name here)	Name: Siobhan Mitchell e-mail: sbbm20@bath.ac.uk Telephone: 07428636586

Source of funding for the study	The student is funded by an ESRC studentship
Proposed dates of study	Data Collection is planned to take place between March – July 2015, the full duration of the study is estimated to be from January 2015 – November 2015.
Research question	<ul style="list-style-type: none"> • What is the association between thinness related learning and health related outcomes in elite dancers? <ul style="list-style-type: none"> ○ What is the strength of the interaction/relationship? ○ Do constructs such as self-esteem, body image and thinness expectancies mediate the relationship?
Background (less than 100 words)	<p>The proposed research is the first in a series of three studies which will form my PhD research: exploring the effect of the thinness related learning (TRL) environment upon the health and wellbeing of elite dancers.</p> <p>Research suggests that TRL environments in dance are associated with the development of disordered eating (Annus and Smith, 2009; Penniment and Egan, 2012). Further to this, research suggests that there are factors which mediate the relationship between the TRL environment and health outcomes. For example, Annus and Smith's (2009) research suggests that thinness expectancies may mediate the relationship between TRL and eating disturbances. This study intends to explore this further by including biological and psychological characteristics, such as thinness expectancies, maturation timing and self-esteem. Through quantifying TRL learning experiences alongside potential mediating factors and health characteristics, we can begin to explore relationships</p>

	<p>between these factors and have a foundation upon which to explore the characteristics which predispose individuals to reduced health and wellbeing.</p>
<p>Methods (less than 300 words)</p>	<p>The study proposes a quantitative design with the use of a survey. Validated questionnaires will be used to measure thinness related learning, self-esteem, thinness expectancies, eating pathologies, body image and general psychological wellbeing. There will be basic demographic questions at the beginning of the survey with a question to assess maturation timing (age of menarche).</p> <p>The following questionnaires will be used:</p> <p>Dance Experience Questionnaire (Annus and Smith, 2009) – this is the only scale which measures thinness related learning in dance, it has strong concurrent validity and internal reliability.</p> <p>Eating Disorder Examination – Questionnaire (Fairburn and Beglin, 2008) – This questionnaire has been well validated with adolescent populations and as eating disorders are highly prevalent amongst dancers, this is a key health outcome to address within this study.</p> <p>Rosenberg Self-Esteem Scale (Rosenberg, 1965)</p> <p>Body dissatisfaction subscale of the EDI-2 (Garner, 1991) – body satisfaction and body image have been key health outcomes in the research surrounding the learning environment and health outcomes such as disordered eating, this is therefore an important scale to include.</p> <p>Psychological Wellbeing scale (Diener and Biswas-Diener, 2009) – in order to gauge general psychological wellbeing</p> <p>Thinness and Restriction and Eating Expectations Inventory (Smith, 2010) This scale has been used in longitudinal studies with adolescents. Thinness expectancies are suggested</p>

	<p>to mediate the development of disordered eating in thinness related learning environments and thus this is another key measure (Annus and Smith, 2009).</p> <p>Age of menarche – 1 question.</p>
Sample size (or equivalent qualitative approach)	Ideally a sample size of 400+
Proposed Analysis	<p>Statistical software (SPSS) will be used to address the research question:</p> <ul style="list-style-type: none"> • Descriptive statistics will be used to examine the characteristics of the sample • Correlations – we will then look for correlations between TRL, our health outcomes and potential mediators • Regression analysis will be used to look at the strength of associations - to estimate the effect of our TRL on health outcomes. • Structural equation modelling will be used to test the theory that thinness related learning influences mediating factors which in turn influence health outcomes.
Potential risks to volunteers	<p>The questionnaires probe sensitive topics such as body image and eating pathology symptoms, the nature of the questionnaire will be made clear prior to obtaining consent from participants.</p> <p>If individuals present concerns, contact information for the researcher and her supervisory team will be available as part of the survey.</p>
Potential for pain/discomfort	<p>As above, full disclosure about the nature of the study will be given prior to asking for consent to participate. The survey is not likely to cause distress, additional information will be provided at the end of the survey to guide support (www.b-eat.co.uk and www.mind.org.uk). It will be communicated to participants that they are free to withdraw up until the point of submitting the questionnaire should they feel uncomfortable with the study.</p>

Benefits to participants	A chance to share their views and opinions. There will also be the chance to enter a raffle to win 1 of 6 £30 vouchers (at the end of the survey there will be a separate section where participants have the opportunity to provide a name and contact details should they wish to enter the raffle)
How will participants be recruited?	The researcher will distribute the survey link to dance organisations in her network via email, forums and social networking. The participant information form will be used to advertise the study. The link for the study will be part of this advert and participants can access the study via this link. The incentive of vouchers will also be part of this advertisement.
Exclusion/inclusion criteria	Females age 16+ who are in vocational dance training or dance professionally.
How will participants consent be taken?	Consent will be taken through the survey, after the initial participant information has been read there will be an opportunity to tick a box to signify consent to participate in the survey. The survey will not continue without the consent box being ticked.
How will confidentiality be ensured?	All participant information will be kept confidential and stored securely on the university premises for 5 years. Data will be stored on an external hard drive and secure server with no identifying information present, data will be kept securely, and only the researcher and her supervisory team will have access to it.

References

- Annus, A., Smith, G.T., 2009. Learning experiences in dance class predict adult eating disturbance. *European Eating Disorders Review*, 17, pp.50-60.
- Penniment, K.J., Egan, S.J., 2012. Perfectionism and Learning Experiences in Dance Class as Risk Factors for Eating Disorders in Dancers. *European Eating Disorders Review*, 20, pp.13-22.

Attach the following (where relevant):

1. Participant information sheet
2. Consent Form
3. Health history questionnaire
4. Poster/promotional material
5. Copy of questionnaire/ proposed data collection tool (questionnaire; interview schedule/ observation chart/ data record sheet/ participant record sheet)

Signed by: Principal Investigator or Student Supervisor



Date: 02/01/15

Signed by: Student or other researchers

Student:



Date: 29/12/14

Co-Supervisor:



Date: 02/01/15

Participant Information



What is the study about?

This study is the first of three studies which I am undertaking as part of my PhD research in Health and Wellbeing at the University of Bath. This first study aims to assess the learning experiences and health characteristics of elite dancers.

What does taking part involve?

- You will be asked to fill in an online survey which will take you around 15 - 20 minutes to complete.
- You will not be required to provide your name or address as part of the survey, the research is **entirely anonymous**, however you will be asked basic demographic questions.
- The survey will ask questions relating to your learning experiences in dance and your psychological wellbeing.
- Questions relating to eating behaviours, body satisfaction, psychological wellbeing and learning experiences in dance will be present.
- You will have the opportunity to enter a prize draw for the chance to win one of six £30 vouchers.

Is it confidential?

All of your answers will be anonymous and kept confidential.

Who can participate?

Female dancers aged 16+ who are in vocational dance training or dance professionally.

How can I participate?

If you are interested in taking part in this study you can complete the survey through following the link: XXXXXXXXXXXXXXXXXXXXXXXXXXXX or if you would like more information about the study please use the contact details below:

Researcher:	Siobhan Mitchell	sbbm20@bath.ac.uk 07428 636586
Research Supervisors:	Dr Sean Cumming	S.Cumming@bath.ac.uk
	Dr Anne Haase	Anne.Haase@bristol.ac.uk

Informed Consent



Please read each statement. Tick in the box if you agree with all of the statements below:

- I am willing to take part in this study.
- The survey has been fully explained to me. I am clear about the purpose and potential benefits of the survey.
- I have had answered any questions I have about the study.
- I understand that my answers are confidential and will be made anonymous.
- I am free to withdraw from the survey up until the point of submitting my answers.
- I understand which topics will be covered in this survey (eating behaviours, body satisfaction, psychological wellbeing and learning experiences in dance)
- I understand that this project has been reviewed by, and received ethics clearance through, the Research Ethics Approval Committee for Health of the University of Bath.
- I understand who will have access to the data provided, how the data will be stored, and what will happen to the data at the end of the project

Your participation in this investigation and all data collected from the above testing procedures will remain strictly confidential. Only the researchers involved in the study will have access to your information and the information will not be accessible to any other member of staff. In compliance with the Data Protection Act (1998) and the Freedom of Information (2000), you will be able to access all information collected upon the completion of the study.

Continue

Sample Questionnaire

Section 1

Date of birth: _____ Country: ** Ethnicity: **

Main style of dance: _____

Age you started dance: _____ Years of formal training: _____

Current status as a dancer: ** (*vocational training/semi-professional/professional)

Did you attend a *vocational dance school? Y/N _____

If yes, from what age did you train *vocationally? _____

At what age did you have your first period?: _____

** Drop down boxes will provide options, for example Ethnicity options will be white/black/Asian/mixed/other etc.
*There will be information symbols with explanations of terms to indicate what is meant by 'vocational training' as understanding of this may vary.

Section 2

The following questionnaire asks about your experiences in dance class. Please answer the following questions for the current instructor you study under.

First, please answer the following questions:

1. What is your height? ____ ____ feet/inches metres/centimetres

2. What is your weight (when measured first thing in the morning without clothes on)? If you do not know for sure, please give your best estimate. _____

Please indicate which measure you have used: kilograms Stone Pounds

For your current instructor, please answer the questions. You may list more than one type of dance that you studied under this instructor.

1. What type of dance was taught in the class (e.g. ballet, modern)?_ ** _____

2. Age you started studying under the instructor _____

3. Number of years you have studied under the instructor_____

4. Approximate number of hours per week you spend studying under this instructor_____

5. How serious was the class (please circle your highest level of involvement):

1. Recreational/For fun
2. More than recreational but never performed
3. Performed but not on a semi-professional level
4. Semi-professional
5. Professional

	Never	Rarely	Sometimes	Often	Usually	Always
	1	2	3	4	5	6
6. How often were you weighed as part of the class or expected to make a certain weight?	1	2	3	4	5	6
7. How much did the instructor emphasize weight or shape in the class?	1	2	3	4	5	6
8. How often did the instructor make comments about your weight/shape, your classmates weights/shape, or weight/shape in general?	1	2	3	4	5	6
9. How critical was the instructor in terms of students' weights/shapes?	1	2	3	4	5	6

10. Where would you put your weight at the time compared to others in the class?*

1. smaller than the average person in the class
2. about the same as the average person in the class
3. bigger than the average person in the class

	None	A few	Almost Half	More than half	Most	All
	1	2	3	4	5	6
11. How many classmates dieted or used other weight loss techniques?	1	2	3	4	5	6
12. How many of your classmates used diet pills?	1	2	3	4	5	6

13. How many of your classmates ever made themselves throw up, use laxatives, or use diuretics?	1	2	3	4	5	6
14. How many of your classmates did you feel had an eating disorder?	1	2	3	4	5	6

Section 3

Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement.

	Strongly Disagree	Disagree	Agree	Strongly Agree
	1	2	3	4
1. On the whole, I am satisfied with myself	1	2	3	4
2. At times I think I am no good at all.	1	2	3	4
3. I feel that I have a number of good qualities.	1	2	3	4
4. I am able to do things as well as most other people.	1	2	3	4
5. I feel I do not have much to be proud of.	1	2	3	4
6. I certainly feel useless at times.	1	2	3	4
7. I feel that I'm a person of worth, at least on an equal plane with others.	1	2	3	4
8. I wish I could have more respect for myself.	1	2	3	4
9. All in all, I am inclined to feel that I am a failure.	1	2	3	4
10. I take a positive attitude toward myself.	1	2	3	4

Below are 8 statements with which you may agree or disagree. Using the 1–7 scale below, indicate your agreement with each item by indicating that response for each statement.

	1 Strongly Disagree	2 Disagree	3 Slightly Disagree	4 Mixed or neither agree nor disagree	5 Slightly agree	6 Agree	7 Strongly Agree
--	---------------------	------------	---------------------	---------------------------------------	------------------	---------	------------------

I lead a purposeful and meaningful life	1	2	3	4	5	6	7
My social relationships are supportive and rewarding.	1	2	3	4	5	6	7
I am engaged and interested in my daily activities	1	2	3	4	5	6	7
I actively contribute to the happiness and well-being of others.	1	2	3	4	5	6	7
I am competent and capable in the activities that are important to me	1	2	3	4	5	6	7
I am a good person and live a good life	1	2	3	4	5	6	7
I am optimistic about my future	1	2	3	4	5	6	7
People respect me	1	2	3	4	5	6	7

Section 4

For each question please select the answer that applies best to you.

	Never	Rarely	Sometimes	Often	Usually	Always
	1	2	3	4	5	6
1. I think my stomach is too big	1	2	3	4	5	6
2. I think my thighs are too large	1	2	3	4	5	6
3. I think that my stomach is just the right size	1	2	3	4	5	6
4. I feel satisfied with the shape of my body	1	2	3	4	5	6
5. I like the shape of my buttocks						
6. I think my hips are too big	1	2	3	4	5	6
7. I feel bloated after eating a normal meal	1	2	3	4	5	6
8. I think that my thighs are just the right size	1	2	3	4	5	6
9. I think my buttocks are too large	1	2	3	4	5	6
10. I think that my hips are just the right size	1	2	3	4	5	6

1 2 3 4 5 6 7
 completely disagree mostly disagree Slightly disagree neither agree nor disagree slightly agree mostly agree Completely Agree

1. When I am feeling nervous or tense, eating helps me relax.	1	2	3	4	5	6	7
2. Eating helps me get over it, when I feel bad.	1	2	3	4	5	6	7
3. Eating helps me avoid uncomfortable social situations.	1	2	3	4	5	6	7
4. When I am angry at my parents or friends, eating helps me get back at them.	1	2	3	4	5	6	7
5. Eating helps me forget bad feelings, like being sad, lonely, or scared.	1	2	3	4	5	6	7
6. Eating helps me feel better when I am stressed or nervous.	1	2	3	4	5	6	7
7. Eating can help me get rid of my feelings when I don't want to feel them.	1	2	3	4	5	6	7
8. Eating helps me deal with sadness or bad feelings.	1	2	3	4	5	6	7
9. I would feel like I could conquer things more easily if I were thin.	1	2	3	4	5	6	7
10. I would be more good looking if I were thin.	1	2	3	4	5	6	7
11. When I limit what I eat, others respect me.	1	2	3	4	5	6	7
12. I would be more good looking to the opposite sex if I were thin.	1	2	3	4	5	6	7
13. I would feel stronger if I were thin.	1	2	3	4	5	6	7
14. I would handle myself better with other people if I were thin.	1	2	3	4	5	6	7
15. If I were thin, I would feel like I had control over myself.	1	2	3	4	5	6	7
16. I would feel like I could do whatever I wanted to if I were thin.	1	2	3	4	5	6	7

The following questions are concerned with the PAST FOUR WEEKS ONLY (28 days). Please read each question carefully and circle the appropriate number on the right. Please answer all the questions.

ON HOW MANY DAYS OUT OF THE PAST 28 DAYS		No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	Every day
1	Have you been deliberately <u>trying</u> to limit the amount of food you eat to influence your shape or weight?	0	1	2	3	4	5	6
2.	Have you gone for long periods of time (8 hours or more) without eating anything in order to influence your shape or weight?	0	1	2	3	4	5	6
3.	Have you <u>tried</u> to avoid eating any foods which you like in order to influence your shape or weight?	0	1	2	3	4	5	6
4.	Have you <u>tried</u> to follow definite rules regarding your eating in order to influence your shape or weight; for example, a calorie limit, a set amount of food, or rules about what or when you should eat?	0	1	2	3	4	5	6
5.	Have you wanted your stomach to be empty?	0	1	2	3	4	5	6
6.	Has thinking about food or its calorie content made it much more difficult to concentrate on things you are interested in; for example, read, watch TV, or follow a conversation?	0	1	2	3	4	5	6

7.	Have you been afraid of losing control over eating?	0	1	2	3	4	5	6
8.	Have you had episodes of binge eating?	0	1	2	3	4	5	6
9.	Have you eaten in secret? (Do not count binges.)	0	1	2	3	4	5	6
10.	Have you definitely wanted your stomach to be flat?	0	1	2	3	4	5	6
11.	Has thinking about shape or weight made it more difficult to concentrate on things you are interested in; for example read, watch TV or follow a conversation?	0	1	2	3	4	5	6
12.	Have you had a definite fear that you might gain weight or become fat?	0	1	2	3	4	5	6
13.	Have you felt fat?	0	1	2	3	4	5	6
14.	Have you had a strong desire to lose weight?	0	1	2	3	4	5	6

OVER THE PAST FOUR WEEKS (28 DAYS)

15.	On what proportion of times that you have eaten have you felt guilty because of the effect on your shape or weight? (Do not count binges.) (Select the number which applies.)	0 – None of the times 1 – A few of the times 2 – Less than half the times 3 – Half the times
-----	--	---

		4 – More than half the times 5 – Most of the times 6 – Every time
--	--	---

16.	Over the past four weeks (28 days), have there been any times when you have felt that you have eaten what other people would regard as an unusually large amount of food given the circumstances? (Please circle YES or NO and put appropriate number in box.)	YES NO
17.	How many such episodes have you had over the past four weeks?	()
18.	During how many of these episodes of overeating did you have a sense of having lost control over your eating?	()
19.	Have you had other episodes of eating in which you have had a sense of having lost control and eaten too much, but have <u>not</u> eaten an unusually large amount of food given the circumstances?	YES NO
20.	How many such episodes have you had over the past four weeks?	()
21.	Over the past four weeks have you made yourself sick (vomit) as a means of controlling your shape or weight?	YES NO
22.	How many times have you done this over the past four weeks?	()
23.	Have you taken laxatives as a means of controlling your shape or weight?	YES NO
24.	How many times have you done this over the past four weeks?	()
25.	Have you taken diuretics (water tablets) as a means of controlling your shape or weight?	YES NO
26.	How many times have you done this over the past four weeks?	()

27.	Have you exercised <u>hard</u> as a means of controlling your shape or weight?	YES NO
28.	How many times have you done this over the past four weeks?	()

OVER THE PAST FOUR WEEKS (28 DAYS) (PLEASE CIRCLE THE NUMBER WHICH BEST DESCRIBES YOUR BEHAVIOUR.)		NOT AT ALL	SLIGHTLY		MODERATELY		MARKEDLY
29.	Has your weight influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5 6
30.	Has your shape influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5 6
31.	How much would it upset you if you had to weigh yourself once a week for the next four weeks?	0	1	2	3	4	5 6
32.	How dissatisfied have you felt about your weight?	0	1	2	3	4	5 6
33.	How dissatisfied have you felt about your shape?	0	1	2	3	4	5 6
34.	How concerned have you been about other people seeing you eat?	0	1	2	3	4	5 6
35.	How uncomfortable have you felt seeing your body; for example, in the mirror, in shop window reflections, while undressing or taking a bath or shower?	0	1	2	3	4	5 6
36.	How uncomfortable have you felt about others seeing your body: for example, in communal changing rooms, when swimming or wearing tight clothes?	0	1	2	3	4	5 6

To enter a prize draw for 1 of 6 £30 vouchers please provide your name and email address. Please note that this is separate to the survey and therefore will not compromise the confidentiality of your answers or your anonymity.

Name:

Email:

For further information on the topics covered in this questionnaire and for further support and guidance please refer to the following sites and source of information:

www.b-eat.co.uk / b-eat helpline: **0845 634 7650** for support and information on eating disorders and disordered eating

www.mind.org.uk / mind info-line: 0300 123 3393 for support and information on mental health

For NHS support speak to your GP or use the following website to find out more:
<http://www.nhs.uk/livewell/mentalhealth/Pages/Mentalhealthhome.aspx>

Appendix B – Study 2 Ethics Documentation and Interview Schedule

REACH initial review Ref: EP 15/16 178

REACH approval Ref: EP 15/16 266

ANNEX ONE

Department for Health

Research Ethics Approval Committee for Health

Checklist for all researchers

The Department for Health requires all members of staff and students who are planning research projects to consider the ethical implications of the work which they undertake. This is important in all research projects, but is **essential** in those projects which involve human participants.

The Department has agreed on an ethical review process which has a fast track for those projects which either do not have ethical implications and thus do not require full scrutiny, or where scrutiny will be given by another body (in particular an NHS Research Ethics Committee [REC]). Projects that fall outside of these categories will need to make a full submission to the Research Ethics Approval Committee for Health.

Name	Siobhan Mitchell
Project Title	An exploration of the characteristics of elite dancers with differing maturation timing

PART A: Determining the nature of your research and the route for ethical approval you need to follow (please tick the route you will follow for your ethical approval):

My proposal is currently at the stage of application for funding (tick box)

Please complete annex 1 & 2 for REACH audit purposes. Further approval may be required once funding is approved (please refer to relevant statement below)

My research project does not involve the use of human subjects or only involves secondary data analysis (**full consideration is not required, complete the checklist and the implications form for audit purposes and return to the Department Co-ordinator; Principal investigator, second reader and researcher to sign and return to the Department Co-ordinator (Annex 2 or 3)**)

My research meets the requirements for submission to an NHS REC (e.g. Involves human subjects, requires access to NHS patients or includes adults lacking capacity) **(full consideration is required by the appropriate NHS REC; complete the checklist and ethical implications form for audit purposes and return to the Department Co-ordinator (Annex 2 or 3) together with the evidence of NRES approval)**
(Where NHS REC approval is required, please provide details of who is sponsoring this project)

My research has received approval from another department within the University of Bath or another UK University ethics committee. Complete the checklist, together with Annex 2 or 3 and submit with evidence of the institutions approval

My research involves human subjects and does not take place in an NHS context **(full consideration is required by REACH (Annex 2 or 3 and Annex 4))**

My research involves human subjects and takes place outside of the UK, and for which particular consideration needs to be given **(full consideration is required by REACH - Annex 2 or 3 and Annex 4))**

My research involves working with children and/or vulnerable adults (a CRB check may also be required in addition to the above)

My research involves the collection and storage (not destroyed on day of collection) of human tissue. (Full consideration from an NRES approved committee is required in addition to the above)

ANNEX TWO

Department for Health

Research Ethics Approval Committee for Health

ETHICAL IMPLICATIONS OF POSTGRADUATE RESEARCH PROJECT

This template should accompany the postgraduate research student application for candidature form submitted to the Board of Studies.

(Additional departmental information may be incorporated as appropriate).

Please note that this procedure is intended to help student and supervisor consider ethical implications of the proposed research project, and as such is a 'light-touch'

approach. Supervisors are responsible for deciding whether a more extensive ethical review is necessary (such as submission to an NHS REC).

Brief Title of Project	An exploration of the characteristics of elite dancers with differing maturation timing
Student	Siobhan Mitchell
Supervisor (s)	Dr Sean Cumming and Dr Anne Haase

Are there ethical implications concerned with the following general issues?

	Comments from Supervisor
Source of the funding	The student is funded by the ESRC, the terms of the funding do not present ethical implications.
What steps will or have been taken to ensure competency of the student?	Completed research methods training as part of an MRes year, continued research skills training (through PGSkills sessions).
Are there any data storage issues? (including confidentiality, availability, length of storage, etc)	All participant information will be anonymous and will be kept for the duration of the PhD. Data will be stored on an external hard drive and secure server with no identifying information present, data will be kept securely, and only the researcher and her supervisory team will have access to it.
Dissemination of results: 1. Are any ethical issues likely to arise? 2. Are dissemination plans appropriate?	Results may be disseminated in the form of a publication or presentation, anonymity and confidentiality agreed with participants at the point of data collection will be upheld. This study will be used to inform further studies within the student's PhD.
Effect on/damage to the environment	n/a

<p>In which aspects of the research process have you actively involved, or will you involve patients, service users, or members of the public? (as stakeholders in the research and not participants)</p>	<p>Please tick all that apply</p> <p><input type="checkbox"/> Design of the research</p> <p><input type="checkbox"/> Management of the research</p> <p><input type="checkbox"/> Undertaking the research</p> <p><input type="checkbox"/> Analysis of results</p> <p><input type="checkbox"/> Dissemination of findings</p> <p><input checked="" type="checkbox"/> None of the above</p>
<p>Give details of patient, service users or public involvement, or if none please justify the absence of involvement.</p>	<p>Participants will be involved only in the data collection phase of this study.</p>
<p>Demonstration of Ethical Considerations Please provide a paragraph describing the ethical issues which will need to be managed during the course of the activity.</p>	<p>Various ethical issues will need to be considered including data storage and informing participants about the nature of the study.</p> <p>Written consent will be obtained from the participants themselves. Full disclosure about the nature of the study will be given prior to asking for consent to participate. The nature of the methods are not likely to cause distress and participants are free to withdraw should they feel uncomfortable with the study.</p> <p>Data Collection: It is understood that learning experiences and maturation may be sensitive topics for discussion. The nature of the project will be disclosed in a participant information sheet prior to asking for consent to participate. Participants will be made aware that they can withdraw from the study at any time. The project adheres to the University's Child protection and safeguarding policy and a DBS check has been obtained by the researcher.</p>


	<p>Data Storage: All participant information will be made anonymous and kept for a maximum duration of 5 years. Data will be stored on an external hard drive with no identifying information present, data will be kept securely, and only the researcher and her supervisory team will have access to it.</p> <p>Recruitment: Individuals consented to follow up contact in a previous study. Individuals will be recruited via the contact details provided.</p>
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Issues for additional consideration: (This list is indicative and is not necessarily exclusive). Please tick which categories apply to your research

	Yes	No
1. Does the study involve participants who are particularly vulnerable or unable to give informed consent? (eg children, people with learning disabilities)		X
2. Will the study require the co-operation of a gatekeeper for initial access to the groups or individuals to be recruited? (eg students at school, members of self-help group, residents of a nursing home)		X
3. Will it be necessary for participants to take part in the study without their knowledge and consent at the time? (eg covert observation of people in non-public places)		X
4. Will the study involve discussion of sensitive topics? (eg sexual activity, drug use)	X	
5. Are drugs, placebos or other substances (eg food substances, vitamins) to be administered to the study participants or will the study involve invasive, intrusive or potentially harmful procedures of any kind?		X
6. Will blood or tissue samples be obtained from participants?		X
7. Is pain or more than mild discomfort likely to result from the study?		X

8. Could the study induce psychological stress or anxiety or cause harm or negative consequences beyond the risks encountered in normal life?		X
9. Will the study involve prolonged or repetitive testing?		X
10. Will financial inducements (or other reasonable expenses and compensation for time) be offered to participants?		X
11. Will the study involve recruitment of patients through the NHS? (Note: If the answer to this question is 'yes' you will need to submit an application to appropriate NHS Research Ethics Committee.)		X
12. Will the study involve obtaining or processing personal data relating to living individuals, (eg involve recording interviews with subjects even if the findings will subsequently be made anonymous)? (Note: If the answer to this question is 'yes' you will need to ensure that the provisions of the Data Protection Act are complied with. In particular you will need to seek advice to ensure that the subjects provide sufficient consent and that the personal data will be properly stored, for an appropriate period of time). Information is available from the University Data Protection Website and dataprotection-queries@bath.ac.uk	X	
13. Will the study involve the use of animals?		X
14. Does the study raise any other ethical issues which you wish to be raised and reviewed by the Research Ethics Approval Committee for Health? If yes, what are they, please expand here:		X

I confirm that the statements above describe the ethical issues which will need to be managed during the course of this research activity.

Principal Investigator/ Supervisor/Project Supervisor	Signature: 
	Date: 25/03/16

Second reader(PhD/DHealth/ MPhil/MD only) (normally <u>external</u> to the project team)	Signature:  Date: 17.03.16
Researcher/Student	Signature:  Date: 16.03.16

Please submit this form to the Department Co-ordinator

ANNEX FOUR – Application form for full submission for research ethics approval

Department for Health

Research Ethics Approval Committee for Health

Title of study	An exploration of the characteristics of elite dancers with differing maturation timing
Chief investigator (for research student projects, put supervisor name here) (for undergraduate projects, put project supervisors name here)	Name: Dr. Sean Cumming, Dr Anne Haase e-mail: S.Cumming@bath.ac.uk Anne.Haase@bristol.ac.uk Telephone: +44(0)1225 386251
Other investigators (for research student projects, put students name here) (for undergraduate projects, put student(s) name here)	Name: Siobhan Mitchell e-mail: sbbm20@bath.ac.uk Telephone: 07428636586
Source of funding for the study	The student is funded by an ESRC studentship

Proposed dates of study	Data Collection is planned to take place between May and August 2016
Research question	What are the characteristics associated with individuals of differing maturity timing who adapt more positively to puberty/thrive within the dance profession?
Background (less than 100 words)	<p>The proposed research is a follow up study from an earlier study within my PhD. The former study assessed the characteristics of elite dancers via an online survey obtaining information about maturation timing, learning experiences in dance and psychological wellbeing.</p> <p>While the majority of dancers in the sample of 300 respondents were late maturing individuals, in line with what you would expect in this population, ~20% of the sample were early maturing and yet succeeded into the profession. Current research suggests that it is very difficult for these earlier maturing individuals to succeed in dance and therefore the aim of this next study is to explore how these individuals have succeeded (Hamilton et al, 1997). The data already obtained about these individuals in study 1 suggests that some who succeeded did so more adaptively/healthily than others. Understanding more about the traits and characteristics that contributed to these individuals succeeding could inform research into how to encourage healthier adaptation at puberty for dancers of differing maturity timing. Alongside this, interviewing their 'on-time' and later maturing counterparts will provide a basis for understanding differences in adaptive and maladaptive responses at puberty.</p>
Methods (less than 300 words)	The study proposes a qualitative design with semi-structured interviews via skype and phone with individuals of differing maturity timing, 5 individuals

	will be recruited from each group (early maturing, on-time and late maturing). Questions will be asked relating to physique and maturation timing, learning experiences in dance, psychological traits (such as self-esteem and resilience) and self-perception of changes at puberty.
Sample size (or equivalent qualitative approach)	~15 for interview
Proposed Analysis	Interpretative phenomenological analysis will be used to analyse the interview data and to draw themes together from the individual responses.
Potential risks to volunteers	<p>The questions may probe potentially sensitive topics such learning experiences in dance, the nature of the questionnaire will be made clear prior to obtaining consent from participants.</p> <p>If individuals present concerns, contact information for the researcher and her supervisory team as well as sources for further information and help will be available as part of the interview and participant information.</p> <p>In terms of ensuring participant wellbeing during discussions of a sensitive nature over phone/skype the following protocol will be followed. The researcher is not a trained counsellor and is not permitted to give advice, but can direct participants to services and support. If a participant presents information suggesting they are a risk to themselves or others or discloses any concerning behaviours or feelings the researcher will advise them to contact their GP/doctor in the first instance to talk about it. Self-help online services will also be signposted to (such as mind.org and b-eat.co.uk).</p>
Potential for pain/discomfort	As above, full disclosure about the nature of the study will be given prior to asking for consent to

	participate. The questions are not likely to cause distress, additional information will be provided at the end of the study to guide support (www.b-eat.co.uk and www.mind.org.uk). It will be communicated to participants that they are free to withdraw at any time during the interview should they feel uncomfortable with the study.
Benefits to participants	A chance to share their views and opinions. There will also be the chance to win a £40 amazon voucher.
How will participants be recruited?	In the previous study, consent was provided by participants to allow further contact for the purpose of any additional research. Participants who left their contact details in the previous study to say they were happy to be contacted for any follow up questions will be contacted via the email addresses they provided. The participant information form will be used to advertise the study. The raffle for a voucher will also be mentioned in this advertisement.
Exclusion/inclusion criteria	Individuals who opted to leave their contact details from the previous study (females age 18+)
How will participants consent be taken?	Written consent will be taken prior to the start of the interview, after the initial participant information has been read.
How will confidentiality be ensured?	All participant information will be kept confidential and stored securely on the university premises for 5 years. Data will be stored on an external hard drive and secure server with no identifying information present, data will be kept securely, and only the researcher and her supervisory team will have access to it.

References

- Hamilton, L. H., Hamilton, W. G., Warren, M. P., Keller, K., & Molnar, M. (1997). Factors contributing to the attrition rate in elite ballet students. *Journal of Dance Medicine & Science*, 1(4), 131-138.
- Wagnild, G., & Young, H. (1993). Development and psychometric. *J Nurs Meas*, 1, 165-178.

Attach the following (where relevant):

1. Participant information sheet
2. Consent Form
3. Health history questionnaire
4. Poster/promotional material
5. Copy of questionnaire/ proposed data collection tool (questionnaire; interview schedule/ observation chart/ data record sheet/ participant record sheet)

Signed by: Principal Investigator or Student Supervisor



Date: 25/03/16

Signed by: Student or other researchers

Student:



Date: 16.03.16

Co-Supervisor:



Date: 17.03.2016

Participant Information



What is the study about?

This is a follow-up from an initial survey you completed earlier this year. The aim of the study is to learn, in more depth, about your experiences in dance and the characteristics which have enabled you to succeed into elite dance.

What does taking part involve?

- You will be asked to take part in a short (30 - 40 minute) interview about your experiences in dance.
- The interview questions will be based around questions relating to your physique and maturation timing, your learning experiences in dance, psychological traits (such as self-esteem and resilience) and your own perception of changes at puberty.
- Audio recordings of the interviews will be taken for the purpose of transcription. You have the right to access to your own data should you wish to.
- Names, any identifying information and all your responses will be anonymised. Where participants are under the age of 18 responses will be confidential except under the following circumstances: if you disclose information which suggests that you are at risk (of harm to yourself or others).
- Only the researcher and her supervisory team (Dr Sean Cumming and Dr Anne Haase) will have access to the data and it will be stored securely at the University of Bath.
- Participation in this study is voluntary and you are free to withdraw from the study at any time. You can stop the interview at any time without any implications and are free to refuse any questions which you do not wish to answer.
- You will have the opportunity to enter a prize draw for the chance to win a £40 amazon voucher.

Is it confidential?

All of your answers will be anonymous and kept confidential.

Who can participate?

Only those invited to participate via email.

How can I participate?

Please reply to the email to let us know if you would like to take part and for any further information about the study. We can then arrange a convenient time for the interview to take place.

Researcher: Siobhan Mitchell sbbm20@bath.ac.uk
07428 636586

Research Supervisors: Dr Sean Cumming S.Cumming@bath.ac.uk
Dr Anne Haase Anne.Haase@bristol.ac.uk

For further information on the topics covered in this interview and for further support and guidance please refer to the following sites and source of information:

www.b-eat.co.uk / b-eat helpline: **0845 634 7650** for support and information on eating disorders and disordered eating

www.mind.org.uk / mind info-line: 0300 123 3393 for support and information on mental health

For NHS support speak to your GP or use the following website to find out more:

<http://www.nhs.uk/livewell/mentalhealth/Pages/Mentalhealthhome.aspx>

Participant Consent Form



Please read each statement.

- I am willing to take part in this study.
- The study has been fully explained to me. I am clear about the purpose and potential benefits of the study.
- I have had answers to any questions I have about the study.
- I understand that my answers are confidential and will be made anonymous.
- I am free to withdraw from the interview at any point up until its conclusion.
- I understand which topics will be covered in this interview (physique and maturation timing, your learning experiences in dance, psychological traits (such as self-esteem and resilience) and your own perception of changes at puberty)
- I understand that this project has been reviewed by, and received ethics clearance through, the Research Ethics Approval Committee for Health of the University of Bath.
- I understand who will have access to the data provided, how the data will be stored, and what will happen to the data at the end of the project

Your participation in this investigation and all data collected from the above testing procedures will remain strictly confidential. Only the researchers involved in the study will have access to your information and the information will not be accessible to any other member of staff. In compliance with the Data Protection Act (1998) and the Freedom of Information (2000), you will be able to access all information collected upon the completion of the study.

Any questions I have about the research have been answered and I understand what is involved in taking part. In signing this form I consent to taking part in this research:

Signature of participant

Date:.....

Interview Schedule

The interview will take place via skype or phone due to many participants residing overseas. The interviews will last between 30-40 minutes.

Ice breaker questions:

What age did you start dancing?

What's your main style of dance?

How many years formal training have you had?

At what age did you start full-time training?

What's your current status as a dancer? (i.e. full-time training/semi-professional/recent graduate/professional)

Main interview questions

1. How would you describe your overall experiences of growing up in dance?

Positive/negative.

a. Any thoughts on particular experiences which have resulted in you feeling this way.

2. Do you think there's an 'ideal body' to have for ballet? Can you describe it?

3. How do you feel your own physique conforms to these ideals? Please comment on the following areas - limb length, torso length, slimness/muscularity, height, overall build/physique, breast development

a. How natural do you feel this physique is for you to attain/maintain?

(i) If your perception is that it's not easy to attain/maintain what do you do in order to achieve the required physique? E.g. diet, exercise etc.

4. For aspiring dancers, do you think puberty is seen as a good or bad thing? Helpful or not helpful for ballet and why?

a. How would you describe your own experiences of puberty as a young dancer? Negative/positive? Why? Incl. age of menarche

5. People go through this process of puberty/maturing at different times, do you feel like you were early, average or late in terms of your development in comparison to your peers (classmates)? Why?

a. How did you feel about those changes at the time? Positive/negative? Why?

- b. How did those changes impact upon your training/readiness for auditions?

6. Can you recall how others (i.e. peers or teachers) reacted to (verbal/non-verbal) the more visible changes associated with puberty? E.g. breast development, growth spurt, increase in weight, widening of hips.

- a. Can you recall any instances which made you feel more negative about the physical changes of puberty?
 - (i) If yes, how did you manage any negative feelings about these changes? What did you do to cope? Support network/add in some resilience bits?
- b. Can you recall any instance which made you feel more positive about the physical changes of puberty?

7. Do you feel any of these changes affected your dance training? E.g. physical things such as growth related injuries/loss of flexibility and/or social things such as changes in confidence, self-esteem, body image.

8. How would you describe your confidence/self-esteem during this time?

- a. How would you describe your confidence/self-esteem now?

9. How would you describe your feelings about your body during this time?

- a. How would you describe your feelings about your body now?

10. If you had to describe the key traits which have helped you to succeed in this profession what would they be and why?

11. From your own experiences, what are the most important traits young dancers should strive to develop in order to have the best chance of succeeding in the profession?

**Appendix C – Study 2 Participant details, individual participant themes,
clustering and cross case analysis, and final themes**

Participant Details

Participant 1 (P1)

Age	20
Country	United States
Status as a dancer	Semi-professional/recent graduate
Age at menarche	13.8
Maturity group	On time

Participant 2 (P2)

Age	20
Country	United Kingdom
Status as a dancer	Final year vocational training
Age at menarche	11
Maturity group	Early

Participant 3 (P3)

Age	21
Country	United Kingdom
Status as a dancer	Final year vocational training
Age at menarche	12.8
Maturity group	On time

Participant 4 (P4)

Age	21
Country	United States
Status as a dancer	Final year vocational training
Age at menarche	11.2
Maturity group	Early

Participant 5 (P5)

Age	27
Country	United Kingdom
Status as a dancer	Professional
Age at menarche	14
Maturity group	Late

Participant 6 (P6)

Age	34
Country	United States
Status as a dancer	Semi-professional (previous professional career)
Age at menarche	13
Maturity group	On time

Participant 7 (P7)

Age	27
Country	United Kingdom
Status as a dancer	Professional
Age at menarche	19
Maturity group	Late

Participant 8 (P8)

Age	21
Country	United States
Status as a dancer	Final year vocational training
Age at menarche	14
Maturity group	Late

Participant 9 (P9)

Age	28
Country	United States
Status as a dancer	Professional
Age at menarche	13
Maturity group	On time

Participant themes and sub-themes

Themes P1
<p>Unrealistic expectations of puberty</p> <ul style="list-style-type: none">• 'You want the body of a 12-13 year old'• Puberty as make or break• Importance of extent of development• Fixed expectations• Conflict between normal changes and ballet demands• Lack of teacher awareness/understanding• Lack of teacher acceptance of puberty as normal – comments <p>SUB-THEMES: Conflict between normal changes and ballet demands, Lack of teacher awareness and understanding</p>
<p>Importance of environment</p> <ul style="list-style-type: none">• Environment dictates body expectations• Peer comparison - fitting in• Hyper-awareness of flaws• Environment supersedes maturity timing effects• Overanalysing/obsessing <p>SUB-THEMES: Peer comparison, importance of environment (own perceptions)</p>
<p>Compensation/Accepting and adapting</p> <ul style="list-style-type: none">• Compensation for lacking ideal body• Benefits and challenges of minimal growth spurt• Body type influences dance teacher interactions• Limits of compensation• Importance of mental toughness/perspective• Learning to cope/adapting is key• Acceptance of what you can/can't change• Different routes to success <p>SUB-THEMES: Adapting or compensating, acceptance</p>
<p>Sources of motivation and support</p> <ul style="list-style-type: none">• Parental involvement/pressure• Identity• Teacher support/expectations as pivotal• Passion and drive• High self-expectations• Importance of role models - body type

Themes P2
<p>Acceptance - being able to adapt, change or accept</p> <ul style="list-style-type: none">• Acceptance - getting on with it• Embracing the challenge• Importance of perspective• Acceptance of change• Mental toughness• Being realistic• Maturity and independence from an early age• Patience, understanding and determination• Understanding of the body• High self-expectations <p>SUB-THEMES: Work ethic, being realistic/perspective</p>

Social support

- Social support/parental influence
- Peer support
- Parental support/understanding benefits preparedness for puberty
- Disliking of physical change overcome with social support/acceptance
- Mental preparedness for puberty facilitates acceptance

Adaptive environment

- Teacher approach and understanding
- Supportive teachers/close relationship
- Long term impact of positive teachers
- Teacher as a moderator
- Indirect approaches by teachers - reassuring
- Importance of consideration and awareness of teachers re puberty
- Teacher guidance
- Avoidance of negative environment
- Impact of maturity timing dependent upon environment
- Reference groups
- Dance as a safe place - adaptive coping

SUB-THEMES: Dance context, Dance teacher behaviour**Importance of different reference groups/social worlds**

- Reference group changes focus/goal for satisfaction with body image
- Wider reference group challenges negative perceptions of body
- Benefits of older peer group
- Peer comparison as validator of ability/body

SUB-THEMES: Perspective, peer comparison**Themes P3****'Coming to terms with it'**

- Acceptance
- Peer support
- Peer comparison/peer modelling
- Benefit from other's experiences

SUB-THEMES: Acceptance, social support**Surviving**

- Enjoyment of pain/hard work
- Fitting in
- Wider options
- Questioning teacher 'wisdom'
- Coping with rejection - not taking it personally

SUB-THEMES: Learning to question, perspective**Conflict/struggle**

- Puberty as negative
- Teacher comments/environment
- Fixed expectations for the body
- Lack of teacher understanding
- Anxiety

SUB-THEMES: Dance context, teacher understanding and behaviour

Themes P4

Conflict/struggle

- Benefits of later specialisation
- Natural ballet physique
- Early maturation - less pressure/less serious
- Getting to know your body
- Minimal effect on training
- Puberty as the elephant in the room - teaching approaches
- Peer comparison with late developers - upsetting
- Importance of extent of development

SUB-THEMES: Timing and extent of development, dance teacher approach

How to survive

- Work ethic
- High expectations
- Perspective - looking back on puberty as 'totally normal'
- Importance of questioning - one opinion isn't everything
- Dedication and enjoyment

SUB-THEMES: Work ethic, learning to question

Acceptance/adjusting

- Time to adjust – Early Maturation
- Importance of wider experiences and interests
- Reassurance and support
- Acceptance of puberty as normal
- Acknowledging change/understanding self
- Importance of teacher approach - passive exacerbates issue
- Advantages of early maturation

SUB-THEMES: Social support, benefits of earlier maturation

Themes P5

Conflict and struggle

- Extent of development
- Puberty as make or break
- Maturity timing/level of training
- Teacher comparison
- Critical comments
- Disliking of pubertal change/disliking of self
- Distorted self-image

SUB-THEMES: Timing and extent of development, Dance teacher behaviour and approach

Lack of acceptance and adjustment – downward spiral

- Compensation not enough
- Struggle to maintain positive mind-set
- Loss of confidence in self and abilities
- Idea of quitting as 'freedom'
- Authoritarian environment - surveillance of eating behaviours
- Loss of passion/enjoyment
- Confidence and self-esteem dependent on teacher approval
- Not questioning authority figures
- Body became too difficult to maintain

SUB-THEMES: Dance teacher approach and relationship, compensation not enough

Themes P6
<p>Struggle/conflict</p> <ul style="list-style-type: none"> • Lack of support • Extent of growth spurt • Body dissatisfaction • Teacher interactions • Not belonging/fitting in • Peer comparison • Critical comments <p>SUB-THEMES: Timing and extent of development, Teacher interactions, peer comparison</p>
<p>Overcoming and managing</p> <ul style="list-style-type: none"> • Compensation with focus/determination/discipline • Teacher support/reassurance • High expectations from others - reassurance • Positive environment • Acknowledgement of weaknesses • Confidence and strength from overcoming/managing • Being realistic • Having a mentor • Acknowledging achievements <p>SUB-THEMES: Being realistic, social support and reassurance</p>

Themes P7
<p>Conflict/struggle</p> <ul style="list-style-type: none"> • Environment/teacher comments • Extent of growth/timing of different developments • Seeking acceptance from the teacher <p>SUB-THEMES: Timing and extent of development, Teacher behaviours</p>
<p>Positive mentality/work ethic</p> <ul style="list-style-type: none"> • Work ethic and passion • Positive outlook • Wider experiences/perspective • Enjoyment of hard work
<p>Positive environment/support</p> <ul style="list-style-type: none"> • Parent/family influence • Positive teacher relationships • Being realistic - parental influence and support

Themes P8
<p>Conflict/struggle</p> <ul style="list-style-type: none"> • Level of conflict dependent on environment • Body type as a barrier • Direct effect of puberty on teacher responses/interaction • Disparity between mental and physical maturity • Critical comments • Direct communication from teacher- puberty as negative <p>SUB-THEME: Dance context, dance teacher behaviours and approach</p>
<p>Accepting changes at puberty</p> <ul style="list-style-type: none"> • Benefit of wide range of experiences • Parental and peer support • Process of learning to accept the body • Developing self-awareness

- Evolving pathway - being open to change
- Perspective
- Acceptance of ups and downs
- Importance of being realistic
- Teacher understanding/support
- Acceptance of body through new perspectives
- Compensation

SUB-THEMES: Compensation and acceptance, perspective, social support

Surviving

- Support system
- Determination/strength/passion
- Not taking self too seriously
- Enjoyment of hard work
- Mental toughness
- Teacher support
- Confidence
- Being mastery oriented
- High self-expectations

SUB-THEMES: Support, mental toughness

Themes P9

Conflict/struggle

- Lack of parental support
- Body size/pressure dependent on environment
- Body size as a barrier/the body as something to 'fix'
- Interaction between timing and context
- Extent of development (growth spurt) less = beneficial
- Importance of context/environment (less serious/recreational)

SUB-THEMES: Extent and timing of growth spurt, dance context, lack of support

'Grit and Grace'

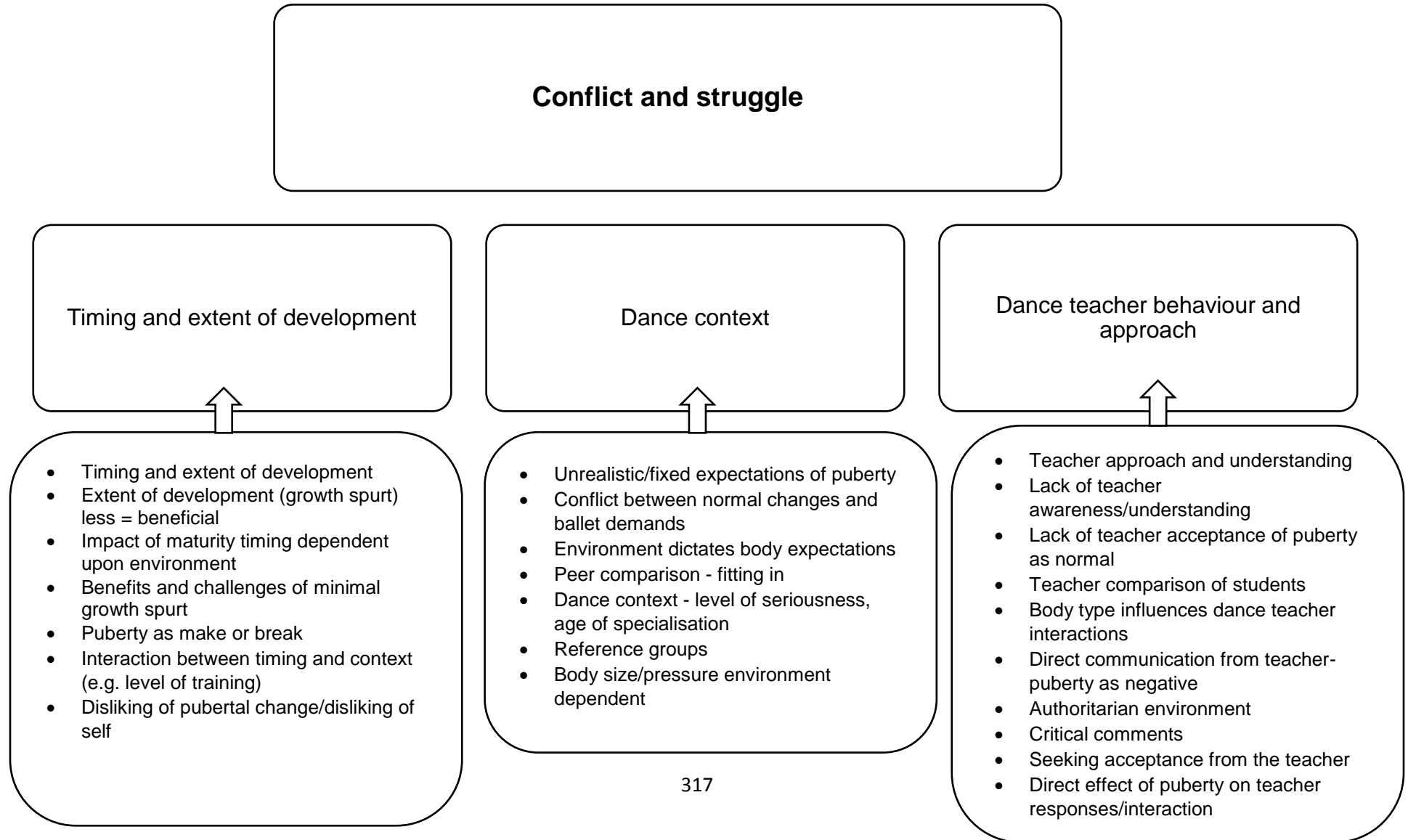
- Work ethic above and beyond physical factors
- High self-expectations
- Learning not to take criticisms or comments personally/too seriously
- Importance of something that sets you out from others - personality
- Importance of enjoyment
- Personality/mentality are key – sustaining

SUB-THEMES: Work ethic, learning to question comments

Adapting expectations/being realistic

- Being realistic
- Adjustment of pathway

Clustering: Themes from cross case analysis



'Coming to terms with it'

Acceptance

- Process of learning to accept the body
- Acceptance of what you can/can't change
- Getting on with it
- Accepting changes at puberty
- Parental role in preparedness for puberty and acceptance of change
- Mental preparedness for puberty facilitates acceptance

Adapting or compensating

- Compensation for lacking ideal body
- Adapting expectations
- Importance of being realistic
- Different routes to success/Adjustment of pathway
- Overcoming and managing
- Compensation with focus/determination/discipline
- Acknowledgement of weaknesses
- Limits of compensation
- Learning to cope/adapting as key to 'survival'

Social support

- Teacher support/reassurance
- High expectations from others - reassuring
- Parental support/understanding benefits preparedness for puberty
- Peer support
- Benefit from other's experiences
- Teacher approach and understanding
- Long term impact of positive teachers
- Teacher as a moderator
- Indirect approaches by teachers - reassuring
- Importance of consideration and awareness of teachers re puberty

'Grit and Grace'

Learning to question

- Positive teacher relationships
- Questioning teacher 'wisdom'
- Importance of questioning - one opinion isn't everything

Work ethic

- Not taking self too seriously
- Enjoyment of hard work
- Mental toughness
- Embracing the challenge
- Patience, passion, understanding and determination
- High self-expectations
- Work ethic above and beyond physical factors
- Positive mentality
- Enjoyment of pain/hard work

Perspective

- Being mastery oriented
- Wider experiences/perspective
- Identity
- Acknowledging achievements
- Perspective - looking back on puberty as 'totally normal'
- Maturity and independence from an early age
- Not taking criticism too seriously - having a filter
- Parent/family influence - positive outlook
- Importance of enjoyment
- Coping with rejection - not taking it personally
- Wider options

Final themes

Table a. Conflict and Struggle

Sub-theme	Qualitative evidence
Timing and extent of development	<p><i>For me, it was an issue, the fact that when I hit puberty I started to get curvy, and you're not supposed to be curvy, as a dancer; they want you to look like you have the body of a twelve or thirteen-year-old, for your whole life, which is easy for some people. I mean, some people are built with that metabolism, that they can do that P1, p.3, line 83-86</i></p> <p><i>I mean, the general stigma is that puberty is not a good thing, but, at the same time, there's this weird thing where they don't want you to be too thin; they don't want you to look like a child. So, you have to have something, but just not too much; it's similar to in regular, everyday society, it's just a lot more exaggerated. P1, p.4, line 125-129</i></p> <p><i>...I feel like the fact that being earlier must be harder because if you're later you've already seen it happen to other people so, yes, it definitely made it easier. P3, p.5, line 94-96</i></p> <p><i>I think most dancers see it as a bad thing because that's when you get boobs and maybe gain a little... like you need to get bigger when you go through puberty, but they're like, "Oh, no! Now my line isn't as good. Now I have all this extra body to deal with." I think it's upsetting for a lot of girls. P4, p.3, line 52-55</i></p> <p><i>I went through puberty fairly young. I was twelve, which, I think, was horrible at the time, but I think it was better because I had more time to adjust. I had more time to come to terms with what my body was after puberty. But I know girls who go through puberty at sixteen or seventeen and then they are, all of a sudden, dealing with a completely different body and they're like, "I don't know what to do with this." P4, p.3, line 58-63</i></p> <p><i>I think it didn't make it as difficult in dance as you might expect, because, since I was so young, I wasn't very serious. I mean, in life it was kind of hard because I had boobs and I got my period and I was twelve, but I think in dance it wasn't as big a deal, actually. I know that's kind of surprising. P4, p. 4, line 71-74</i></p> <p><i>I think it was a positive thing because by the time I was really more serious, I knew what my body was and I knew what it was capable of and I could work with it better. I feel just having that self-knowledge was so helpful in terms of my training and in terms of improving, because when your body is changing, it's like, who knows where you're at? So it's very unfamiliar. P4, p.4, line 94-98</i></p> <p><i>I think part of it was that once I was... my body hasn't changed that much since I was about fourteen. I've got stronger. I've got a lot stronger, but for the most part it's stayed about the same, and everyone else's... like, once everybody else's body had changed, as well, that was really helpful and I kind of felt like I'd had a leg-up because I already knew. I was already adapting and I was already getting stronger and I already knew my body fairly well. Once everybody else's body changed and I could kind of look back with some perspective, I knew that I was normal, totally normal. I was fairly lucky in a lot of ways. Some people go through puberty when... my boobs didn't get that much bigger. I didn't have breasts too big for ballet and I</i></p>

	<p><i>didn't... I don't know other puberty things... I didn't gain a ton of weight or have a massive growth spurt that completely limited my flexibility. P4, p. 7, Line 203-213</i></p> <p><i>Being petite, I can't say I've ever really had a growth spurt. I remember being a shoe size five when I was 14. I don't remember my height when I was 14 but I know I was a shoe size five and I'm still a shoe size five so for me, I don't think I've changed height much. I know some people go through a growth spurt and they have growing pains, etc., and you do hear in ballet teaching of young children that go through that growth spurt and they find it difficult to control their bodies because they're getting used to their longer limbs, etc., and they look a bit like a foal. But I never experienced that myself. P5, p.5, line 134-141</i></p> <p><i>But for myself when I was taking dance very seriously I was just going through it and it wasn't really a concern until I was probably 16, and then, obviously, that's when all the dieting starts and you have to be very careful with what your eating but for me it didn't affect me as greatly as some other dancers. P9, p.3, line 87-90</i></p>
<p>Dance training context</p>	<p><i>... you can see every single negative, comparative to you. You look at yourself in the mirror, every single day, for hours and hours and hours, in super tight-fitting clothes, and you look at everybody else to you, and you can see everybody's flaws, and you're trained to look for them too; you don't just observe them, you're trained to see every single one, so you can fix it, kind of. So yes, it changed when I went through puberty because my body changed too, as did the way I thought about things. P1, p.2-3, line 53-61</i></p> <p><i>when you're first hitting puberty, like I was saying, you're really excited because you're starting to look like a grown-up, but then you realise that's not what is required in your profession. You can't look like everybody else; you can't have that same kind of aesthetic, as the rest of the world wants you to have, even if you're naturally built for it. P1, p.5, line 180-183</i></p> <p><i>...in my main school we had all shapes and sizes, and it is a lot more relaxed and very comfortable, and you've got dancers that go on to dance, and people that just do it for fun, so it's very mixed, and it made everyone feel a lot more comfortable, I think; although people were very self-conscious and whatever, you had all shapes and sizes, and shape and size was never much of an issue. Then I went to this other school, and I seemed like one of the fattest there, and one of the tallest, surprisingly, as well, having always been one of the smallest I was now one of the tallest. That changed, as the others kind of grew; I must have grown before these girls, because they all grew. But, that second school that I went to, there were very few curvy girls; it was very much skinny, slender, petite ladies, which, for me, I think was a bit like 'alright' – it made me think about shape a bit more, and about size and 'am I feeling a bit fat today in this', and 'have I put on weight?', or whatever. So, I think it was quite contrasting. P2, P.7, Line 275-285</i></p> <p><i>I think it took a long time to come to terms with it. I really didn't like it, and I would try and, yes, stop and think I needed to eat less because I was getting bigger and I really didn't like it. Especially, because I used to do... when I was training it was more ballet than anything else and especially if, at the weekend, I went to associate class for pre-vocational training so then it would be like... in my local dance school I wasn't really that bothered, but when I was there and it was more serious, it was like everyone was trying to get that physique and knew what they wanted. Aspiring to be a professional dancer it was like,</i></p>

"Oh, is that what I'm supposed to look like?" Especially as it was held in a ballet school and so they were all there as well, the full-time students. That made it a lot harder. P3, p.5, line 100-109

...it would be announced, "We're weighing you all today. You all line up outside the office." We'd all try and go to the loo thinking if we had a wee then we'd be a bit lighter and the director would laugh at us and say, "That's not going to make any difference." He'd write down our weight, etc. That was the first time ever that anyone had ever told me that I need to lose weight, it was a bit of a shock. My family never really talked about weight. My mum wasn't obsessed like some women are so it was a bit of a shock. P5, p. 8, line 272-276

I would have good days and there were days that he'd say I'd done something really well and I could demonstrate it to the class but I would say most of the time low because I had acne, because of the weight. He was always telling us to lose weight. I mean thinking back, I think my body was probably the best it's ever been in those two years, really strong and the slimmest I've ever been but I always felt like I was fat and needed to lose more weight, etc. That's not a nice negative thing to be thinking. I suppose also the fact that the studio is completely mirrored so you're spending all day looking at yourself in a leotard and tights, you become very obsessed with yourself and how you look. You can't get away from that. P5, p.10, line 364-368

Before people told me I was fat, I thought of myself as strong and sturdy. I didn't have a double chin, well I did a little bit but I wasn't, you know some of these kids that you see like Americans are obese and it's like an obese child? I wasn't obese. I was fat, I was chubby. I had big thighs but I didn't have a massive gut because I was a dancer. I had muscles and I could do sit ups and I could do push ups so I always... prior to puberty I just thought of myself as strong and I was always proud of it. I was like, "I'm really strong." Then suddenly my idea of myself as being sturdy and stocky was a word my mother always used; "You're sturdy. You're stocky. You're not like other girls, you're a stocky build," which is totally not true because now I'm the weight I should be as an adult woman and I'm what everyone calls petite. P6, p.8-9, line 276-284

Well, I mean, you know, I never looked at it as negative but when you're body is changing, for the girls, you know, it definitely becomes a concern, you know, and some kids see it and some kids don't see it, you know? I feel like it depends on how seriously they're dancing, you know, so, if they're not dancing seriously then they'll be like, "Oh my chest is filling out and I look so cute," you know? But, you know, especially for aspiring ballet dancers they'll see it as a negative thing. P9, p.3 line 65-67

I think it's, you know, that I was also a new dancer to that company so they have their eye on you pretty consistently and you can see, you know, every pound that you put on, you know, it's pretty obvious to yourself but then it becomes obvious to other dancers or artistic staff, you know, so, that's part of the pressure of, you know, what you're supposed to look like and you have to be – you have to stay at the weight and, you know, at the appearance of when you were hired, so, you know, once that you start to fluctuate especially as a new dancer, you know, that's when people start to, kind of, look at you and you can see that they're looking at you, you know P9, p.6, line 251-257

	<p><i>So that needs to be treated really carefully because it... self-awareness is good because dancers are going to come away having spent that near time with knowing how they carry themselves and what posture looks like and what presence looks like, which is a great gift but it can also be really detrimental when you're nine and you have an opinion about your thighs. P6, p.4, line 108-111</i></p>
<p>Dance teacher behaviour and approach</p>	<p><i>I thought it was going to be a huge opportunity for me, it was my first break into the professional world, and I was super excited about it, but it became very clear, as soon as I got there, that they weren't going to treat me like they treated everybody else, because I had body-type issues, and I didn't look like the other people that they hired, even if I danced as well as them. So, I mean, sometimes it doesn't matter how good you are if you don't look the part. They started not even letting me learn things, and just kind of ignoring me altogether; it was a tough year. P1, p.5, line 196-203</i></p> <p><i>I feel like it was never... I didn't really ever expect it to happen and it was never really addressed that suddenly you can't get your legs up anymore and I feel there was pressure to still be able to do what you used to be able to do. So then you'd start using the wrong muscles because you're just trying... you're like, "Well, I used to be able to get my leg over there, why isn't it going there?" Just desperately trying to get it up. I feel it wasn't addressed or recognised, so that made it harder. With balance and growth spurts, I never thought about that as a reason I couldn't do it. It was just, "Why can't I do it? I used to be able to do it, and now I can't. Why?" P3, p.6, line 112-120</i></p> <p><i>I remember there was one girl and she used to say to her things about, "If you work harder then..." Like, she never directly said, "If you work harder, then you'll lose weight," but everyone knew that's what she meant. We started doing more conditioning things before class suddenly when we were getting older, and you got that sense more that these changes aren't good. That was the kind of message. P3, p.7, line 177-181</i></p> <p><i>I don't think it really affected my training but I remember getting fitted for a costume and being really embarrassed about having boobs. It was more embarrassing than it was, actually, hindering. I think, maybe, my teachers treated me differently. I think I was viewed as more mature... Even though I wasn't... I think I could have been viewed as younger for a little while longer. I don't know. I feel like I was kind of forced to grow up a little bit faster because of it, but I don't know if it's really a good thing, or a bad thing. P4, p. 4, line 81-90</i></p> <p><i>Yes, unfortunately. It was like I knew, on a conscious level, that I was fine and that my body was just doing what it would normally do but I think, since there were girls who were just like, some were smaller than me because they hadn't gone through puberty yet... I guess it was a little upsetting and it definitely affected my confidence, and the fact that it was not acknowledged made it worse, because I knew it, but no-one just said it. P4, p. 7, line 182-187</i></p> <p><i>He saw himself as a mentor, not just a teacher, which I don't know is always that healthy. Some dancers did live with him for periods of time if they were doing intensive training. Some dancers did international competitions so he would fly with them to New York or whatever or do an intensive two week training session with them and they'd all stay somewhere together. I don't know if that's always healthy. I think you need your own time away from the person that's teaching you so that if you've had a</i></p>

bad day you can process it. But I think he wanted to be very involved in every aspect of your life. I remember him saying to one of the dancers that he shouldn't have a boyfriend because that's going to distract him. P5, p.9, line 314-324

They took parts away unless I could lose the weight. I was only 11 and I didn't know how to lose weight at 11 years old so I ended up losing the part in the show and stuff. I had to learn. Now it's easier. I know how to eat healthily and I know how to take care of myself with proper nutrition and stuff. P6, p.3, line 62-66

I don't know. I think it did affect my training a little bit because my teachers were suddenly like, "You need to lose weight. You have to lose weight." I think it made me feel a little bit stressed out and confused about what was suddenly different. I think outside of my training I was just mad at it, just like, "I don't really want to grow up," or whatever, "I don't want to do this. I don't understand it. It's weird, why is everybody acting like this is a big deal?" I didn't want to be overweight or whatever but at the same time I was just like, "Well why is everybody so interested in what my body looks like?" But me and some of the other girls would have conversations about it. Like after class or at sleepovers or something we'd talk about how we wished our bodies were different. We couldn't have been older than 10. P6, p.5, line 129-139

Yes, definitely it did. Because of teachers telling me things like I would never be tall enough and other parents saying things like tree stump legs. It was Swan Lake in particular, I was supposed to be one of the four swans. They gave me the part and the audition because I was good enough for the part and then they took it away a few weeks before the show because I couldn't lose the weight in time. It definitely added a level of stress to it that just seemed mystifying. I was like, "I don't understand, how does one lose weight? What do I do?" Then I think when I would go to class, rather than being focused on what I was there to learn, I was spending a lot of head space looking at other people's bodies and comparing and being anxious about putting on my dance clothing and how could I cover myself up. I just remember starting to want to wear big t-shirts over my leotard and not being allowed to. That was just really distracting from my learning. P6, p.8, line 251-262

I got my first period when I was 13 and it was irregular for the next three years and my mum was just a little concerned about it. So, I went to the doctor and I was put on birth control so I would get my period and that was during the summer and when I went back to Chicago, my ballet teachers, they were like [name], what happened to you, you've completely lost your shape, you just look so much bigger and I honestly hadn't even noticed because of course I was with myself all summer and I just felt the same. So, I didn't really notice and that's when it really started becoming a problem. So, through that I know a lot of girls that started getting bigger boobs and gaining weight but I think you need to be healthy, like a woman should be getting her period regularly and I know that's a thing that all athletes have a problem with in my opinion, I think I would rather have children than a nice body. P8, p.3, line 113-124

I was a little bit shocked, definitely taken aback when they pulled me into their office, it was a man and a woman, they're married and they were the directors of this school and I actually because I feel like from the end of the last year to over the summer and then to the beginning of that year, that the relationship between us, was not the same so I said, I want to talk to you, I want to see what's going on and their answer was literally, your body has changed and I'm like, this is what this is all about, are you kidding me? And they were like, you don't see this? And they're Russian too, and they were like, you don't see

the change in your body, your shape has just all gone, what happened? And I'm like, oh my god, I thought I was starting to help my body to be healthy and now you are shitting on me right now, I wasn't prepared, I was seriously scared. So, of course, I call my mum right afterwards in tears, just crying, crying, crying and she was like, I noticed, I didn't think it would be that big of a deal but she's like, well now you have to start watching what you eat and eat healthier, you can't be eating this junk food. So, that was just a really, really hard transition for me and I was not a good place for a couple of weeks afterwards. It's also just to see someone that you thought you knew and I loved these teachers and they really liked me too and then to come back and be treated like that, made me feel really bad about myself. So, I had to work much harder, because they weren't going to look at me for my body, maybe they would look at me for my work ethic or whatever. So, that was hard. P8, p.8-9, line 379-401

Table b. Coming to terms with it

Sub-theme	Qualitative evidence
Acceptance	<p><i>There are so many things, like body-types, it is going to happen; you are going to change, and you can work with what you have, you can change things slightly, but it's not going to change things indefinitely. You can change the way you eat, and you can look healthier, but you can't change the way that your bones are structured; you just have to learn to work with what you have, and when I was growing up I thought that I could change everything about myself, if I just tried hard enough. But, there are great things about having bigger body types, and I've been in ballet companies and they are all super slim, and I mean super muscular and everything, but they are all built completely differently, and you can see that they have all worked in totally different ways to get there. So, I don't think there is one set route to get to a professional career. P1, p.9, line 386-396</i></p> <p><i>I think, like I said, it was very hit and miss; there were times when I felt very unsure about – I was like, 'this is different', and a little bit self-conscious, because my hips were growing wider or whatever else that may be. Generally speaking, I don't think it bothered me too much, because I knew it was going to happen and I just had to accept that that was just happening, and focus on the dancing, but yes, there were definitely periods where I was like 'I don't know if I like this', but we got through it. P2, p.8-9, line 354-360</i></p> <p><i>I just felt like I was fighting to stop it because I was naturally thinner as a child so I feel like, yes, your lines change and you have to accept... I used to think that everything was getting worse and didn't look like what I wanted it to look like, or what it used to look like. And you start losing flexibility. You have to try to maintain it rather than it just be there. Everything just, generally, gets a lot harder, and balance, I used to be good at turning before. P3, p.5, line 74-80</i></p> <p><i>So, my feelings about my body? I would say that they were negative for a while and definitely not constructive but, I suppose, after... that was while puberty was happening, and then afterwards that's when they then changed to being more positive</i></p>

	<p><i>again and realising that, actually, it's not desirable to look like a child anyway, in dancing. That's not a great physique. So I think there are positives to going through puberty. P3, p. 9, line 233-238</i></p> <p><i>I'm definitely trying to become more accepting of my body and I train in the way that I look right and I like to keep healthy, I've never had an eating disorder and felt that I have had to starve myself but I've always been aware that my body doesn't always ... I'm never the skinniest in the room but I need to be more comfortable with that. P8, p.3, line 93-96</i></p> <p><i>Of course, I nit-pick my body and I think about how this could be better and I could lose a few pounds but it's all a work in progress and just knowing that your body is your instrument, you've got to treat it right, you've got to eat healthy but also don't overdo it, don't overthink it either because that's when you go into the danger zone then but yes, I think my yoga practice has definitely been a huge factor in my confidence, in my ability to just accept what I am right now. P8, p.9, line 430-435</i></p>
Adapting or compensating	<p><i>I just tried to pretend that they didn't exist. I just tried to push on through it, and like I said, make people forget that I had those flaws, by trying to make my assets greater, yes. P1, p.7, line 288-290</i></p> <p><i>My biggest asset as a dancer I think has been focus, determination and discipline. I think that's true for a lot of dancers. But myself in particular, I was always aware that I wasn't the girl with the really crazy extension and I didn't have the long legged, skinny ballet body but I was really determined to be good at everything else. So it was just a lot of determination and willingness to work really hard so I would say my strengths, technically, is that I have good technique because I really was able to be like, "Oh right, well that's what I'm going to focus on and I have good technique, I have good turns, I have good balance." But yes, I guess weaknesses are just I wasn't tall and skinny and I was never great with extension. I just never had those long limbs and able to hold them up in the air. I'm flexible, I just don't have that extension. P6, p.6, line 183-193</i></p> <p><i>So, when I was training, you know, my teachers were saying you're too short, you're too short because I'm 5'3" but once I got out there I never really ran into that being an issue and, maybe, with the type of company I was looking at because some companies are taller than others, you know, so you're going after companies that are apt, you know, more acceptable of your body type or your look, you know, that was always – whenever – every company I worked in the women always looked like me. It wasn't much of an issue, especially with height but yeah, it's changing now, you know, women are much more muscular, they have different height types but, you know, you still have to be very fit, you know, and it's, obviously, a concern for everybody, so, less now, I would say, than even when I was first starting to dig into it. P9, p.2, line 47-57</i></p>
Social support	<p><i>I think my Mum, because she danced, and knowing me so well, she knew that I was going to find it a bit odd and a bit difficult, and because dance was my safe place, if all of a sudden it became a not-safe place, then I might be in a bit of a tricky situation. So, she did prepare me as well P2, p.9, line 380-384</i></p> <p><i>Also, because you see other people go at different paces, so sometimes they get something before you and you hear them get told something, and you go 'I wonder if it'll happen to me', and then it does happen, and you go 'let's do this'. P2, p.9, line 397-399</i></p> <p><i>I feel, because you had been... my class was all girls, as well, I feel like in between lessons, kind of a group... because everyone was going through it about the same time, you would just chat with each other and you'd be like, "Oh, it's happening</i></p>

to everyone.” So then, as a collective, it was okay. I feel that was the main, like, talking to your friends, “Oh yes, you’re getting bigger too.” P2, p.5, line 82-86

Yes. I feel I definitely would try, especially at the beginning, I really was like, “Oh, why am I getting so fat?” I thought I was fat, even though I wasn’t. I feel like it was all, again, a class dynamic. That was because everyone... and then we’d all be there thinking like, “I’m trying to lose weight this week” and then after a while, everyone was like, “That’s not how it works.” So, I do feel it was very, but in the beginning, I would say for a good year, I hated it and tried to change it all the time, like, “I’m not going to eat biscuits or cake or chocolate, because I don’t like my legs” and that kind of thing. We’d all do it together and it would be like, “Oh, yes, I didn’t eat crisps this week” and you would talk about it and share that, after class. P3, p.7-8, line 185-194

Well it was positive for me because it gave me a home, it gave me a group of people that wanted me there and were expecting me there so I had a place to belong. I didn’t necessarily fit in or belong anywhere else so I knew every day after school that I would be going to this place and then I would do this thing for four or five hours at night and that I would spend my entire Saturday there. Later on in my latter training between 18 to 23, again it was the same thing. I would be at junior college all day and then I would dance all day in the evening and on the weekends. I had a really strong social network there and support network. My trainers were all really wonderful mentors, especially the latter half of my training, even more when I was professional as an adult. The directors and the artistic director, they were both really, really helpful and great mentors so yes. P6, p.3-4, line 25-35

I think I’m really lucky in the way my parents brought me up. They were just really realistic and they kept me grounded. So I think yes, apparently when I was really young my mum said the only time she ever smacked me was when I did a competition and I won and I came out going, “I won. I’m the best.” She smacked me because she couldn’t stand it. I think that’s just stayed with me. P7, p.6, line 167-171

Table c. 'Grit and Grace'

Sub-theme	Qualitative evidence
Work ethic	<p><i>Getting into college was pretty make or break in terms of the school I got into. I think, maybe going to my first summer programme. It was when I was about twelve, and I just figured out what being a serious dancer actually meant. I think had I not gone there and done that I wouldn't have gained the work ethic I needed to pursue dance more fully, later. P4-5, p.4, line 104-108</i></p> <p><i>Yes, I feel like mostly knowing that I work really hard and I do a lot of cross-training and dance a lot and knowing that I am in really good shape is really what makes me happy about my body. P4, P.8, Line 227-229</i></p> <p><i>It's almost over the top and actually, people with those legs and feet, it's even harder to dance sometimes so sometimes it's easier to have the worst and then push what you have as opposed to trying to attract what you have over time. P7, p.3, line 42-44</i></p> <p><i>But the thing is with ballet as well, you can never be like, "I'm ready," because you'll never be ready. You can always make something better and always make something more perfect. It's nice that you come to realise this and you just enjoy the process of improving yourself and not actually achieving any goals as such. P7, p.3, line 60-63</i></p> <p><i>I think a hard work ethic is probably the best but that also comes from wanting it the most and loving it the most and just being smart with how you're working and just being intelligent as well and listening to the people who are trying to help you and really trying to understand movement and coordination. Basically the more you learn about your own body and how it feels and how you master the movements that you're trying to achieve, the better really. That comes with time and experience and age but you have to keep at it. P7, p.8, line 258-264</i></p> <p><i>I'd say overall, my dance has made me the person I am, I feel very independent, I feel very strong, I feel very determined, I'm a real go-getter, I love to work at ballet class and also all aspects of my life and I think it has just really shaped me into the person I am and I think that's a pretty cool person. P8, p.2, line 61-64</i></p> <p><i>Well, I think a work ethic, you know, it's over and beyond what most people think are hardworking people. It's absolutely necessary, you know, some people, I guess, can, kind of, float by depending on the size of the company. Sometimes, when dancers are in bigger companies they don't have to – not that they don't have to work as hard, but, they can be comfortable in what they're doing and they don't feel like they need to – but, maybe, it's just a personality thing I always wanted to, kind of, keep doing more and get to the next rung and be a principal and then move on to, you know, so, but that was, I put that pressure on myself. A lot of dancers are very comfortable being in the core and they, you know, spend their entire career in the core and are fine with it, you know, so, for me it was, you know, you also have to never be, you know, take anything personally, because you're going to get a million 'no's' and a million, "You stand in the back line," you know, and you have to still be fine with it. P9, p.7, line 303-316</i></p>

Learning to question	<p><i>I would definitely say, having a filter. Like, having the confidence to know when... taking everything that people say to you, but then thinking about it, and not just taking everything that teachers say as truth, and resilience because I feel, especially when you start auditioning... because even when I was younger, I would audition for youth performances and stuff, and Royal Ballet and all of that, and you realise that you're always going to get rejected at some point. You can't get a 'yes' every time. So, definitely knowing how to cope with that and not taking it personally. I think being able to... if you can't take criticism, then that's really not going to work. Being able to take corrections and apply them. P3, P.9, line 249-258</i></p> <p><i>A strong work ethic. I think that's really, really important. Just taking everything with a grain of salt and evaluating everything. Still listening and paying attention but knowing that one opinion isn't everything. Like, any correction you get, sometimes you're like, "That's a stupid correction. That just doesn't work for me, at all." Having that same perspective when people have opinions about you. But also, having a great work ethic and being dedicated and enjoying it, because if you don't enjoy it, you shouldn't do it. I think sometimes people forget that p4, P.8, line 234-241</i></p>
Perspective	<p><i>Well I felt at the time that he was telling me that I can't eat these certain things. I think now perhaps I would ignore him and I would come up with a healthy meal plan. I guess I was very young and I was living away from home. I was only 16 so I took everything he said as gospel. P5, p. 9, line 300-303</i></p> <p><i>I was just like, "They're trying to help me so what they're saying is kind of true." It's horrible to hear but it's kind of true so I have to accept it and maybe do think about it and do something about it. But also don't take myself so seriously that I'm going to go home and cry about it because that's just that one person's opinion. So it's a way of picking and choosing what you take into your head I guess. It's like choice. You can choose to let someone hurt you or not. In fact, if they are trying to hurt you then that's just weird but I think they should always be trying to... they're trying to get the same thing. We're all on the same track to help, to either make the show look good so they're just helping. Everyone is putting it in and you just happen to the piece, the tool that's going to be on stage at that moment. They're just trying to help, in a strange way maybe. P7, p.6, line 179-189</i></p> <p><i>I just really, really wanted to go away and dance. I'd been doing competitions actually before that. The Royal Ballet School had a Young British Dancer of the Year competition and I went the year before so I was looking at everyone at my age and the standard. What I realised was I felt lucky because I'd managed to have a normal childhood up until that point and these kids had not. I wasn't too far behind really so it was okay. I think what I took with it was that I maybe didn't have a natural body or look that was either classical or a ballet thing but it didn't stop me I guess... Yes, possibly. I guess you see the world out there and you see there's more going on and it's not everything. Even though it is everything to me but you realise that you can do other stuff. I don't know really. Everyone that went to ballet school, it sounds like they missed out on something but I guess not. I really was doing a lot of dance anyway, not living at boarding school. P7, p.7, line 216-231</i></p>

Appendix D – Study 3-6 Ethics Documentation

REACH Review reference number: EP 15/16 4

REACH Approval reference: EP 15/16 70

ANNEX ONE

Department for Health

Research Ethics Approval Committee for Health

Checklist for all researchers

The Department for Health requires all members of staff and students who are planning research projects to consider the ethical implications of the work which they undertake. This is important in all research projects, but is **essential** in those projects which involve human participants.

The Department has agreed on an ethical review process which has a fast track for those projects which either do not have ethical implications and thus do not require full scrutiny, or where scrutiny will be given by another body (in particular an NHS Research Ethics Committee [REC]). Projects that fall outside of these categories will need to make a full submission to the Research Ethics Approval Committee for Health.

Name	Siobhan Mitchell
Project Title	An exploration of individual experiences of differing maturation timing in ballet

PART A: Determining the nature of your research and the route for ethical approval you need to follow (please tick the route you will follow for your ethical approval):

My proposal is currently at the stage of application for funding (tick box)

Please complete annex 1 & 2 for REACH audit purposes. Further approval may be required once funding is approved (please refer to relevant statement below)

My research project does not involve the use of human subjects or only involves secondary data analysis (**full consideration is not required, complete the checklist and the implications form for audit purposes and return to the Department Co-ordinator; Principal investigator, second reader and researcher to sign and return to the Department Co-ordinator (Annex 2 or 3)**)

My research meets the requirements for submission to an NHS REC (e.g. Involves human subjects, requires access to NHS patients or includes adults lacking capacity) **(full consideration is required by the appropriate NHS REC; complete the checklist and ethical implications form for audit purposes and return to the Department Co-ordinator (Annex 2 or 3) together with the evidence of NRES approval)**
(Where NHS REC approval is required, please provide details of who is sponsoring this project)

My research has received approval from another department within the University of Bath or another UK University ethics committee. Complete the checklist, together with Annex 2 or 3 and submit with evidence of the institutions approval

My research involves human subjects and does not take place in an NHS context **(full consideration is required by REACH (Annex 2 or 3 and Annex 4))**

My research involves human subjects and takes place outside of the UK, and for which particular consideration needs to be given **(full consideration is required by REACH - Annex 2 or 3 and Annex 4))**

My research involves working with children and/or vulnerable adults (a CRB check may also be required in addition to the above)

My research involves the collection and storage (not destroyed on day of collection) of human tissue. (Full consideration from an NRES approved committee is required in addition to the above)

ANNEX TWO

Department for Health

Research Ethics Approval Committee for Health

ETHICAL IMPLICATIONS OF POSTGRADUATE RESEARCH PROJECT

This template should accompany the postgraduate research student application for candidature form submitted to the Board of Studies.

(Additional departmental information may be incorporated as appropriate).

Please note that this procedure is intended to help student and supervisor consider ethical implications of the proposed research project, and as such is a 'light-touch'

approach. Supervisors are responsible for deciding whether a more extensive ethical review is necessary (such as submission to an NHS REC).

Brief Title of Project	An exploration of individual experiences of differing maturation timing in ballet
Student	Siobhan Mitchell
Supervisor (s)	Dr Sean Cumming and Dr Anne Haase

Are there ethical implications concerned with the following general issues?

	Comments from Supervisor
Source of the funding	The student is funded by the ESRC, the terms of the funding do not present ethical implications.
What steps will or have been taken to ensure competency of the student?	Completed research methods training as part of an MRes year, continued research skills training (through PGSkills sessions).
Are there any data storage issues? (including confidentiality, availability, length of storage, etc)	All participant information will be anonymous and will be kept for a maximum duration of 5 years. Data will be stored on an external hard drive and secure server with no identifying information present, data will be kept securely, and only the researcher and her supervisory team will have access to it.
Dissemination of results: 1. Are any ethical issues likely to arise? 2. Are dissemination plans appropriate?	Results may be disseminated in the form of a publication or presentation, anonymity and confidentiality agreed with participants at the point of data collection will be upheld. This study will be used to inform further studies within the student's PhD.

Effect on/damage to the environment	n/a
In which aspects of the research process have you actively involved, or will you involve patients, service users, or members of the public? (as stakeholders in the research and not participants)	Please tick all that apply <input type="checkbox"/> Design of the research <input type="checkbox"/> Management of the research <input type="checkbox"/> Undertaking the research <input type="checkbox"/> Analysis of results <input type="checkbox"/> Dissemination of findings <input type="checkbox"/> None of the above
Give details of patient, service users or public involvement, or if none please justify the absence of involvement.	Participants will be involved only in the data collection phase.
Demonstration of Ethical Considerations Please provide a paragraph describing the ethical issues which will need to be managed during the course of the activity.	As participants sought are under the age of 16, a DBS certificate has been obtained by the researcher for the purpose of this research. Consent: Consent will be sought from a parent/guardian and the school which will be facilitating data collection. Written assent will also be obtained from the participants themselves. Full disclosure about the nature of the study will be given prior to asking for consent to participate. The nature of the methods are not likely to cause distress and participants are free to withdraw should they feel uncomfortable with the study. Data Collection: It is understood that learning experiences and maturation may be sensitive topics for discussion. The nature of the project will be disclosed in a participant information sheet prior to asking for consent to participate. Participants will be made aware that they can withdraw from the

	<p>study at any time. The limits of confidentiality, in accordance with NCB guidelines (Shaw, Brady & Davey, 2011) will be explained to participants; if an individual is indicated to be at risk, procedure will be in place prior to the collection of data in accordance with the policies of participating schools, with an identified member of staff for referral. If individuals are in any way distressed or upset during the interview the interview will be stopped immediately/recording will cease and the appropriate pastoral care be offered in accordance with the policies of participating schools.</p> <p>Data Storage: All participant information will be made anonymous and kept for a maximum duration of 5 years. Data will be stored on an external hard drive with no identifying information present, data will be kept securely, and only the researcher and her supervisory team will have access to it.</p> <p>Dissemination: Results may be disseminated in the form of a publication, anonymity and confidentiality agreed with participants at the point of data collection will be upheld. The participating schools will be made aware of this intention and may choose whether or not to be acknowledged formally within any future publications.</p>
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Issues for additional consideration: (This list is indicative and is not necessarily exclusive). Please tick which categories apply to your research

	Yes	No
1. Does the study involve participants who are particularly vulnerable or unable to give informed consent? (eg children, people with learning disabilities)	X	
2. Will the study require the co-operation of a gatekeeper for initial access to the groups or individuals to be recruited? (eg students at school, members of self-help group, residents of a nursing home)	X	
3. Will it be necessary for participants to take part in the study without their knowledge and consent at the time? (eg covert observation of people in non-public places)		X
4. Will the study involve discussion of sensitive topics? (eg sexual activity, drug use)	X	
5. Are drugs, placebos or other substances (eg food substances, vitamins) to be administered to the study participants or will the study involve invasive, intrusive or potentially harmful procedures of any kind?		X
6. Will blood or tissue samples be obtained from participants?		X
7. Is pain or more than mild discomfort likely to result from the study?		X
8. Could the study induce psychological stress or anxiety or cause harm or negative consequences beyond the risks encountered in normal life?		X
9. Will the study involve prolonged or repetitive testing?		X
10. Will financial inducements (or other reasonable expenses and compensation for time) be offered to participants?		X
11. Will the study involve recruitment of patients through the NHS? (Note: If the answer to this question is 'yes' you will need to submit an application to appropriate NHS Research Ethics Committee.)		X
12. Will the study involve obtaining or processing personal data relating to living individuals, (eg involve recording interviews with subjects even if the findings will subsequently be made anonymous)? (Note: If the answer to this question is 'yes' you will need to ensure that the provisions of the Data Protection Act are complied with. In particular you will need to seek advice to	X	

ensure that the subjects provide sufficient consent and that the personal data will be properly stored, for an appropriate period of time). Information is available from the University Data Protection Website and dataprotection-queries@bath.ac.uk		
13. Will the study involve the use of animals?		X
14. Does the study raise any other ethical issues which you wish to be raised and reviewed by the Research Ethics Approval Committee for Health? If yes, what are they, please expand here:		X

I confirm that the statements above describe the ethical issues which will need to be managed during the course of this research activity.

Principal Investigator/ Supervisor/Project Supervisor	Signature:  Date: 02/10/15
Second reader(PhD/DHealth/ MPhil/MD only)(normally <u>external</u> to the project team)	Signature:  Date: 02/09/15
Researcher/Student	Signature:  Date: 31/08/15

Please submit this form to the Department Co-ordinator

ANNEX FOUR – Application form for full submission for research ethics approval

Department for Health

Research Ethics Approval Committee for Health

Title of study	An exploration of individual experiences of differing maturation timing in ballet
Chief investigator	Name: Dr. Sean Cumming, Dr Anne Haase e-mail: S.Cumming@bath.ac.uk Anne.Haase@bristol.ac.uk

<p>(for research student projects, put supervisor name here)</p> <p>(for undergraduate projects, put project supervisors name here)</p>	<p>Telephone: +44(0)1225 386251</p>
<p>Other investigators</p> <p>(for research student projects, put students name here)</p> <p>(for undergraduate projects, put student(s) name here)</p>	<p>Name: Siobhan Mitchell</p> <p>e-mail: sbbm20@bath.ac.uk</p> <p>Telephone: 07428636586</p>
<p>Source of funding for the study</p>	<p>The student is funded by an ESRC studentship</p>
<p>Proposed dates of study</p>	<p>October 2015 – December 2015</p>
<p>Research question</p>	<p>What are the experiences of maturing and developing young dancers in the context of dance training environments?</p> <p>Are there/what are the differences in health outcomes and coping mechanisms/how individual's manage different learning experiences between early/average maturing individuals and late maturing individuals?</p>
<p>Background (less than 100 words)</p>	<p>Current research suggests that maturation timing (whether an individual biologically matures in advance of their peers, later than their peers or at an average time) may be an important factor in how individuals cope with different learning experiences and social contexts and can therefore play a role in subsequent psychological wellbeing (Brooks-Gunn & Warren, 1985). This study is intended to explore this</p>

	<p>within the context of elite dance training and to investigate how we might use this knowledge within dance teaching contexts to promote and to optimise psychological wellbeing in adolescent dancers. This stage of my research will involve conducting interviews with young dancers of differing maturation timing to understand more about individual experiences within the context of elite dance training.</p>
<p>Methods (less than 300 words)</p>	<p>The study proposes a qualitative design; with the use of semi-structured individual interviews. Interpretative phenomenological analysis will be used to obtain experiential accounts from dance students.</p> <ul style="list-style-type: none"> • Stage 1 – as many students from each year group as possible to complete brief 6-item survey (demographic information/Pubertal development scale). • Stage 2 – The 6-item survey will be used to screen and then select a range of individuals for interview who have differing maturation characteristics. • Stage 3 – Short interviews (20-30mins) will be conducted to develop an understanding of individual experiences within the context of elite dance training. Ideally this would be preceded by observation of these individuals in a class environment. • Stage 4 – Transcription of interviews, supplemented by maturation/pubertal timing data <p>The observation stage will follow an ethnographic approach with the researcher collecting data in the form of field notes.</p> <p>Stage 1 acts as a screening stage so that appropriate participants can be selected for interview. Consent for stage 1 will be in the form of</p>

	<p>an 'opt out' for parent/guardian's and a loco parentis for the school to consent. In addition to written assent by the student which will be included with the survey.</p> <p>For the interview stage full parental consent will be sought, the researcher will provide a letter the school can send out to the relevant parent/guardians which explains details of the study and asks whether they consent to their child's participation. Written assent will also be required by the student.</p>
<p>Sample size (or equivalent qualitative approach)</p>	<p>Ideally the sample would be drawn from 2 – 3 different training establishments, with 8 individuals per category for interview (early, average, late) – total of 24 interview participants.</p>
<p>Proposed Analysis</p>	<p>Qualitative data from interviews will be anonymised, transcribed and then analysed with the aid of N-Vivo software. Interpretative phenomenological analysis is concerned with making sense of people's experiences, analysis would begin with 1) Summarising the experiences described by the participant; 2) Examining what this means; 3) Examining an individual's self-reflections to explore what they make of their own experience. Initial themes will then be identified – these will come about through writing descriptive summaries of what the participant has said, what issues have been identified, what events are relayed, what feelings are expressed and so on. Further, making initial interpretations about what these issues, events and feelings might mean. Through this analysis we can begin to understand the experience of the individual (Shaw, 2010 In Forrester ed., 2010). When all transcripts have been analysed overlaps and differences may be highlighted within the sample. Data will be kept in a secure location, password encrypted.</p>

	Data from the pubertal development scale (PDS) will be used to select participants of varying maturation for interview and to present demographic/maturation data about the sample. From the PDS stage-normative and peer-normative pubertal timing can be derived which will be part both the selection for interview and the demographic data for the sample.
Potential risks to volunteers	The short survey requires students to disclose information about their development, it is understood that this information is personal and it will be made clear to participants that this will be confidential. Although the researcher will need to be able to identify participants in order to invite them for interview, their responses to the survey will remain anonymous to all others and data will be fully anonymised for the data analysis phase. In terms of interview data, the limits of confidentiality, in accordance with NCB guidelines (Shaw, Brady & Davey, 2011) will be explained to participants; if an individual is indicated to be at risk, procedure will be in place prior to the collection of data in accordance with the policies of participating schools, with an identified member of staff for referral. The interview involves participants disclosing their experiences, however, it will be made clear that participants have the freedom not to talk about any topics that they do not wish to talk about. The nature and topic area of the study will be made clear prior to asking for consent to participate. A member of the pastoral team from the participating school will be identified prior to the beginning of the study for students to talk to if they feel that they need further support.
Potential for pain/discomfort	As above, full disclosure about the nature of the study will be given prior to asking for consent to participate. The nature of the methods are not likely to cause distress and participants are free to

	withdraw at any time should they feel uncomfortable with the study.
Benefits to participants	Students will benefit from an opportunity to reflect on their experiences in dance and to contribute to a three year project working to improve our understanding of young dancers in training. Schools can also benefit from participation in this study, with an opportunity to learn from the findings of this research project and to play an active role in contributing to research into the wellbeing of their students.
How will participants be recruited?	Initially vocational dance schools will be recruited, this will be done through the researcher's own contacts and with the help of national dance organisation Dance UK who will send out a recommendation to participate in this research to their contacts. Once 2 – 3 schools have been recruited and consent from parent/guardians and the schools has been obtained, students within those schools will be recruited for interview through a short screening questionnaire pertaining to pubertal development (6-items). A selection of individuals representing differing maturation timing will be invited for interview and parental consent will be sought.
Exclusion/inclusion criteria	Schools: Vocational dance schools (ballet focus), with students age 11 -17. Individuals: aged 11 – 17, female, in vocational ballet training – ideally a range of ages within the 11-17 bracket.
How will participants consent be taken?	Firstly, I will ask participating schools for their consent to undertake the research. Stage 1 acts as a screening stage so that appropriate participants can be selected for interview. Consent for stage 1 will be in the form of an 'opt out' for parent/guardian's and a 'loco parentis' for the school to consent. The 'opt-out' form will be sent out to parent/guardians of the students, requiring them to

	<p>do nothing if they consent to their child's participation and to return the 'opt-out' form if they do not.</p> <p>For the interview stage full parental consent will be sought, the researcher will provide a letter the school can send out to the relevant parent/guardians which explains details of the study and asks whether they consent to their child's participation.</p> <p>During both stages students will be asked to provide written assent prior to taking part.</p> <p>The researcher will liaise with the schools to decide upon the best way to get consent and information forms to parent/guardian's. This may be online or via post. Ample time will be given for parents to return the forms and in the case of the full consent forms for the interview no child will participate if these forms have not been returned. The opt-out form will be sent out to parents a full week prior to data collection to provide plenty of time for parents to return, a reminder will be sent out two days prior to data collection.</p> <p>Full information about the nature and the methods of the study will be provided before any parties are asked to consent to participation via the information documents (attached). Participants will have the option to ask further questions prior to consenting and also will be fully informed of their right to withdraw from the study at any point.</p>
<p>How will confidentiality be ensured?</p>	<p>All participant information will be made anonymous and kept for a maximum duration of 5 years. Data will be stored on an external hard drive with no identifying information present, data will be kept securely, and only the researcher and her supervisory team will have access to it.</p>

References

Brooksgunn, J., & Warren, M. P. (1985). The Effects Of Delayed Menarche In Different Contexts - Dance And Non-Dance Students. *Journal of Youth and Adolescence*, 14(4), 285-300. doi: 10.1007/bf02089235

Forrester, M.A. (2010). *Doing Qualitative Research in Psychology: A Practical Guide*. London: Sage Publications

Shaw, C., Brady, L-M., Davey, C. (2011). National Children's Bureau: Guidelines for Research with Children and Young People: <http://www.nfer.ac.uk/schools/developing-young-researchers/NCBguidelines.pdf>

Attach the following (where relevant):

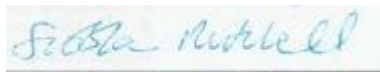
1. Participant information sheet
2. Consent Form
3. Health history questionnaire
4. Poster/promotional material
5. Copy of questionnaire/ proposed data collection tool (questionnaire; interview schedule/ observation chart/ data record sheet/ participant record sheet)

Signed by: Principal Investigator or Student Supervisor



Date: 02/10/15

Signed by: Student or other researchers

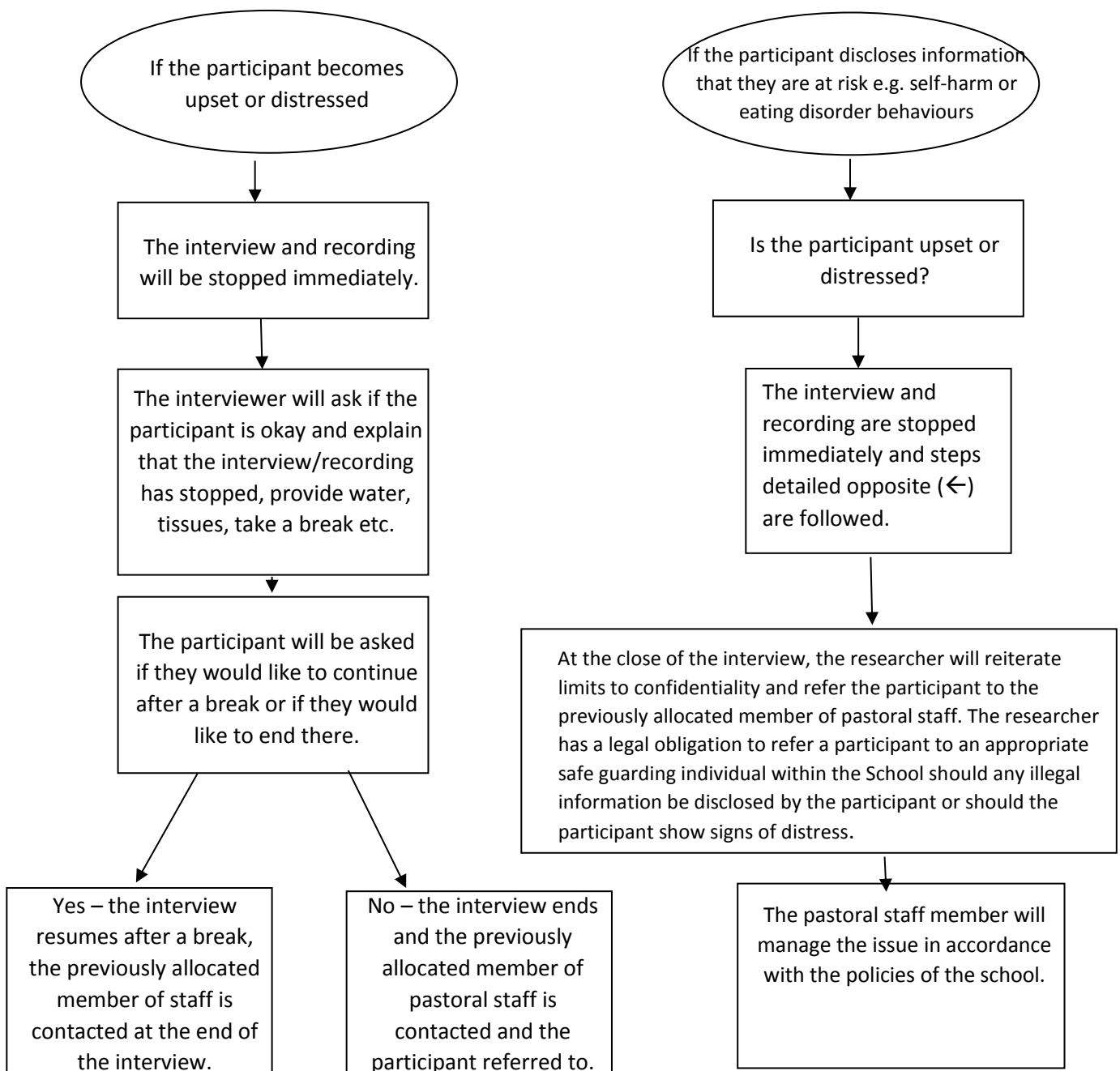


Date: 02/10/15

Interview Procedures to ensure child safety and wellbeing

N.B All participants will be informed of limits to confidentiality and the researcher's responsibility should the participant disclose anything which suggests that they are at risk (to themselves or others). Participants will be informed of this prior to the interview (within the information sheet) and again, verbally, before the interview commences.

A member of pastoral staff will be agreed with the school upon recruitment in order to provide a contingency for such circumstances. This member of staff will be identified to participants, so they are aware that even if issues do not arise in the interview itself they can go to this member of staff to talk.



Appendix E – Study 3-6 Handbook for participating schools (consent and information forms, survey and interview schedule)

INFORMATION HANDBOOK FOR SCHOOLS



UNIVERSITY OF
BATH



University of
BRISTOL



CONTENTS

Key contacts

Researcher Biographies

Research Outline

Logistics

Safeguarding procedures

Forum/CPD

Letters and consent forms

Copy of survey and interview questions

Resources

KEY CONTACTS

Principal researcher: Siobhan Mitchell

Email: S.B.Mitchell@bath.ac.uk

Tel. +44 (0)7428 636586

Address: Department for Health,

University of Bath,

Bath, BA2 7AY

United Kingdom

Research Supervisors: Dr Sean Cumming

University of Bath

Email: S.Cumming@bath.ac.uk

Dr Anne Haase

University of Bristol

Email: Anne.Haase@bristol.ac.uk

For any concerns or complaints contact the head of the Research Ethics Approval Committee for the Department of Health at the University of Bath:

Dr Gordon Taylor

Email: g.j.taylor@bath.ac.uk

Tel. +44 (0)1225 38 5415.

RESEARCHER BIOGRAPHIES



Siobhan Mitchell, University of Bath

Siobhan is an associate lecturer and doctoral researcher. Siobhan trained as a dancer at Ballet West in Scotland before going on to complete a BA Hons in Dance at the University of Roehampton, an MSc in Dance Science at Trinity Laban Conservatoire of Music and Dance and an MRes in Health and Wellbeing at the University of Bath. Awarded a full ESRC Studentship in 2014, Siobhan is currently working on her PhD exploring the implications of maturation timing upon psychological wellbeing in dancers.



Dr. Anne Haase, University of Bristol

Anne is currently Senior Lecturer in Exercise, Nutrition and Health. Anne's research interests focus on individual and family-based theoretical approaches to lifestyle behaviour change, including chronic disease-preventive health behaviours (physical activity, food choice, weight management and dieting) and the benefits of exercise and diet in mental health (depression, eating disorders). Recent interventions aim to facilitate physical activity in hard to reach populations (adolescent girls, people with depression, pregnant women) while other work explores communication of health behaviours across generations in families. Additional areas include body image, weight issues and body checking, along with a focus on perfectionism and social physique anxiety. Her research employs various methodology ranging from qualitative and quantitative approaches to experimental interventions.



Dr. Sean Cumming, University of Bath

Sean joined the Department for Health at University of Bath in 2006 from the Department of Psychology at The University of Washington (Seattle). He obtained his PhD in Kinesiology from Michigan State University in 2002 where he worked for the Institute for the Study of Youth Sports. Sean's research focuses on adolescent health and development, with particular emphasis on the processes of growth and maturation, and the development of school and sports based initiatives that encourage active and healthy living. He has published more than 50 peer-reviewed manuscripts and his research has been funded by a number of agencies including the Economic and Social Research Council, the British Academy, and 21st Century Legacy. Sean is an Associate-Editor for the Journal of Applied Sport Psychology, and sits on the editorial board of the International Journal of Sports Science and Coaching.

RESEARCH OUTLINE

What?

Current research shows that whether an individual biologically matures before their peers, later than their peers or at an average time to their peers may be an important factor in how they cope with different learning experiences and social contexts and can therefore play a role in subsequent wellbeing. My PhD research aims to explore this within the context of elite dance training and to investigate how we might use this knowledge to promote and to optimise wellbeing in adolescent dancers. This research will involve conducting interviews with young dancers of differing maturation timing to understand more about individual experiences within the context of elite dance training.

This research project seeks participation from female dance students age 11-17.

How?

- Stage 1 – as many students from each year group as possible to complete a brief 6 question survey (this survey asks questions pertaining to demographic information and pubertal development).
- Stage 2 – The 6-item survey will be used to select a range of individuals for interview who have differing maturation characteristics. Around 8 -10 students will be selected for interview.
- Stage 3 – Short interviews (30 - 45mins) aimed at developing an understanding of individual experiences within the context of elite dance training. Ideally this would also involve observation of these individuals in a class.

Consent for stage 1 will be in the form of an 'opt out' for parent/guardian's and a loco parentis for the school to consent. In addition to written assent by the student which will be included with the survey.

Consent for stage 3 will be in the form of a full consent form completed by the student's parent/guardian, accompanied by written assent by the student.

LOGISTICS

BASIC REQUIREMENTS

Space: A small, private room to conduct the interviews in would be all that is needed.

Time: One initial visit for introductions, questions and to administer surveys. On a separate occasion, 2-3 days to conduct interviews. I am keen to fit in around your schedule to cause the least disruption possible.

What is required of the school?

- Consent to conduct the research with your students/at your school.
- Assistance with sending out consent forms to parent/guardians.
- To assist with administering surveys to students at the school.
- Provision of a small space for interviews to take place.

- Permission for the researcher to observe classes while at the school.
- To assist communication between the researcher, students and parents.

Pre-visit: 'opt out' consent forms for surveys to be sent out to parent/guardians with a deadline of 1 week. Forwarding of any opt out forms to the researcher.

Initial visit:

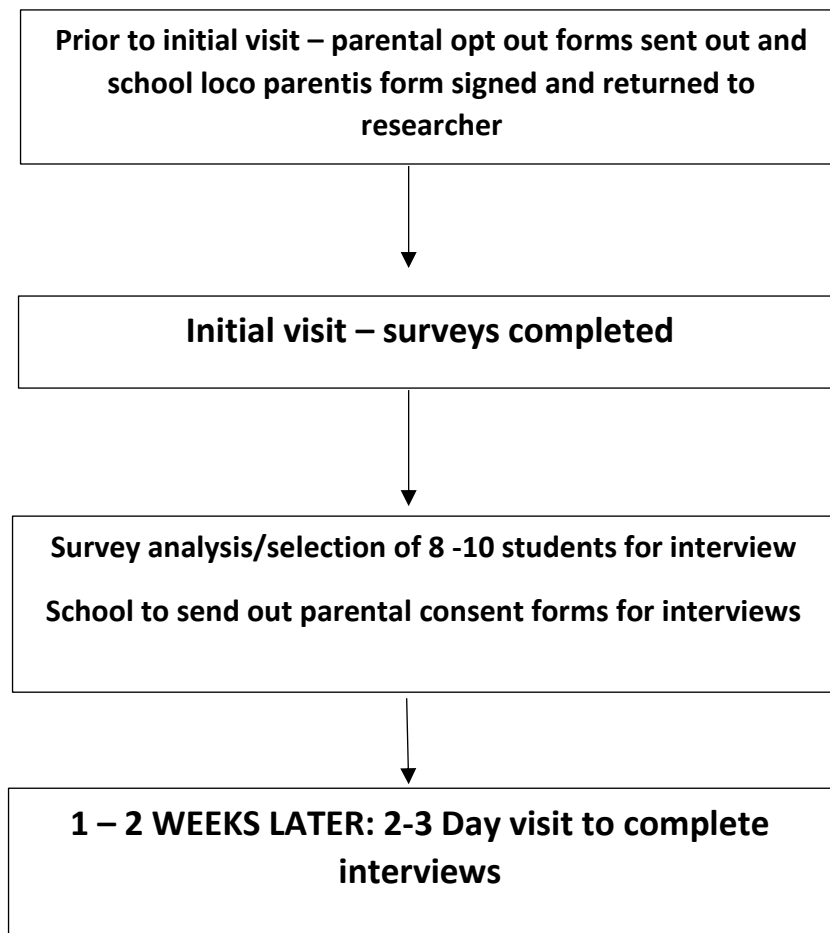
- Answer any questions from staff about research.
- Identify member of staff for any safeguarding/pastoral referral.
- Introduce myself and the research project to students, answer any questions from students about the research.
- Administer survey to students.
- Observe classes if possible.

Surveys will be analysed and 8 - 10 students selected for interview. Parental consent forms for these students to be sent out within the same week or the following week. Interviews to be arranged within the following 2 weeks.

Interview visit:

- 2 or 3 days would be needed to conduct interviews (8 interviews 3-4 per day, this can be adjusted to suit time/space).
- I am keen to fit in around your schedule to cause the least disruption possible i.e. conducting interviews within breaks.
- Interviews will only take around 30 - 45 minutes.
- Ideally during these 2-3 days it would be great if I am able to observe classes too.

TIMELINE



Proposed dates:

Initial visit: TBC

Interview visit: TBC

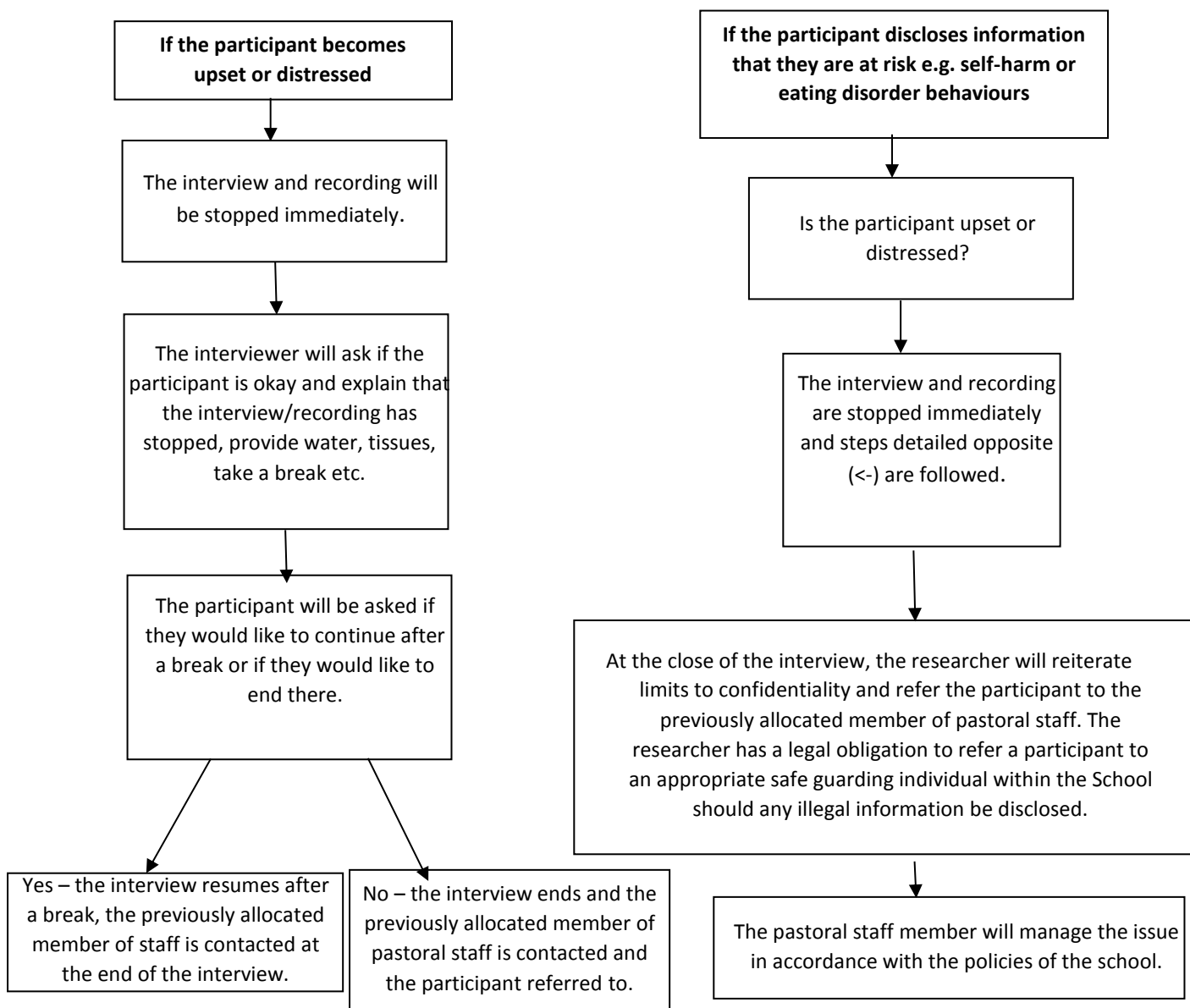
SAFEGUARDING PROCEDURES

Interview Procedures to ensure child safety and wellbeing

N.B All participants will be informed of limits to confidentiality and the researcher's responsibility should the participant disclose anything which suggests that they are at risk (to themselves or others). Participants will be informed of this prior to the interview (within the information sheet) and again, verbally, before the interview commences.

A member of pastoral staff will be agreed with the school in order to provide a contingency for such circumstances. This member of staff will be identified to participants, so they are aware that even if issues do not arise in the interview itself they can go to this member of staff to talk.

Please agree upon a member of pastoral staff for referral in this instance. Please ensure this member of staff is aware of the research project and kindly email the researcher with the appropriate staff member copied into the email.



FORUM

As soon as the research project commences students will be made aware of the following forum: <http://wellnesswall.proboards.com>

This forum is a safe space to ask any questions which may arise whether on the topic of the research or questions about the research project itself.

This forum will be password protected and only accessible to students involved in the research project. All entries to the forum will be anonymous and moderated by the researcher. Only the researcher will have access to provide responses on the forum.

The forum will continue for 6 months after the research project to ensure students have an appropriate space to ask questions.

FUTURE CPD OPPORTUNITIES

It is acknowledged that the research may prompt students to ask questions related to the subject matter of the research i.e. puberty and maturation.

The researcher is undertaking a 3 month placement with national organisation Dance UK between March and May 2016. During this placement the researcher will be developing and delivering CPD training sessions for dance teachers on the topic of puberty and dance, covering the physiological, biological and psychological changes of puberty and how these may impact upon dance training and performance.

In exchange for your participation in this research project the researcher would like to extend the offer of a complementary CPD session for your teachers from May 2016 onwards. If you are interested, please contact Siobhan for details.

LETTERS AND CONSENT FORMS

Parental consent can be sent to parents via the students or via email – most appropriate way to communicate with parents to be discussed/agreed with the school.

FORMS TO BE COMPLETED/SENT OUT BEFORE XXXXXX:

1. **SCHOOL PRINCIPAL LOCO PARENTIS CONSENT FORM**
2. **PARENTAL CONSENT FORM 'OPT OUT' (CONSENT FOR SURVEY) – PLEASE SEND OUT TO ALL FEMALE STUDENTS AGE 11 – 17**

SCHOOL PRINCIPAL LOCO PARENTIS CONSENT FORM



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University of
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DEPARTMENT FOR HEALTH

School Principal 'Loco parentis' declaration

Research Question:

An exploration of individual experiences of differing maturation timing in ballet

On behalf of the students at [name of school], I fully understand what is involved in taking part in this study. Any questions about the students' participation in it have been answered to my satisfaction. I have been informed that the students are free to withdraw their consent and discontinue participation at any time. If they do decide to withdraw from the study, it has been made clear that it will not have any undesirable consequences.

It has been made clear to me that steps will be taken to preserve anonymity and confidentiality of the children participating in this study, in accordance with the National Children's Bureau Guidelines, there may be limits to confidentiality should a child disclose information that they are at risk in any way. In the unlikely event a child discloses information which suggests that they are at risk, school policies will be followed and an appropriate member of staff will be designated prior to interviews taking place for the researcher to approach in this event. I understand that only the researcher and her supervisory team (Dr Sean Cumming and Dr Anne Haase) will have access to the data.

Should I feel that these regulations are being infringed or that the interest of the students are being ignored, neglected or denied, I should inform Dr Gordon Taylor, head of the Research Ethics Approval Committee for the Department for Health who will undertake to investigate my complaint. Dr Gordon Taylor can be contacted via email at g.j.taylor@bath.ac.uk or by phone on 01225 38 5415.

Signature of School Principal:

Name Printed:

Date:

PARENTAL CONSENT FORM 'OPT OUT' (CONSENT FOR SURVEY)



UNIVERSITY OF
BATH



University of
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DEPARTMENT FOR HEALTH

PARENTAL CONSENT FORM FOR SURVEY PARTICIPATION

An exploration of individual experiences of differing maturation timing in ballet

Principal Researcher: Siobhan Mitchell (S.B.Mitchell@bath.ac.uk)

Research Supervisors: Dr Sean Cumming (S.Cumming@bath.ac.uk)

Dr Anne Haase (Anne.Haase@bristol.ac.uk)

The students attending [name of school] have been invited to take part in a research study conducted by myself as part of a three year PhD research project at the University of Bath. The study will take place during the school term between January and February 2016. Participation in this study is optional and there is absolutely no obligation for your child to take part. Information about the project and what would be asked of your child if she was to be involved are detailed below. Hopefully this will give you the chance to see what is involved before you decide whether you would be happy for your child to take part.

The purpose of the study:

Current research shows that whether an individual biologically matures before their peers, later than their peers or at an average time to their peers may be an important factor in how they cope with different learning experiences and social contexts and can therefore play a role in subsequent wellbeing. My PhD research aims to explore this within the context of elite dance training and to investigate how we might use this knowledge to promote and to optimise wellbeing in adolescent dancers.

What would your child be asked to do?

If you decide your child could participate in this project they will be asked to complete a short 6 question survey related to maturity. The survey asks questions about physical development such as whether or not they have had a growth spurt and biological maturation such as age of first period. From this survey, several students will also be invited to participate in a brief interview. If your child is invited to participate in an interview, you will receive further information and be asked for your consent. Students will have the opportunity to withdraw from participating at any point with no implication. All research activities will be scheduled around your child's school day so that no classes are missed.

Prior to this taking place, I will explain the study to students and about what would be involved. Students will also be able to ask any questions they may have about what they will be doing.

Following this, your child will be asked to provide her own written consent before taking part in the study. It will be made very clear that participation is optional and that your child is free to refuse to respond to any specific question on the survey and withdraw from the study at any point with no implication.

Your child's responses and identity will remain confidential throughout. School staff will not have access to the individual surveys. Your child's identity will be made anonymous, I will allocate a number to ensure their identity remains anonymous. The data will only be used to answer the specific research question and will be kept for a maximum of five years in a secure manner in the Health department at the University of Bath. Only the researcher and her supervisory team (Dr Sean Cumming and Dr Anne Haase) will have access to the data.

It is your decision if you would like your child to participate in this research study. **If you are happy for your child to participate, you do not need to do anything.** However if you would prefer that your child **does not** take part, please may you contact me to let me know. You can do this either by **e-mailing the opt-out form to the researcher (Siobhan Mitchell) directly via the contact details below or by asking your child to submit the opt out form to the school reception before [INSERT DATE].** If either you or your child decides to opt-out at a later date, this is perfectly acceptable. Participation in this study will not affect your child's training in any way.

If you have any questions please don't hesitate to contact me directly:

Siobhan Mitchell (Tel: 07428 636586; Email: S.B.Mitchell@bath.ac.uk).

Yours sincerely

A handwritten signature in blue ink that reads "Siobhan Mitchell". The signature is written in a cursive style and is placed on a light blue rectangular background.

Siobhan Mitchell

PhD Candidate, Department for Health, University of Bath

For the attention of Siobhan Mitchell - University of Bath

Student's School:

UNIVERSITY OF BATH RESEARCH PROJECT

OPT-OUT FORM

I would prefer my child(Full name) **not to take part**
in the research study.

Signature:

Date:

* Please only complete this form if you do **NOT** want your child to take part in the research study.
If you are happy for your child to be involved then you do not need to send this form back.

FORMS/COMMUNICATIONS TO BE COMPLETED/SENT OUT BEFORE XXXXXX

1. Email sent to 8-10 students to invite them for an interview
2. **PARENTAL CONSENT FORM FOR INTERVIEW** – sent out to the parents of the 8 students, to be returned before XXXXXX
3. Interviews to be scheduled around the school day across [INSERT DATES].

PARENTAL CONSENT FORM FOR INTERVIEW



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DEPARTMENT FOR HEALTH

PARENTAL CONSENT FORM INTERVIEW PARTICIPATION

An exploration of individual experiences of differing maturation timing in ballet

Name of researcher: Siobhan Mitchell (S.B.Mitchell@bath.ac.uk)

Research Supervisors: Dr Sean Cumming (S.Cumming@bath.ac.uk)

Dr Anne Haase (Anne.Haase@bristol.ac.uk)

The students attending [school name] have been invited to take part in a research study conducted by myself as part of a three year PhD research project at the University of Bath. The study will be conducted during the school term between January and February 2016. Participation in this study is optional and there is absolutely no obligation for your child to take part. Information about the project and what would be asked of your child if she was to be involved are detailed below. Hopefully this will give you the chance to see what is involved before you decide whether you would be happy for your child to take part.

The purpose of the study:

Current research shows that whether an individual biologically matures before their peers, later than their peers or at an average time to their peers may be an important factor in how they cope with different learning experiences and social contexts and can therefore play a role in subsequent wellbeing. My PhD research aims to explore this within the context of elite dance training and to investigate how we might use this knowledge to promote and to optimise wellbeing in adolescent dancers.

What would your child be asked to do?

If you decide your child could take part in the research they will be invited to participate in a short interview around 30-40 minutes in length. Interviews will take place over the course of a school

week and the interview will be based around learning experiences in dance and how different learning experiences are managed. Audio recordings of the interviews will be taken for the purpose of transcription. Students' names and schools will remain anonymous in the transcription and be replaced with an identification number (e.g., Student 1, School A). Students will have the opportunity to withdraw from participating in the interview at any point with no implication. All research activities will be scheduled around your child's school day so that no classes are missed.

Before the interview takes place, I will explain the study to students and what would be involved. Students will also be able to ask any questions they may have about what they will be doing. Following this, your child will be asked to provide her own written consent before the interview takes place. It will be made very clear that participation is optional and that your child is free to refuse to respond to any specific question in the interview and withdraw from the study at any point with no implication.

Steps will be taken to preserve your child's anonymity and confidentiality, in accordance with the National Children's Bureau Guidelines, there may be limits to confidentiality should a child disclose information that they are at risk in any way. In the unlikely event your child discloses information which suggests that they are at risk, the policies of the school will be followed, with a designated member of staff for referral. School staff will not have access to the interview recordings/transcriptions. I will not record your child's name at any point during the interview; instead I will give them a number to ensure their identity remains anonymous. The data will only be used to answer the specific research question and will be kept for a maximum of five years in a secure manner in the Health department at the University of Bath. Only the researcher and her supervisory team (Dr Sean Cumming and Dr Anne Haase) will have access to the data.

It is your decision if you would like your child to participate in this research study. If you are happy for your child to participate, please sign and return the accompanying form. However if you would prefer that your child **does not** take part, please indicate this on the accompanying form. **Please return the form via email to the researcher (Siobhan Mitchell) directly via the contact details below or by asking your child to hand in the form to the school reception before [INSERT DATE].** If either you or your child decides to opt-out at a later date, this is perfectly acceptable. Participation in this study will not affect your child's training in any way.

If you have any questions please don't hesitate to contact me directly:

Siobhan Mitchell (Tel: 07428 636586; Email: S.B.Mitchell@bath.ac.uk).

Yours sincerely



Siobhan Mitchell

PhD Candidate, Department for Health, University of Bath

For the attention of Siobhan Mitchell - University of Bath

School:

Name of Student

UNIVERSITY OF BATH RESEARCH PROJECT

CONSENT FORM

Please select the relevant box:

I do not give consent for my child to participate

I do give consent for my child to participate

If you **do** give your consent, by signing this form you confirm the following:

- I consent to my child taking part in this study.
- The interview procedure has been fully explained to me. I am clear about the purpose and potential benefits of the interview.
- I have had answered any questions I have about the study.
- I am aware of any possible risks involved in this interview and these risks have been explained to me. I understand that every effort will be made to minimise these risks based on information that I have provided and observations carried out by the researcher throughout the interview.
- I understand that my child is free to withdraw from the study/interview at any time without necessarily giving a reason.
- I understand that this project has been reviewed by, and received ethics clearance through, the Research Ethics Approval Committee for Health of the University of Bath
- I understand who will have access to personal data provided and the anonymity and confidentiality of this data has been explained to me.

Parent/Guardian signature: _____.

Date: ____ / ____ / ____

Researcher signature: _____.

Date: ____ / ____ / ____.

THE FOLLOWING ARE ADDITIONAL DOCUMENTS THAT WILL BE USED DURING THE RESEARCH INCLUDING INFORMATION AND CONSENT FORMS FOR STUDENTS WHICH WILL BE GIVEN OUT AT THE TIME OF SURVEYS/INTERVIEWS AND THE SURVEY AND INTERVIEW QUESTIONS.

PARTICIPANT INFORMATION (STUDENTS SURVEY)



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What is the study about?

As part of my PhD research at the University of Bath I am interested in the experiences of students in vocational dance training. I am particularly interested in experiences of maturing within the context of vocational dance training and how different learning experiences are managed.

What does taking part involve?

- You will be asked to complete a short 6 question survey which will take you around 5 minutes to complete.
- The survey will ask questions relating to your maturation, such as whether or not you have had a growth spurt.
- You will need to provide your name as part of this survey, but only the researcher will have access to this. Your name will only be used to contact you if you are invited to be interviewed.
- Your answers to the survey will be kept completely confidential and will not be shared with anyone at the school or with your parents. You have the right to access to your own data should you wish to.
- After the survey, several students will also be invited to participate in a short interview. It is you and your parent/guardian's choice whether or not you would like to take part in an interview and you will be provided with more information about the interview to help you to decide.

Is it confidential?

Your answers to the survey will be kept confidential and will not be shared with anyone at the school or with your parents. Only the researcher and her supervisory team (Dr Sean Cumming and Dr Anne Haase) will have access to your survey.

Who can participate?

Female dancers age 11 - 17 who are in vocational dance training.

How can I participate?

The survey can be completed during school time, but will not interfere with your training. You will have the opportunity to ask questions before taking part and the researcher will also be present should you have any questions after completing the survey. Your participation in this survey is completely voluntary, you can withdraw from the project at any time without any implications.

Who is 'the researcher'?

Siobhan is a PhD student from the University of Bath, you will be introduced and have the opportunity to ask any questions about the research before the survey takes place. Siobhan can be contacted via: S.B.Mitchell@bath.ac.uk

Any questions I have about the research have been answered and I understand what is involved in taking part. In signing this form I consent to taking part in this research:

Signature of participant Date:.....

**PARTICIPANT
INFORMATION (STUDENTS
INTERVIEW)**



UNIVERSITY OF
BATH



What is the study about?

As part of my PhD research at the University of Bath I am interested in the experiences of students in vocational dance training. I am particularly interested in experiences of maturation in the context of vocational dance training and how different learning experiences are managed.

Name of researcher: Siobhan Mitchell (S.B.Mitchell@bath.ac.uk)

Research Supervisors: Dr Sean Cumming (S.Cumming@bath.ac.uk)

Dr Anne Haase (Anne.Haase@bristol.ac.uk)

What does taking part involve?

- You will be asked to take part in a short (30 - 40 minute) interview about your experiences in dance. Interviews will take place over the course of a school week.
- The interview questions will be based around your experiences in dance and how you manage different experiences.
- Audio recordings of the interviews will be taken for the purpose of transcription. You have the right to access your own data should you wish to.
- Full anonymity will be given - names, any identifying information and all your responses will be made anonymous and your responses will not be shared with anyone at the school or parents.
- Your responses will be confidential except under the following circumstances: if you disclose information which suggests that you are at risk (of harm to yourself or others), the policies of the school will be followed, with the identified member of staff to follow up. Only the researcher and her supervisory team (Dr Sean Cumming and Dr Anne Haase) will have access to the data.
- Participation in this study is voluntary and you are free to withdraw from the study at any time. You can stop the interview at any time without any implications and are free to refuse any questions which you do not wish to answer. If you feel upset or unhappy at any point the interview will be stopped immediately.

Who can participate?

Female dancers age 11 - 17 who are in vocational dance training.

How can I participate?

Interviews will take place during school time, but will not interfere with your training. You will have the opportunity to ask questions before taking part and the researcher will also be present should you have any questions before or after the interview. Your participation in the interview is completely voluntary, you can withdraw from the project at any time without any implications.

Who is 'the researcher'?

Siobhan is a PhD student from the University of Bath, you will be introduced and have the opportunity to ask any questions about the research before the interview takes place. Siobhan can be contacted via: S.B.Mitchell@bath.ac.uk

Any questions I have about the research have been answered and I understand what is involved in taking part. In signing this form I consent to taking part in this research:

Signature of participant Date:.....

COPY OF SURVEY AND INTERVIEW QUESTIONS

Initial Survey

Student Name:

Date of Birth:

School Year:

What is your height (centimetres)?

What is your weight (kilograms)?

1. Would you say that your growth spurt in height has not yet begun, has barely started, is definitely underway, or does growth seem completed? (spurt = more growth than usual)

1	2	3	4
No	Yes (barely)	Yes (Definitely)	Seems Complete

2. And how about the growth of body hair? Would you say that your body hair has not yet started growing, has barely started growing, or does growth seem completed? (body hair = underarm or pubic hair)

1	2	3	4
No	Yes (barely)	Yes (Definitely)	Seems Complete

3. Have you noticed any skin changes, especially pimples?

1	2	3	
No	Yes (barely)	Yes (Definitely)	

4. Have your breasts begun to grow?

1	2	3	4
No complete	Yes (barely)	Yes (Definitely)	Development seems

5. Have you started your period?

1	2	3	
No	Yes (barely)	Yes (Definitely)	

IF YES:

5a. What was the date of your first period?:

Year Month

5a1. If you don't know the date, how old were you?

Age

6. Do you think your development is earlier or later than most other girls your age? (please circle)

1. Much earlier
2. Somewhat earlier
3. About the same
4. Somewhat later
5. Much later

**Adapted from Pubertal Development Scale; Petersen, Crockett, Richards, & Boxer (1988).
A self-report measure of pubertal status: Reliability, validity and initial norms.**

Interview Schedule/Questions

The data collection consists of a short, semi-structured interview around 30-40 minutes. As such, the schedule of questions will act as more of a guideline than a set – the interview will be largely participant led in order to elicit a true understanding of the topic from their perspective.

Prior to the interview commencing all information about the study and what it involves will be repeated to ensure understanding on the part of the participant. The term maturation will also be defined in order to ensure participant understanding.

The interview will begin with simple ice-breaker questions e.g. How did you first get into dance?

1. Do you think there's an 'ideal body' to have for ballet? Can you describe it?
2. Everybody as they grow up goes through something called puberty – this is where you change from being a girl into a woman. As ballet dancers when you go through puberty do you think it's seen as a good or bad thing? Helpful or not helpful for ballet?
3. People go through this process of puberty/maturing at different times, do you feel like you are early, average or late in terms of your development? And compared to your peers? Why?
4. Do you feel your body is changing at the moment? How do you feel about these changes/lack of?/For older – how did you feel about those changes at the time/how do you feel now you've gone through those changes? Positive/negative? Why?
5. How do you feel about physical changes/lack of in comparison to your peers?
6. How do you think others feel about changes/reaction to changes?
7. How do you feel about these changes within the context of your ballet training (aesthetic/functional/psych/social etc)? Have they changed anything – positive/negative?
8. How do you feel these changes affect(ed) you? Socially/physically/psych e.g. confidence etc.

Thinking of your environment, peers and teachers...

9. What are the sorts of things which make you feel positive about physical changes? Can you explain why?
10. What are the sorts of things which make you feel negative about physical changes? Can you explain why?

11. How do you manage any negative feelings about these changes or challenges that come with these changes? What is your response? What do you do to cope?

RESOURCES

The Challenge of the Adolescent Dancer

by the International Association for Dance Medicine and Science
www.DanceEducation.org



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The adolescent growth spurt often occurs just as dance students are committing to career paths and increasing the intensity of their dance training. During the growth spurt enormous physical, psychological, and social changes correspond to a time when the young dancer is very vulnerable. Sudden increases in height and decreases in muscle strength and coordination are compounded by dramatically fluctuating hormone changes. Taken together, these changes can overwhelm both male and female teenagers.

Choices made during the adolescent growth spurt can have a profound impact on a dancer's professional development and long-term health. Parents, teachers, and the young dancers themselves all need to be aware of the following: physiological changes, psychological issues, nutritional considerations, and the need for training modifications.

Physiological Changes During the Adolescent Growth Spurt

During the adolescent growth spurt, physiological changes include increased height, increased body mass, increased arm and leg length, and changing proportion of limb to torso length. As the nervous system struggles to keep up with these muscular and skeletal changes, the dancer experiences fluctuations in coordination and balance.

The long bones of the arms and legs grow prior to the trunk, challenging the stable torso required in dance classes. This growth can also be asymmetrical, with one arm growing more rapidly than the other. Since the muscles often do not lengthen as fast as the bones, strength and flexibility can decrease. Growth plates at the ends of bones can be vulnerable to injury, particularly in areas such as the knees where strong tendons attach.

The age of onset, length and pace of the growth spurt are all highly individual. The growth spurt usually takes place at ages 11 to 14 (sometimes earlier for

girls and later for boys) and can last 18 to 24 months. While some youngsters grow slowly and may notice no dramatic changes, others can grow as much as one centimeter or more in a month.

As one might imagine, these complex physical changes can have a significant effect on dance abilities. Many students will experience an overall decrease in technical skill and control. Specifically, a young dancer may notice a decrease in strength and flexibility, resulting in lower leg extensions. Decreased coordination and balance often make pirouettes and long balances difficult. The increased length of the legs in relation to the spine challenges the student's ability to maintain proper (neutral) alignment of the pelvis and torso. As technical control decreases, the risk of injury increases.

Psychological Issues

The adolescent dancer in a fast paced growth spurt is coping with rapid changes in his/her world. The combined pressures of dramatic hormone fluctuations and a perceived decrease in ability can make this an emotionally challenging time. Unless he or she is well informed, the student dancer is likely to feel a loss of confidence in dance ability and a corresponding decrease in self esteem, compounded by being unable to perform at a level that was previously taken for granted. This in turn can be perceived as a loss of talent, especially when fellow students appear to be improving. Changes in body shape and size may also challenge a dancer's positive self-image, particularly in a dance environment that values a slender physique.

The young dancer should be informed that this is a temporary rather than a permanent state, and that the previous ability will return once the body has begun to catch up with the growth rate. The dancer also needs to understand the lengthy time frame of the growth spurt and accept that this process may last a year or more. Teachers and parents can boost the dancer's confidence and morale by acknowledging the student's

efforts and maturity, providing a positive perspective while reinforcing the need for patience.

Nutrition: Avoiding the Female Athlete Triad

Recent research suggests a relationship between exercise levels, nutrition, hormone levels, and bone density. Adolescent dancers, like all physically-active young women, are at risk for developing the Female Athlete Triad, a syndrome comprised of disordered eating, amenorrhea (absence of menstruation), and osteoporosis (loss of bone density). Emphasis on low body weight as a prerequisite for success as a professional dancer can encourage the eating disorders linked to the Female Athlete Triad. This syndrome may have long-term health ramifications, with a chronic energy deficit or disordered eating contributing to amenorrhea, which in turn may lead to reduced bone density and early onset of osteoporosis. Young dancers should be educated about healthy eating habits and encouraged to pursue a healthy lifestyle to improve and prolong their dance careers.

Suggested Class Modifications

Teachers can accommodate the adolescent growth spurt in their classes by modifying the class content and structure on an individual basis, making the class less physically stressful. This period can be used to consolidate technical understanding, enhance artistry, learn about the body and work on individual needs.

Sections of the class that should be limited include impact work such as jumps, pointe work in the center on one leg, challenging lifts in partnering classes, kneeling sequences in modern and jazz classes, and other movements that stress the knees, such as grand pliés.

Other aspects of class can be expanded. Teachers can focus the student's attention on trunk and pelvis stabilization through postural corrections, facilitating a deeper kinesthetic awareness. Attention to trunk control in classes may produce the dual benefits of minimizing injury while establishing good movement patterns. Similarly, spending time on developing proprioceptive skills (awareness of the position and motion of the body in space) through simple exercises will have long-term benefits. Body conditioning techniques are especially useful at this time as they can be non-weight bearing and executed during class.

The challenge for the dance teacher is to continue

the dance class as normal for the majority of students while accommodating those in a growth spurt. Teachers should encourage students to modify their participation on an individual basis and provide alternative forms of class participation, such as floor barres and supplemental conditioning techniques aimed at muscular control rather than excessive flexibility. Teachers also might postpone high profile competitions or examinations during this time to lessen the pressure on the young dancer.

Medical Support

It is important that dance students have access to informed medical advice during the adolescent growth spurt. A screening program may help to identify problem areas and prevent injuries; physical therapists or other exercise specialists can design preventive and rehabilitative personal exercise programs. Medical practitioners should work collaboratively with teachers and students to establish a team approach. The research work of dance medicine and science professionals should be shared with dance teachers and students in a way that is applicable to daily training.

Summary

Physiological changes associated with the adolescent growth spurt can temporarily diminish a dancer's technical proficiency and increase vulnerability to injuries. The loss of technique in combination with normal adolescent emotional challenges can lead to lack of confidence and low self-esteem. Adolescent dancers should be encouraged to learn about their changing bodies while trusting that they will regain their technical control and resume their progress once the growth spurt has ended. Teachers can support their students during these challenging times by providing flexible individual class modifications and encouraging healthy nutritional habits. Parents should be provided with information about the changes that occur during the growth spurt and encouraged to supply a supportive environment at home. Health care practitioners should work in collaboration with dance teachers, students, and their parents to build a bridge between the science and art of dance.

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Appendix F – Study 4 Participant details, individual participant themes, clustering and cross case analysis, and final themes

Participant details

EM1	
Age (years)	11
School	1
Height (cm)	164
Weight (kg)	55
BMI	20.4
Age of menarche	n/a
PDS average/Category score	2/7 mid-pubertal
Self-perception of timing	A little earlier

EM2	
Age (years)	14
School	1
Height (cm)	173
Weight (kg)	-
BMI	-
Age of menarche (age, month)	12, December
PDS average/Category score	3.4/11 post-pubertal
Self-perception of timing	A little earlier

EM3	
Age (years)	17
School	1
Height (cm)	161
Weight (kg)	51
BMI	19.7
Age of menarche (age, month)	12, June
PDS average/Category score	3.8/12 post-pubertal
Self-perception of timing	A little earlier

EM4	
Age (years)	16
School	1
Height (cm)	172
Weight (kg)	53
BMI	17.9
Age of menarche (age, month)	10
PDS average/Category score	3.6/12 post-pubertal
Self-perception of timing	A little earlier

EM5	
Age (years)	11
School	3
Height (cm)	161.5
Weight (kg)	-
BMI	-
Age of menarche (age, month)	10
PDS average/Category score	2.8/6 late puberty

Self-perception of timing	A little earlier
EM6	
Age (years)	13
School	3
Height (cm)	165
Weight (kg)	48
BMI	17.6
Age of menarche (age, month)	11, January
PDS average/Category score	3/6 late puberty
Self-perception of timing	Much earlier
EM7	
Age (years)	17
School	3
Height (cm)	169.8
Weight (kg)	53.8
BMI	18.6
Age of menarche (age, month)	11, May
PDS average/Category score	3.4/7 late puberty
Self-perception of timing	Much earlier
EM8	
Age (years)	14
School	2
Height (cm)	168
Weight (kg)	48
BMI	17
Age of menarche (age, month)	12, July
PDS average/Category score	3.4/7 late puberty
Self-perception of timing	About the same
EM9	
Age (years)	12
School	2
Height (cm)	155
Weight (kg)	41.3
BMI	17.2
Age of menarche (age, month)	12, April
PDS average/Category score	3.2/6 late puberty
Self-perception of timing	About the same
EM10	
Age (years)	16
School	2
Height (cm)	-
Weight (kg)	50
BMI	-
Age of menarche (age, month)	12, January
PDS average/Category score	3.2/8 post-pubertal
Self-perception of timing	About the same

Participant themes and sub-themes

Themes EM1
<p>Being exposed</p> <ul style="list-style-type: none"> • Self-consciousness • Standing out • Being different • Peer comparison • Need to conform/make or break
<p>Struggling and coping</p> <ul style="list-style-type: none"> • Peer support • Wide support network - access to and ability to utilise • Supportive environment • Pushing through • Getting on with it • Demands of being a dancer
<p>Escape</p> <ul style="list-style-type: none"> • Dance as an escape • Escape from dance – withdrawing from peers • Social benefits

Themes EM2
<p>Being different</p> <ul style="list-style-type: none"> • Importance of being the best • Self-critical/self-comparison • Peer comparison
<p>Adult roles and expectations</p> <ul style="list-style-type: none"> • Pressure to grow up quickly - mental readiness • Asynchrony between physical/emotional maturity • Getting on with it
<p>Puberty as normal/positive</p> <ul style="list-style-type: none"> • Perspective - social norms • Perception • Being different is okay/normal • Distance and perspective • Acceptance of change - puberty as inevitable • Being different • Accepting change • Support <p>SUB-THEMES: Accepting change, perspective and support</p>
<p>Physical injury</p> <ul style="list-style-type: none"> • Practical challenges
<p>Escape</p> <ul style="list-style-type: none"> • Dance as an escape • Balance

Themes EM3
<p>Getting on with it</p> <ul style="list-style-type: none"> • Self-reliance and responsibility • Adult roles • Resilience • Growing up quickly • Developing independence • Escape
<p>Puberty as negative</p> <ul style="list-style-type: none"> • Physical injury/pain • Breast development • Realities of dance training environment
<p>Being under a microscope</p> <ul style="list-style-type: none"> • Peer comparison • Being exposed • Self-consciousness
<p>Acceptance</p> <ul style="list-style-type: none"> • Adjustment of expectations • Constant physical and mental adjustment • Perspective/time • Questioning of norms • Support • Self-awareness • Positive outlook - silver linings • Taking your time

Themes EM4
<p>Being different</p> <ul style="list-style-type: none"> • Being out of synch - coping alone • Lack of peer support/understanding • Self-consciousness • Disconnect with peers • Developing self-reliance/independence • Social exclusion • Lack ability to access peer support/preferring support from adults • Learning to cope/developing confidence • Adult role within friendship groups • Peer comparison • Adult role - perception/treatment • Self-reliance
<p>SUB-THEME: Coping alone</p> <p>Benefits of maturity /Advantages of Early maturation</p> <ul style="list-style-type: none"> • Being 'grown up' • Benefits for physique - muscle • Mature body a positive - muscle • Learning and adapting/growing • Developing cog maturity • Mature outlook - benefits of struggling • Confidence associated with pubertal events/physical change • Benefits for strength and emotional maturity for dancing

- Mature body and mind
- Positive outlook/prepared
- Prepared for next step
- Maturing as a dancer (cognitive/emotional benefits)
- Advantages of early maturation
- Time to adjust
- Perspective
- Developing independence
- Puberty as positive
- Self-awareness
- Proactive attitude towards independence
- Clear pathway

SUB-THEMES: Physical and functional benefits, Psychological benefits (being prepared), Time to adjust, benefits for performance

Getting on with it

- Practical mentality
- Physical and functional challenges
- Family support
- Amplified challenges of dance environment
- Supportive environment
- Parental support
- Pain of dancing/pains of puberty
- Control

SUB-THEMES: Importance of support, physical and functional challenges

Themes EM5

- **Getting it out of the way**
- Early maturation positive 'getting it out of the way'
- Advantages of Early Maturation
- Physical challenges associated with growth spurt

SUB-THEME: Advantages of early maturation

Negative responses/reactions

- Negative attention
- Lack of peer support
- Negative perceptions and responses from significant others
- Being different as negative
- Being singled out
- Not conforming
- Social exclusion
- Being different
- Early maturation as a taboo in ballet
- Breast development - key difference

SUB-THEMES: Lack of support/being alone, negative responses

Support - reassurance and understanding

- Older friendship groups
- Reassurance from teachers and some peers
- Perspective/understanding

Themes EM6

Getting it out of the way

- Advantages of Early Maturation
- Physical injury
- Adjusting and accepting
- Awkwardness, pain, embarrassment
- Getting it over with
- Unknown/known outcomes
- Importance of recognising progress
- Frustration
- Developing independence

SUB-THEMES: Advantages of early maturation

Visible change

- Peer comparison
- Importance of extent of changes
- outcomes of puberty make or break
- Visible differences as key (breast development/height)
- Being out of synch
- Being alone

Feeling supported

- Parental support
- Peer support
- Support

Themes EM7

Importance of visible changes

- Genetically lucky
- Visible development key (breast development/height)
- Lack of peer understanding
- Being exposed
- Outcomes of puberty make or break
- Being 'grown up' from a young age
- Vulnerability/withdrawing

SUB-THEMES: Puberty as make or break, being exposed

Getting on with it/coping

- Peer support group – Early maturing individuals
- Pain and injury
- Peer and pastoral support
- Peer support
- Getting on with it - resilience
- Adjustment
- Adjusting and adapting
- Time to adjust
- Quick to adapt
- Self-awareness
- Developing independence

SUB-THEMES: Peer support, Time to adjust

Themes EM8

Being in synch

- Being in synch - key to positive adaptation - perception
- Perception related to mixed peer groups
- Wider perspectives
- Acceptance
- Peer support - in synch
- Exposure to variety of opportunities and experiences
- Perception of timing - wide perspective
- Understanding and support
- Genetically lucky - enables to feel in synch?
- Diverse social groups
- Peer comparison

SUB-THEMES: Peer comparison, understanding and support

Getting on with it

- Adjusting and adapting
- Importance of recognising progress
- Parental support
- Sink or swim - adapting quickly
- Advantages of Early Maturation

SUB-THEMES: Advantages of early maturation, Adjusting and adapting

Themes EM9

Being exposed

- Functional challenges of growth spurt
- Reference point in ballet
- Self-critical

Being 'normal'/different perspectives

- Perception of timing as 'normal'
- Older peer group
- Feeling 'normal'
- Peer comparison
- Wide friendship group - 2 different social worlds
- Different perspectives on changing body - ballet context/school context - conflicting
- Not conforming to ideals
- Avoiding peer comparison
- Benefits of staying small - aesthetic/performance

SUB-THEMES: Puberty as normal, importance of perspective

Benefits of maturity

- Value of maturity (cognitive/emotional) in the profession
- Importance of technique over aesthetic
- Self-assured and unphased

Themes EM10

Adjusting and adapting

- Positive mental outlook
- Adjusting and adapting
- Practical considerations
- Acceptance - puberty as normal
- Time to adjust - feeling prepared
- Professional mind-set/approach
- Determination/motivation
- Self-assured
- Well adapted
- Strong willed/determined
- Mature attitude

SUB-THEMES: Time to adjust

Benefits and challenges of early maturation

- Genetically lucky/favourable sequence of changes
- Lack of peer support/understanding
- Time to adjust - feeling prepared

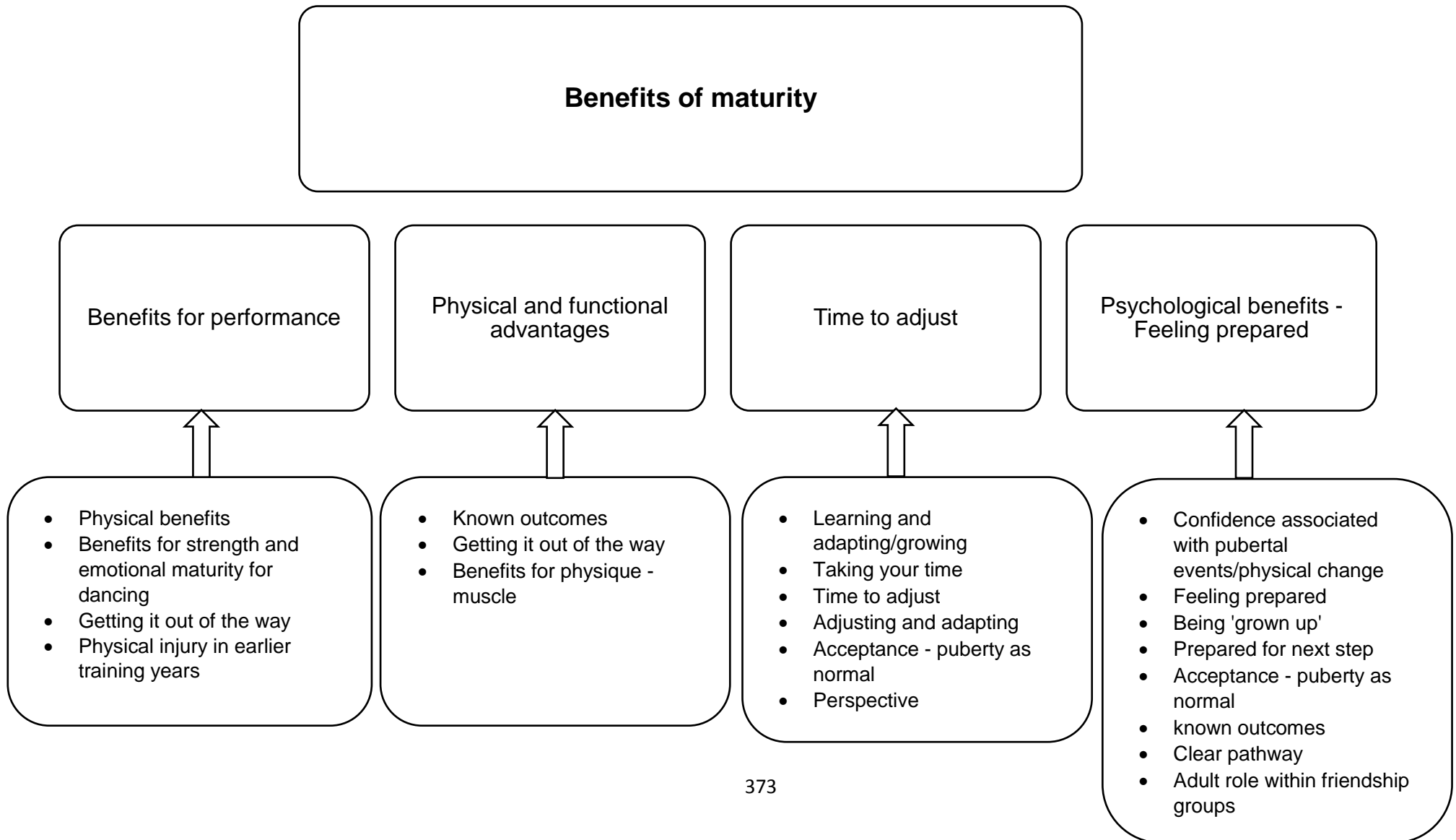
Being exposed

- Being viewed/on show
- Aesthetic of key importance
- Breast development as negative

Importance of context

- Different social worlds - context as key
- Benefits of later specialisation
- School - puberty as normal
- Dance as an escape

Clustering: Themes from cross case analysis



Functional and aesthetic challenges

Physical pain and injury

- Physical injury/pain
- Awkwardness, pain, embarrassment
- Frustration
- Getting on with it - resilience

Physical growth and development

- Practical challenges
- Functional challenges of growth spurt
- Physical and functional challenges
- Overcoming challenges

'Being under a microscope'

- Peer comparison
- Physical change and breast development
- Being exposed
- Self-consciousness
- Puberty as negative
- Being viewed/on show
- Aesthetic of key importance

Being different

Importance of visible changes

- Importance of extent of changes
- Self-consciousness
- Standing out
- Peer comparison
- Visible differences as key (breast development/height)
- Self-critical/self-comparison
- Perspective - social norms
- Adult role - perception/treatment
- Amplified challenges of dance environment
- Negative perceptions and responses from significant others
- Being different as negative
- Early maturation as a taboo in ballet

Coping alone

- Lack of peer support/understanding
- Developing independence
- Resilience
- Social exclusion
- Getting on with it
- Being out of synch - coping alone
- Disconnect with peers
- Developing self-reliance/independence
- Lack ability to access peer support/having to access support from adults
- Learning to cope/developing confidence
- Vulnerability/withdrawing

Learning to cope

Importance of support

- Wide support network - access to and ability to utilise
- Supportive environment
- Family support
- Parental support
- Older friendship groups
- Reassurance from teachers and some peers
- Peer support group – Early maturing individuals
- Peer and pastoral support
- Perception related to mixed peer groups
- Wider perspectives
- Understanding and support

Accepting or adjusting

- Constant physical and mental adjustment
- Puberty as normal/positive
- Being different is okay/normal
- Acceptance of change - puberty as inevitable/normal
- Adjustment of expectations
- Perspective/understanding
- Adjusting and adapting
- Perception of timing - wide perspective
- Sink or swim - adapting quickly
- Avoiding peer comparison

Final themes

Table d. Benefits of early maturity

Sub-theme	Qualitative evidence
<i>Benefits for performance</i>	<p><i>Okay. I feel like it's really helped me because, like I said, with the people who are going through it now, it's harder for them. I think everyone in our Year will have gone through it last year, but it's still quite fresh. I've gone through that at a dance age when it wasn't crucial in my dance which is really beneficial because now I'm used to it and I know how to deal with things. If it's an important show or audition, I know how to deal with it if I've got bad tummy cramps, or if I'm on my period in an audition...So, I've learnt all of the skills which I need at this crucial point, so that's really helped. I think muscle definition and maturing, and things, all adds up. EM4 (age 16) p.16 line 528-536</i></p> <p><i>In year 9 we have our big appraisal and that's quite an important appraisal. It's where we either get assessed out or we can stay for the next few years. So the reason I think it's quite good at the moment that I'm growing now is because I'm getting it over and done with. I'm having all my injuries now because of my growth and so hopefully I won't have them in year 9 because I've started so early. So that's quite positive about that...Especially when I get to year 11. EM6 (age 13), p.8. line 263-270</i></p> <p><i>It's probably easier to go through it earlier, because then by the time you are coming up to auditions, you have finished your growing, and you can get ready for that without worrying, "Am I going to grow again? Will everything still fit [laughter]?"...I feel... yes, it has worked that way for me. EM8 (age 14), p.4 line 97-100</i></p>
<i>Physical and functional advantages</i>	<p><i>I think that it's a positive thing because you develop muscle and you develop a body shape like a woman. Also, you need to know where your arm starts and finishes at times like that because when you're constantly growing you don't know where anything is. EM4 (age 16), p. 3 line 71-76</i></p> <p><i>I think, for dance, it was good for me because obviously developing a mature body from a young age is good because then you can develop muscle, and things like that. There was the dance side and there was the normal side. The normal side was difficult, but the dance side was okay. EM4 (age 16), p.6 line 195-198</i></p> <p><i>...Some people that are small at the moment in my class have got the flexibility now but they might not have it later when they grow. EM6 (age 13), p.3 line 68-70</i></p> <p><i>Starting late it means you don't know what your body's going to be like...Well there are a couple of girls who are worrying about what they're going to look like and stuff but not that many people. Some people are, kind of, happy that they haven't started yet but they don't really realise what's going to happen because they haven't, kind of, started so yes...It feels like a good thing but it ended up not being that good. EM6 (age 13), p.8-9 line 272-280</i></p>

	<p><i>I think it's a positive thing at the moment because I know what my body is changing into now, so then when it comes to, like, feeling like all my muscles are growing now rather than later because then I could have more problems when I'm older, if that makes sense? EM6 (age 13), p.3 line 80-86</i></p>
<p><i>Time to adjust</i></p>	<p><i>...it's allowed me to learn how to cope with it, to be able to use it to my advantage... Yes, everyone else is around me saying, "Oh, this . . ." and I'm, like, I've totally gone past that, I'm fine now. EM4 (age 16), p.3 line 89-94</i></p> <p><i>Now that I'm at this age — and this is the crucial age for going away to university — and I'm not going through that right now. I think that helps because then I'm not sensitive to what's happening. I can just go in for my auditions and if I'm on my period in my audition, I know how to deal with it, and things like that. It's nice to know how to deal with all of that. EM4 (age 16), p.4 line 121-135</i></p> <p><i>In terms of dance it gives you a chance to get used to it; just to give a chance to your body, to get used to it, and just get in the habit that things are going to happen every month, or anything EM10 (age 16), p.4 line 160-163</i></p>
<p><i>Psychological benefits - Feeling prepared</i></p>	<p><i>I think the, sort of, confidence thing has only really come recently but I think that's just a growing up thing. I think everyone's always going to go through that stage. I'm getting better now at, sort of, telling myself to not look at other people. To just focus, because at the end of the day what they can do and what they can't do doesn't make a difference on what I can do, so there's no point in acknowledging it in any influence to my training or whatever but I think when it first starts it does knock your confidence a lot. EM3 (age 17), p.7 line 192-200</i></p> <p><i>I guess I'm kind of happy that I dealt with it a younger age, and now when anything ever happens I kind of just deal with it. And I've definitely learnt ways to control my emotions, particularly at a boarding school, and with dancing as well if I'm feeling pretty rough on a certain day, I know my limits as well. I've learnt along the way... More than my friends did particularly, because I got over it. The first six months was my hardest and then I was fine. My friends at a normal school, it took them a lot longer as well. I was just quite quick at that, I don't know. EM7 (age 17), p.4, line 181-189 EM7</i></p> <p><i>That I don't have to worry about still growing up, and being tall because all of the other girls there, they still have to grow and they don't know how tall they are going to get but I get that I probably won't grow anymore. Um, better in a way, because then I know, like I am not going to grow anymore so like I said, I don't need to worry about it. EM5 (age 11) P.8 line 230-240</i></p> <p><i>...I think I'm more prepared now. Sixteen, you're already all into it; that's the centre part of you being a teenager, I think, and, yeah, I'm pretty prepared, I'm fine with it. EM10 (age 16), p.4 line 168-178</i></p>

Table e. Functional and aesthetic challenges

Sub-theme	Qualitative evidence
Physical injury and pain	<p><i>I've always had really tight quad muscles because my legs tended to grow first which made me have sore knees because my kneecaps were always really pulled up. EM3 (age 17), p. 7 line 204-207</i></p> <p><i>...when I was having my massive growth spurt I was in so much pain just on one side, and that definitely held me back a lot from improving, and getting my technique to where it should be. EM7 (age 17), p.7 line 340-342</i></p>
Physical growth and development	<p><i>I always think, with flexibility, when people are smaller they have less weight. Like, we were told to lift up last week — if you've got longer legs and heavier bones, it's harder. So you always look less flexible than everyone else. I'm not really un-flexible, but I'm not as flexible as a lot of other people in my year because of how long my legs are, and weight and stuff...Also, with my weight, I'm really, really heavy but I'm not really fat...Yes, I'm just really tall and heavy bones and everyone else is just really slim. EM1 (age 11), p.4 Line 104-112</i></p> <p><i>...I hated it. I hated it. As soon as, like, boobs started to grow and stuff I really didn't like it and, no, it was horrible...I think it was generally because... I think it's, like, the figure, because that was probably about fourth year so I still thought that the body of a twelve year old was how it was supposed to be forever and I was like, "What the Hell is this?" but then, I don't know, I just really didn't like it and started to put on weight other places as well and it just wasn't nice. EM3 (age 17), p.5 line 113-120</i></p> <p><i>I think, flexibility-wise — there was a point in time in that my flexibility . . . I'd got a lot tighter and I was like, "What is going on? How can I change this?" But there was nothing that I could do really. I think it was just that I felt bad when I was dancing because I thought, "Oh God, I look rubbish compared to everyone else." But it was just that time of the month and you can't really do anything about it. EM4 (age 16), p.9 line 291-295</i></p> <p><i>The teachers have said before, like if you had a growth spurt, because you don't know where to put your arms and everything. EM5 (age 11), p.5 line 127-128</i></p> <p><i>Because you're growing and some people weren't, I'm quite tall in my year and I'd feel definitely like a giant compared to my friends. Also, even if I wasn't growing outwards, I would feel like I was so I didn't particularly like being at the front, and even some movements I just didn't want to do. Because I'm meant to look pretty, I didn't feel good in myself in that way. EM7 (age 17), p.9, line 431-434</i></p>
'Being under a microscope'	<p><i>If you're doing something, like an exercise in ballet, and you have to look at yourself to make sure you look okay, sometimes you can feel self-conscious EM1 (age 11), P.2 Line 39-41</i></p> <p><i>It's stuff like being in a leotard and tights and you feel bloated, it's like, "Whoa" and then it's like you're under a microscope more, sort of thing, like it wasn't really anything I'd ever thought about before you came here and it becomes a bit more, like, at the front of what you are thinking about. EM3 (age 17), p.4 line 97-103</i></p>

	<p><i>I think it's maybe sometimes more challenging in a dance environment because you're wearing a leotard and tights and you look at yourself in the mirror every day. It's more difficult to, kind of, hide. EM4 (age 16), p.5 Line 140-142</i></p> <p><i>More difficult than going through the changes out of dance because there are so many other things, like having to wear leotards and tights – more to worry about and stuff. I don't really know. People can criticise you more if, in the dance world. EM9 (age 12), p.8 line 244-246</i></p>
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Table f. Being different

Sub-theme	Qualitative evidence
Importance of visible changes	<p><i>Through primary school I was always a giant compared to everyone else. I was head and shoulders taller than everyone. I think it was quite hard for me to be so much taller than everyone. I don't know . . . I felt really self-conscious with that, which was a shame. But now I've levelled off with people in my Year and I'm not so much a giant. But, yes, I was always the giant in primary school. EM4 (age 16), p.6 line 190-194</i></p> <p><i>Well I think it's harder here because of a dancer's body, like, you use your dancer's body so some of us end up growing the wrong shape. And then because, like, everybody here wants the dancer's body so then it might take more advantage. People could take advantage of it because at normal school, like, everybody's doing it with you it's, kind of like, there's more people with you. Here it's different because we're not doing normal things like other people. So in that way, yes. EM6 (age 13), p.9-10 line 307-313</i></p> <p><i>One of my friends in Year 9 was assessed out because she had bigger boobs than everyone and in Year 9 you're quite young still...And that was very difficult for her. EM7 (age 17), p.3 line 107-112</i></p> <p><i>Sometimes I feel good about it, and sometimes I feel bad about it...Probably because of my growth spurts, like I was saying before, I won't grow any more...Well, not here but sometimes other places I get bullied for being more mature than everybody and everything...Sometimes people have cringed...And laughed. EM5 (age 11), p.3-4 line 84-100</i></p>
Coping alone	<p><i>Negatives, probably is that I started really young and it was hard and I didn't know what to do, and no-one around me was going through the same thing so I couldn't talk to anyone about it. It was more teachers — which I didn't want to know about it. EM4 (age 16), p.4, line 126-129</i></p> <p><i>Normally, I would just deal with it then, and then I go home and cry. That's what I have been told to do, pretty much. EM5 (age 11), p.6 line 171-172</i></p> <p><i>Yes. Although some of the girls still like, it's got back to me by my friends that, they have been gossiping and saying that I am, I don't know, just talking about the way I have grown up. EM5 (age 11), p.6 line 175-177</i></p>

To be honest, when I first started going through it, I felt quite alone because no-one else around my age was having to deal with that. When I was younger in primary school, I had to tell teachers and stuff because, obviously, I was the only one in that Year it had happened to. EM4 (age 16), p.4 line 100-106

Table g. Learning to cope

Sub-theme	Qualitative evidence
Importance of support	<p><i>In a way, easier, because the group of people here are a lot closer friends; that we do talk about everything with one another. Everything's quite open, whereas at my old school and with my old friends I can tell there's stuff, like, I wouldn't talk to them about because it's just different. I think because of the environment we notice things more to do with growth and development and stuff so, yes, and especially because you do talk to people in older years as well which is nicer to, sort of, be able to talk to people who've gone through it and know that you come out alive the other side. [Laughter]. EM3 (age 17), p.8 240-247</i></p> <p><i>Well we have our guardian angels when we arrive...A girl in the older year. So they, like, write to you and everything and my guardian angel, I knew her from home so I'd go and see her and stuff. And then in the beginning of year 8 I shared with a new girl in year 9 and she came and I shared with her and when I was upset or anything she always used to, like, help me. I sometimes go to her or I just phone my mum and stuff or we go to house parents and your house parents help quite a lot. EM6 (age 13), p.6-7 line 199-206</i></p> <p><i>I just sort of try to learn from everything that I've been through, like being bullied and things like that. And my Mum has always helped me through things like that and I always talk to her about my problems. She's my best friend...Yes, she's really helped me through all of these tough times. EM4 (age 16), p.12 line 395-399</i></p> <p><i>Yes, I think we just surrounded ourselves with each other. If we ever had a problem like that, we wouldn't go and talk to the smaller people because they wouldn't really understand...So, yes, we just stuck together as a group but we're all supportive of each other anyway. EM7 (age 17) p.9-10 line 454-458</i></p> <p><i>...one girl has just started her period, in my class but no one knows...Yes. She wouldn't tell anyone... We've been able to talk to each other about it... EM5 (age 11), p. 10-11, line 298-306</i></p> <p><i>Well, teachers have said to me, "Don't feel so bad about it because the other people just haven't grown up properly yet"...Because I am just earlier than them, it is going to happen to them as well. And then some friends have said that as well. EM5 (age 11), p.6 line 154-158</i></p>
Accepting or Adjusting	<p><i>It's stuff that's really unavoidable like mirrors, but obviously you need them because of dance, and the leotard and tights but again, it's the uniform, there's not really any escaping it but I think it does, sort of, almost make you grow up a little bit quicker because you have to realise you are who you are, so you've just got to get on with it, which I think is a</i></p>

big difference between the dance school pupils and some of the mainstream pupils that that tends to be the case. EM3 (age 17), p.10 319-327

I don't know. I don't think I did really cope with it. I'm still really self-conscious about it but, I don't know, I've just sort of gotten over it a bit more. I've sort of grown up in the way that I don't really care as much. It's not the right word to use...it's more that I've, sort of, accepted that there is nothing I can do about it, that I am just going to have to work with the body I've got, which is fine...Because there's people who still have...like, there's still quite a lot of people who've got ...they've still got the really skinny bodies that haven't developed yet so they're like, "Oh, I'm jealous." I'm like, "No. It's the other way around. Believe me. EM3 (age 17), p.5 line 123-134

It's trying to learn to be okay with if you're by yourself, or something. It's not a bad thing. That's what I've tried to learn. So, it's just trying to find different ways to cope with things. EM4 (age 16), p.12 line 400-404

Learning how to deal with it I definitely found quite hard. I'd go up, and my emotions were everywhere and I was so young...So I found myself getting upset so much more than my friends. Other than that, that was probably about it. Just learning to deal with everything at a young age. EM7 (age 17), p.3 line 136-142

Last year I really wasn't very good... so I literally couldn't do anything...and then because you're sitting out you do put a bit of weight on and so then when you get back to dancing you're that little bit behind. I think that's one of the things that made me, sort of, realise, well there's nothing I can do about it now so I've just got to work harder to get back to where I would have been which does definitely help...I was a lot better at it this year. I did everything I could do so I knew in my head there's nothing more I can do and just, sort of, had to wait... I think that injury last year, sort of, made me grow up and realise what's happened has happened and just you've got to do the best with what you've got. EM3 (age 17), p.12, line 378-390

**Appendix G – Study 5 Participant details, individual participant themes,
clustering and cross case analysis, and final themes**

Participant details

OT20	
Age (years)	14
School	3
Height (cm)	173
Weight (kg)	53
BMI	17.7
Age of menarche	13, October
PDS average/Category score	3.6/7 Late puberty
Self-perception of timing	Much later

OT21	
Age (years)	13
School	3
Height (cm)	157
Weight (kg)	42
BMI	17
Age of menarche	13, January
PDS average/Category score	2.2/4 Late puberty
Self-perception of timing	About the same

OT22	
Age (years)	15
School	2
Height (cm)	157
Weight (kg)	-
BMI	-
Age of menarche	13, November
PDS average/Category score	3.4/7, Late puberty
Self-perception of timing	A little earlier

OT23	
Age (years)	15
School	3
Height (cm)	-
Weight (kg)	45.6
BMI	-
Age of menarche	13, October
PDS average/Category score	3/6 Late puberty
Self-perception of timing	A little later

OT24	
Age (years)	13
School	2
Height (cm)	170
Weight (kg)	44.4
BMI	15.4
Age of menarche	13, September
PDS average/Category score	3.2/6 Late puberty
Self-perception of timing	About the same

OT25	
Age (years)	14
School	3
Height (cm)	170.6
Weight (kg)	46
BMI	15.7
Age of menarche	13, February
PDS average/Category score	2.8/4 Late puberty
Self-perception of timing	A little later

OT26	
Age (years)	16
School	1
Height (cm)	163
Weight (kg)	52.1
BMI	19.6
Age of menarche	13, August
PDS average/Category score	3.4/12 Post pubertal
Self-perception of timing	About the same

OT27	
Age (years)	12
School	1
Height (cm)	140
Weight (kg)	-
BMI	-
Age of menarche	Not yet started
PDS average/Category score	1.4/3 Early puberty
Self-perception of timing	About the same

OT28	
Age (years)	13
School	1
Height (cm)	152
Weight (kg)	47
BMI	20.3
Age of menarche	13, September
PDS average/Category score	3/10 Post pubertal
Self-perception of timing	A little earlier

Participant themes and sub-themes

Themes OT20
<p>Implications of puberty upon perceptions of physical-self</p> <ul style="list-style-type: none"> • Struggles with weight gain • Peer comparison - size • Implications of Growth and maturation - physical/size/posture/confidence • Adult shape as depressing • Negative psychological wellbeing associated with perceived womanly shape - physical changes have implications for psychological wellbeing • Challenges of dance attire • Constant self-evaluation - body image • Peer comparison - facilitated by environment <p>SUB-THEMES: Weight concerns (self-evaluation/attire), Peer comparison (environment/size), psychological implications (confidence/depression) associated with perceived size</p>
<p>Negative to positive transition</p> <ul style="list-style-type: none"> • Growth related injury • Adaptive coping strategies - facilitated by school • Challenges of growth • Acceptance • Advantages of earlier maturation - time to adjust/accept • Negative to positive transition • Being different and adjusting/accepting <p>SUB-THEMES: Being different/challenges of growth, Time to adjust/accept</p>
<p>Support</p> <ul style="list-style-type: none"> • Peer support • Teacher support/understanding • Supportive environment • Wide support network/ability to access <p>SUB-THEMES: Peer support, Teacher support/understanding</p>
<p>Perception as early maturing</p> <ul style="list-style-type: none"> • Being different physically • Advantages and disadvantages perceived with earlier maturation • Advantages associated with later maturation <p>SUB-THEMES: Being different physically, Benefits and challenges</p>

Themes OT21

Puberty as an opportunity

- Physical/functional ideals make it easier
- Injury as a motivator/opportunity for improvement
- Growth helps you to improve
- Puberty as valued experience - enables to help peers
- Puberty as opportunity to realise more ideal physique
- Experience of being alone/scared - wants to support peers
- Time to adapt/adjust - improves with time
- Adaptive/cognitively mature
- Perception as earlier than norm
- Benefits of puberty/Puberty as positive
- Helping/supporting peers increases confidence
- Personal growth - cognitive maturity/increased openness
- Perseverance/motivation

SUB-THEMES: Potential for physical and functional improvement, Puberty as a valued experience to support peers and for personal growth

Peer support

- Older peer group
- Peer support
- Positive social experience
- Coping/escape
- Balance
- Older peer group - advice/peer support
- Benefits of peer closeness/support
- Unable to attain parental support - peer support in place

SUB-THEMES: Peer closeness, Older peer group

Physical and functional implications of puberty

- Growth related injury
- Functional implications of growth - balance

Implications of earlier puberty

- Peer comparison
- Different reference groups for norms
- Feeling exposed
- Lack of peer understanding
- Self-consciousness - gender/attire
- Puberty/menstruation as scary
- Taboo around menstruation - seeking understanding/support
- Having to share personal/private info - lack of privacy in this context
- Secrecy around menstruation if early
- Being viewed
- Preoccupation with body shape and size
- Peer modelling
- Peer negativity about body shape/size - implications for own perceptions
- Anxiety
- Peer comments influencing feelings
- Feeling unprepared

**SUB-THEMES: Challenges of dance attire/feeling exposed, self-consciousness
Lack of peer understanding, Taboo around menstruation/menarche as scary,
Peer comments/comparison**

Themes OT22

Advantages of earlier maturation

- Earlier maturation as advantageous - getting comfortable/understanding your body and its limitations
- Earlier maturation advantages for audition periods - importance of early change for physical adjustment
- Perceives self as early
- Importance of timing relative to auditions
- Fitting in within ballet context - in sync with peers

SUB-THEMES: Fitting in, physical adjustment

Challenges of developing earlier

- Earlier maturation as embarrassing
- Balance of physique as important
- Growth related injury - time out from dance
- Importance of tempo and order of change
- Earlier maturation - false perception of being too big for ballet - importance of patience
- Self-consciousness - ballet attire
- Peer comparison

SUB-THEMES: Importance of the order of changes, Injury, peer comparison

Getting judged constantly

- Getting judged constantly 'on how skinny you are'/'you are always judged no matter what you do' - friends/teachers/panel
- Comparison by others
- Importance of mistakes - ego-oriented environment
- Contemplation of dropping out - environment/the right body/corrections
- Hierarchical relationships in studio
- Mental toughness
- Indirect approach to puberty from dance teachers

SUB-THEMES: Ego-oriented environment, indirect approaches to puberty, judgement by others

Themes OT23

Puberty as positive

- Puberty as helpful - feeling more mature/feeling healthy
- Puberty as positive overall
- Growth in height as positive
- Puberty as normal and healthy
- Perception as on time
- Growing as competitive
- Eating disorder experience - desire for normal puberty as a sign of being healthy
- Silver linings coping strategy

SUB-THEMES: Puberty as normal and healthy, Puberty as helpful

Challenges of growing up in dance

- Physical challenges of puberty - < coordination/adjustment to changes
- Struggled with eating disorder which disrupted development
- Puberty more challenging in a dance environment
- Implications of menarche for dancing - an inconvenience
- Being 'wary' of changing - difficulty in accepting changes
- Comments on growth easily misinterpreted
- Dance environment > anxiety over food quantity/choices - removal from dance environment positive
- Competitive environment - wanting to be the best
- Dance attire associated with feeling bad about her body - being exposed
- Breast development as negative
- Teachers passive approach to puberty
- Physical challenges of puberty - inconsistency
- Some peer support
- Restricted friendship group (year group)

SUB-THEMES: Environmental pressures, Physical changes, Limited support

Themes OT24

Benefits of being in synch

- Confidence
- Support - benefits of maturing with majority of peers
- Social benefits of maturing on time

SUB-THEMES: Social benefits and support, Psychological benefits

Puberty unhelpful

- Speed of change
- Physical and functional challenges
- Injury - catching up
- Visibility of change
- Importance of height
- Perceives early maturation as best - time to adjust

SUB-THEMES: Tempo and timing as key, Physical and functional challenges, Visibility of change

Positive outlook/cognitive maturity

- Perseverance
- Consideration of future options - forward thinking
- Benefits of separate social groups
- Time management - cognitive development
- Perceives corrective comments positively - resilience?
- Value in experience - cognitive maturity
- Self-pride - recognition of achievements

SUB-THEMES: Valuing experience and achievement, Having a thick skin/Resilience, Perspective and forward thinking

Facilitative environment/environment as pivotal

- Dance as expression
- Teaching approach - autonomy
- High pressure/competitive environment
- Benefits of split gender teaching
- Unrealistic expectations relating to increased limb length (during growth)

SUB-THEMES: Teacher interactions: expectation and approach, Classroom environment

Themes OT25

Concern about extent of growth

- Secular change - height requirements
- Implications of height for performance/selection
- Implications of extent of growth
- Goal to be 'perfect height'
- Comments of growth perceived negatively
- Implications of extent of growth - confidence
- Social stimulus value of height - ballet mums
- Height as sensitive issue

SUB-THEMES: Implications for performance, Implications for selection/social stimulus value, Implications for confidence

Physical implications of growth

- Implications for performance
- Increases and decreases in performance
- Growth - set backs
- Weight concerns
- Concerns about body shape and size

SUB-THEMES: Implications for performance, Concerns about body shape and size

Peer support

- Peer closeness associated with dance attire
- Peer support
- Younger peers (intimidated by older)
- greater confidence with dance peers

SUB-THEMES: Peer grouping, Peer closeness

What's normal?: Importance of social context and peer groups

- Awareness of ideal body
- Perceives self as average
- Peer comparison
- Familial comparison/competition
- Importance of social context and ref group for meanings of change
- Importance of peer comparison/reference groups
- Benefit of range of peer groups - perspective
- Sibling rivalry/sister as role model

SUB-THEMES: The 'ideal body', Importance of social context

Challenges of growing up in dance

- Challenges of balancing dance and academics
- Balance
- Strict environment perceived as positive
- Constructive comments
- Critical comments - confidence
- Awareness of being judged on physical appearance
- Challenges of dance environment - attire
- Menstruation as most difficult part of puberty
- Feeling exposed

SUB-THEMES: Balance, Constructive and critical comments, Feeling exposed

Themes OT26

Importance of having the 'right' body

- Puberty as positive and negative
- Different aspects of puberty have different connotations
- Growing is positive
- Amazing body = amazing dancer
- Technique/passion is important but so is the right body
- acknowledgement of late maturing physique as ideal
- Peer comparison
- Importance of extent and timing of growth to determine +/- perception
- Puberty as helpful overall 'more pros than cons'
- Awareness of gender differences in the implications of puberty
- Different emotions associated with different aspects of puberty
- Menarche associated with being 'grown up'
- Importance of height - being the same as peers as positive
- Feeling judged
- Anxiety over body

SUB-THEMES: Extent of growth, Order of development, Perceptions of growth

Coping with change

- Reflection as a coping mechanism
- Manipulating exercise/diet to manage feelings
- Peer support
- Mixed gender peer support
- Teacher awareness/preparing students for change
- Importance of confidence - makes up for lacking physical ideals
- Rechannelling anxiety into something positive
- Expectations of the body are culture specific - directing aspirations toward realistic options
- Highly driven/self-motivated
- Development of confidence
- Feeling autonomous/independent
- Support network – staff

SUB-THEMES: Social support, Adaptive coping strategies, Maladaptive coping strategies

Breast development as negative

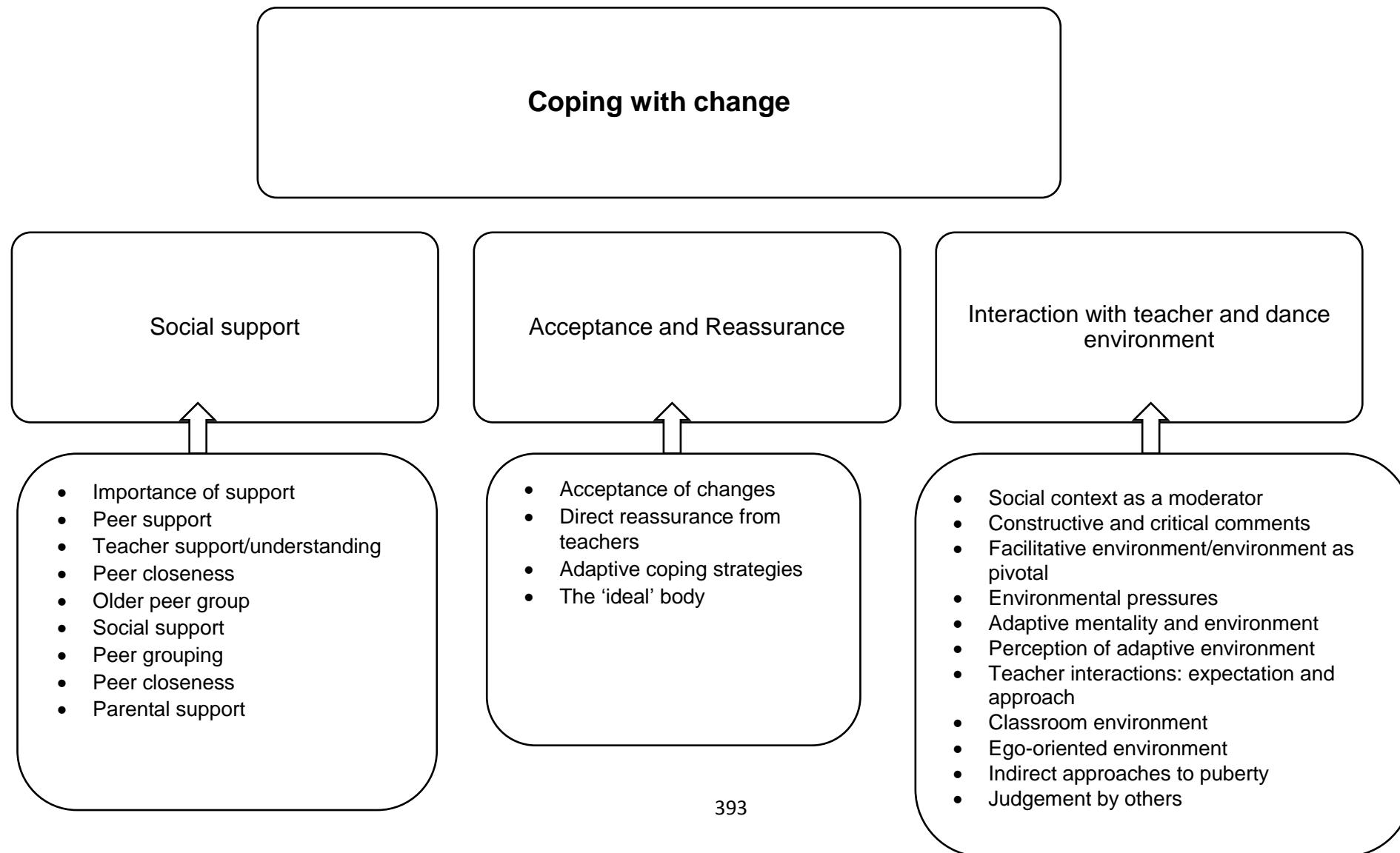
- Breast development differentiates you from peers
- Breast development associated with negative emotions - moving away from prescribed ideals
- Feeling exposed/being different
- Lasting negative implications of breast development associated with attire
- Breast development connotations dependent on genre
- Permanence of physical change
- Breast development leads to feeling 'bigger' than peers

SUB-THEMES: Conforming to ideals, reactions and responses of peers/teachers

Themes OT27
<p>Fitting in</p> <ul style="list-style-type: none"> • Peer support/inclusivity • Wide peer support network - different ages/mainstream and dance • Role models • Fitting in - growing but not too little or too much • Peer and teacher support • Tempo of growth important <p>SUB-THEMES: Positive mentality, Extent and tempo of growth and maturation, Peer support and role models</p>
<p>'It's just life' puberty as no big deal</p> <ul style="list-style-type: none"> • Passion more imp than physique • Neutral feelings toward puberty - little personal experience to inform this yet • Benefits of being small • Perceptions from peers inform expectations of puberty - not too negative • Implications of growth for performance (<flexibility) • Unphased <p>SUB-THEME: Managing challenges of puberty</p>
<p>Adaptive mentality and environment</p> <ul style="list-style-type: none"> • Positive mentality • Confident and self-assured - resilient mind-set • Self-belief • positive experiences in vocational training • Self-assured/outgoing • Positive mastery oriented environment - developing confidence • Perception of positive environment • Cognitive maturity in behaviour and approach <p>SUB-THEMES: Perception of adaptive environment, Positive mentality</p>

Themes OT28
<p>Puberty as negative in a dance environment</p> <ul style="list-style-type: none"> • Implications for confidence (dance attire/being viewed) • The 'ideal body' (perception as slightly earlier than peers - physically more mature than majority/make or break for ballet aspirations/being visibly muscular) • Implications for performance (strength/flexibility) <p>SUB-THEMES: Psychological challenges, the 'ideal body'</p>
<p>Feeling grown up</p> <ul style="list-style-type: none"> • Maturity benefits for performance • Feeling grown up - positive • Developing independence and responsibility • Mental/emotional maturity • Cognitive maturity/well-adjusted <p>SUB-THEME: Sense of maturity and independence</p>
<p>Ego-orientation</p> <ul style="list-style-type: none"> • Negative mind-set/self-aware • Competitive environment • Ego-oriented personally • Cognitive maturity/social awareness • Ego-oriented environment - mistakes punished • Escape - dance as escape from being yourself • Control <p>SUB-THEMES: Environment, Personal outlook/mentality</p>

Clustering: Themes from cross case analysis



Advantages of on time maturation

Fitting in

- Fitting in
- Peer support and role models
- Extent and tempo of growth and maturation
- Social benefits and support
- Benefits of being in synch

Time to adjust

- Negative to positive transition
- Time to adjust/accept
- Positive mentality
- Physical adjustment
- Psychological benefits
- Perspective and forward thinking

Puberty as an opportunity

- Feeling grown up
- Sense of maturity and independence
- Potential for physical and functional improvement
- Puberty as a valued experience to support peers and for personal growth
- Valuing experience and achievement
- Puberty as normal and healthy
- Puberty as helpful

Challenges of growing up in dance

Peer comparison

- Peer comparison (environment/size)
- Lack of peer understanding
- Peer comments/comparison
- Puberty as negative in a dance environment (change amplified by environment)
- The 'ideal body' (perception as slightly earlier than peers - physically more mature than majority/make or break for ballet aspirations/being visibly muscular)

Acceptable and unacceptable changes

- Weight concerns (self-evaluation/attire)
- Being different physically
- Puberty: Unknown outcomes with fixed expectations
- Fixed expectations regarding pubertal outcomes, acceptable and unacceptable changes
- Physical implications of growth
- Concerns about body shape and size

Tempo and order of changes

- Extent of growth
- Order of development
- Perceptions of growth
- Concern about extent of growth
- Implications for performance
- Implications for selection/social stimulus value
- Tempo and timing as key
- Implications for performance (strength/flexibility)
- Implications for confidence

Feeling judged

- Implications for psychological wellbeing (confidence/depression) associated with perceived size
- Challenges of dance attire/feeling exposed
- self-consciousness
- Taboo around menstruation/menarche as scary
- Visibility of change
- Implications for confidence (dance attire/being viewed)

Final themes

Table h. Coping with change

Sub-theme	Qualitative evidence
Social support	<p><i>...it's just the fact that you can help others and be certainly more confident and make them confident because I'm not really one who is like super confident but I think I've now just got like a lot of more open about things because I'm one of the first and I should really be helping my year through it and stuff. OT21, p.9-10, line 330-334</i></p> <p><i>Well, if you really need help then you can ask your ballet teacher because they went through it at boarding, well, ballet school, as well, so they can give you more help. They support you, as well, because they get to know your body so they can work with that instead of working the same as everybody else, but concentrating on what you can do and what you can get out of your body. P20, p.4, line 124-128</i></p> <p><i>Oh yes, I think it's good in a way because I get to help people to be a bit more open but then in a way that for me, it's a bit like scary but I know that everyone's going to eventually go through it. So when people do go through it then if they feel how I felt I can like boost them a bit. I think being in a leotard all day is kind of a bit conscious because you can see everything. P21, p.3, line 88-93</i></p> <p><i>Well, because of the people in my class I've got people in the year below and people above. Most of them are in my year but there's a bit of a mixture... Yes, I like that, because we can like give each other tips. So the people that are in the year above can give us tips on auditioning and then we can give the younger ones tips on auditioning and just we can be like, "Well, you might be feeling like this now but you'll feel like this later." P22, p.13, line 412-418</i></p> <p><i>I thought it was going to be a lot more like stricter and harsher and all the years wouldn't talk to you but I'm in a House with an older year and it's like a lot easier to talk to them. I thought it wouldn't be. Yes, it's really nice. P21, p.1, line 25-27</i></p>
Acceptance and reassurance	<p><i>"Oh, goodness, I just don't look right at all." But the others see it differently, they're like, "No, you're actually okay.""</i></p> <p><i>OT21, p.9, Line 287-288</i></p> <p><i>You're here for a reason so like if you weren't right then you wouldn't be here." And I've had many conversations with other teachers and they've been like, "Well, this teacher said this so this must be true."... You know, like just constant reassurance of... That I'm okay.</i></p> <p><i>OT22, p. 11, line 333-342</i></p> <p><i>Well I'd say having more one to one conversations so if I had an issue I'd be like... well I'd go to them and I'd be like, "Well I don't think I've got the right body, I don't think things are going as well." I just need the reassurance of like, "No, you're here for the reason that you are right for this." And just keeping up like little bits of positivity here and there if you're feeling a bit low and just not quite sure what you want to do... Just keep saying, "Yes, you're fine, stop thinking that." Because it is all mentality. OT22, p.10, line 312-319</i></p>

	<p><i>Well, I think everyone here, kind of, just accepts it because we've all seen each other, kind of, mature and we've just been like, "Well, now it's my turn." And there's not much you can do. P24, p.9, Line 283-285</i></p>
<p>Interaction with teacher & dance environment</p>	<p><i>I get a lot of comments like, "Oh you're growing so much," which I don't really want to hear because I don't want to grow too tall. I don't really like those comments and I don't feel they're boosting my confidence that much. They might not think it's a bad thing, but, I'm just kind of, like "Okay.". OT25, p.4, line 189-192</i></p> <p><i>Just, you might not be doing something really great but if they just put one little comment and be, like, "oh, that was better" or "you're getting much stronger now", or something along those lines that just boost your confidence to keep trying, pushing you through that stuff. OT25, p.5, line 239-242</i></p> <p><i>Well, there has been quite a few times where I'd be like, "Right, that's it, I don't want to dance anymore. I keep getting shouted at, I just don't." Because I'm really sensitive when it comes to that kind of thing, like if someone keeps shouting at me I'll panic, I'll be like, "What am I doing wrong?" And then they won't explain it to me. But yes, I think it does, kind of, affect the way you feel about dancing as well because if you've got a teacher shouting at you all the time and you're always that one person, which I am, who gets shouted at all the time for doing anything wrong, then you just give up... I've tried for so long to make this teacher happy and make this group of people happy and I just can't seem to... (that's not what I'm good at. OT22, p.8-9, line 260-270</i></p> <p><i>Sometimes in class the teacher can compare what you do, to other people. Sometimes without meaning it, really. Sometimes they can go, "You've got to move your legs as fast as so-and-so," or, "You need to jump higher than so-and-so." Sometimes, if you've got a different, well, everyone has a different body shape, then that thing is... it's harder, so then you're just like, "Argh!" It's really hard. OT20, P.4, Line 132-137</i></p> <p><i>Well, they will say, 'Oh, you have got really long legs, you should be able to jump across the room," and stuff like that, which sometimes makes me feel like others are not trying hard enough, because they think that I have just got naturally long legs that I'll be able to, like, jump really far...OT24, p.5, line 151-154</i></p> <p><i>You need to be more fit. You need to keep running." You need to do all that kind of stuff, just like work out more, because they're making a subtle hint that you need to sort yourself out basically. As hard as it is, they try and say it subtly but you know exactly what they're trying to say to you." OT22, p.10, line 323-326.</i></p>

Table i. Advantages of on time maturation

Sub-theme	Qualitative evidence
Fitting in	<p><i>...we find that we are getting to, catching up with the others and everything, so not like different or anything. We are not small or we are not tall; we are like in between and we are like, "Yeah" because we fit in with everyone and things, no one makes fun of us because we are small or tall, so that is quite good, we get to fit in. OT27, p.3 line 71-74</i></p> <p><i>...it feels good, yes, because you know that you are growing and you are fitting in with other people as well, that you know that you are actually going somewhere and you are not staying the same size as you were, and your feet are like tiny. Yes, it's good. OT27, p.4, Line 119-123</i></p> <p><i>It's easier in, like, with everybody else, because they're all going through it as well and because we're dancers, and obviously we're boarding so we're all very close. We ask each other questions and help, whereas in a normal school you're not boarding, you're not as close, and they don't do ballet, so it's kind of harder there. OT20, p.4, line 108-112</i></p> <p><i>Well I think because we're dancers I think most of us are less developed. I think I'm probably one of the most developed in my class but I still think I'm average in like the average range... OT21, p.3, Line 81-83</i></p> <p><i>Yes, it is nice being at the same time not like after, or before anyone. OT24, p.3, line 80</i></p> <p><i>I would say, like, they have been like supportive to me. Like they just, I think, because they have all had it like at the same time as me, and they are all just like, "Oh, right, cool." OT24, p.5, line 136-138</i></p>
Time to adjust	<p><i>It was a bit embarrassing but I've, kind of, came out and everything has all evened out now so it's okay... I think it's better to mature a bit earlier just so you can get comfortable, you know, at an earlier stage and you know exactly how your body works and you know what you can and can't do... Yes, because you need to know exactly what your body can do and how you move... Instead of like... you could have a growth spurt like a week before your audition and you're like, "Oh, my goodness, what do I do?" And like your arms are too far away from the barre and stuff. OT22, p.4, line 91-105</i></p> <p><i>Well, I've already gone through it all so now I can just focus on what I've got and focus on other things, whereas other people who haven't started, they've got so used to what they've got and suddenly it will all change for them. I'm more mature so they can notice it more, I guess, so that must be harder for them. So I guess it's easier for me because I know what I've got for the most of my life with dance now, so I can just focus. OT20, p.6, line 209-214</i></p> <p><i>Well now that I'm back doing exercise and everything, everything's kind of settled and I've built more muscle with what I've put on. I don't know, I've just like grown slowly rather than just like waking up in the morning and being like... Really tall. It's hard, you just feel more comfortable. I don't know if I have like... I don't know. I just feel more comfortable with myself... You come to accept how you look and you're like, "Well yes, I've been told that I can do ballet so that's the way it is. Whether I like my body or not I can do it."... And that's all that really matters. OT22, p.5, line 135-145</i></p> <p><i>Well, it's negative at first because you start sticking out a bit and like, "Oh, my goodness! What do I do?" But when you get used to it, then it's a positive, I guess. As positive as it can be. OT20, p.7, line 218-220</i></p>

	<i>I would probably say a bit earlier [is best] so it is like out of the way, so I can like concentrate on my dancing a bit more while my growing stops. OT24, p.3, line 87-88</i>
Puberty as opportunity	<p><i>Well I think the growing bit... because I found it really hard because I was growing so much that it was meaning I had loads of injuries and stuff. I feel like there is a good side to it because it could also help you improve. I know another person who's had loads of injuries and stuff with growing, but I think that's probably what made me better, because it makes you want to work harder, because obviously you're off balance and you're not as good in turnout so you want to improve. And I've like been getting a lot of extra help because I know I've been growing so much so... OT21, p.3, line 68-75</i></p> <p><i>Like I say, I think most of it is like a downside because I think if it's all happening all at once you could your legs will be like off balance and stuff. I think there's always a good side in which if you wish that you had your stereotypes of long legs you could get them. And you could also, if there's something you need to work on, and you're really determined, then you can just try and try to get like that. And either way you're getting better. So it's like good and bad sides. OT21, p.4, line 104-110</i></p> <p><i>It's really hard. I would probably say a positive because... I've said this loads but I think you can only get better and if you start like growing and stuff I think that's the only way you can get better, is if you keep like practising and stuff and try and work at it. Because, like I said, I was growing so much I was getting a lot tighter and stuff, so I tried to get my flexibility back and I think like... Yes, I just think it's really positive. OT21, p.9, line 318-324</i></p> <p><i>I think growing people enjoy, it's a bit competitive... Yes, if you're one of these...unless...well, I think most people want to grow and be taller and if you look like you've grown everyone is like, "Lucky you, you've grown, I haven't" or something like that, yes. So, I think that's seen as a good thing. It's like people enjoy that when they grow. OT23, p.4, line 111-116</i></p>

Table j. Challenges of growing up in dance

Sub-theme	Qualitative evidence
Peer comparison	<p><i>Definitely maturing one of the first in my year, it can put you down, when you're in a class full of a load of really skinny people who haven't started developing yet. I've got quite an 'adulty' shape already. It's kind of depressing sometimes, but you get over it. OT20, p.3, line 99-102</i></p> <p><i>Yes, it is a bit scary. You just look at yourself and you're looking at someone next to you and you're like, "Oh, I don't look like them." OT22, p.3, line 76-77</i></p> <p><i>I felt self-conscious and I wasn't too keen on wearing a full leotard as much as just I felt I was like, "Oh, I'm really different than all of my other friends," like because they were still very skinny and childlike and I was a bit more matured. So I was</i></p>

	<p><i>a bit self-conscious and just, kind of, lost a lot of the confidence in my dancing and I was like, “I just don’t look right to do this, what’s going on?” You know, I just wasn’t really sure about what I wanted to do. OT22, p.6, line 178-183</i></p> <p><i>I used to get really upset because obviously my sister is much smaller and she was, like, the perfect height, or used to be the perfect height, of the smaller ballerinas but I don’t really know, they’re kind of, like, growing, so it doesn’t affect me as much anymore. OT25, p.5, line 197-200</i></p> <p><i>In ballet, I think at the start I did feel quite self-conscious, because I was quite short but I was getting a bit stumpy. So, yes, I felt quite self-conscious about that. But now I have grown a bit and I’m in the same height range as most people but I still do feel kind of bigger than them. It’s strange. OT26, p.5, line 151-154</i></p>
<p>Acceptable and unacceptable changes</p>	<p><i>Well, it can be a bad thing if you develop the way that your teachers think you wouldn’t. So if you develop in a way that you’re not fit to do ballet anymore then that’s bad. But if you develop in a way and you kind of stay the same, then it’s good... Maybe like over growing in the chest or your legs become too big, hips are too wide. All that kind of stuff. Just -... You just don’t look right doing ballet. OT22, p.3, line 65-73</i></p> <p><i>[the ideal is] More or less the same, yes. Or you’ve changed and morphed into more of an adult ballet dancer than a child ballet dancer... You get a bit taller, a bit more muscular, just that kind of stuff. OT22, p.3, line 80-83</i></p> <p><i>I was, kind of like, “Oh, I don’t have the body to dance.” I felt like weight had gone on in different areas. It didn’t help that I had an injury at the time so I wasn’t doing any exercise, I wasn’t able to dance. So I was looking at myself, I was like, “Oh, what’s going on here?” And I was like, “This is, I can’t dance anymore.” OT22, p.4, line 110-114</i></p> <p><i>I don’t want to grow too tall but I just want to be a good height that can be classed as, like, the taller or the shorter, so it’s just in the middle. So yeah, just that perfect height. OT25, p.4, line 152-154</i></p> <p><i>...if I grow a lot taller, then maybe I could do ballet. I want to do ballet... Yes, and I need to get taller and not any wider. OT28, p.7, line 233-235</i></p> <p><i>I have to say I was quite excited when I got my period because I was, like, grown up. But I do look back on how much of a pain it is. And, definitely, the breast development and growth — that really annoyed me and it still does... I guess because, when you’re in your leotards, you’re quite exposed and you need more support in a leotard and you’re not having the same as everyone else if they don’t have it. So, you just feel a bit out, and then you do look at the ballet body and the primas and you get a bit down. Yes, it’s difficult, I think. OT26, p.4, line 107-115</i></p>
<p>Tempo and order of changes</p>	<p><i>It was all to do with like the muscles in my hips, like my bones were growing too fast and my muscles were getting stretched and then it was up in my back and down in my knees and it was horrible... Yes. It was about over a year that everything had happened so I wasn’t dancing really for a year. OT22, p.4, line 118-123</i></p> <p><i>I’d probably say [puberty is] less helpful... I just feel like, because I feel I am growing a lot faster, and I am getting less flexible so I have to work even harder to – - get my flexibility ... so probably still growing. OT24, p.3, line 68-73</i></p>

	<p><i>Yeah. Because like dancing, like, again, it is your flexibility and if you are growing really fast you have to work a lot harder. Whereas if you are in school it doesn't feel like a change because you are just growing as the day goes, but in dance you can definitely see a change in yourself. OT24, p.6, line 190-193</i></p> <p><i>I think it's a bit of both because you can grow and really elongate it and things. But I would say definitely for myself, you do begin to get breasts. I filled out when I went through puberty — but, yes... For myself, it was a negative thing... Well I used to be quite short and, I guess, in proportion. But, yes, bits of my body didn't grow at the same time as others. My legs didn't grow but then my chest got bigger. But now it's, hopefully, balanced out. OT26, p.3, line 61-70</i></p>
Feeling judged	<p><i>Yes, because I'd say ballet and dancing is more about the look rather than like... you could have like five Highers at my age but they just go based on your looks. So I think it's hard because you're looking in the mirror and it's like, "Would someone take me to be in whatever, like the show or something?" So you're like, "Oh, yes." You get yourself so paranoid and I don't think you should because you're here for a reason. We wouldn't be here if we weren't right to do ballet. But yes, I'd say being a dancer and growing up is hard because you're constantly being judged on your looks and how your body's going to develop even though you don't know yourself yet. OT22, p. 7, line 195-203</i></p> <p><i>Yeah, because everyone can see everything but at school you've got your uniform on and no one knows what's going on underneath it, but then, at dancing you're stripped back, just in your leotard and tights, and everyone can see everything, so it's quite, like, 'judgy' in that way... At dancing, your period, I think that's the hardest thing, because if it's bad and it goes in your tights, everyone can see and at school you've got your black tights on and you're completely fine. And that's, kind of, hard. I would say that was definitely the hardest thing for me. OT25, p.9, line 446-456</i></p> <p><i>...Like kind of getting judged constantly on how skinny you are, either way, whether you're a dancer or not, whether it's by your teacher, a panel or your friends... So you are always judged no matter what you do basically. OT22, p. 7, line 213-217</i></p> <p><i>Probably in ballet when you see yourself in the leotard. And, I guess you feel judged. I remember at the start when I started having puberty I felt quite judged by the teacher. I don't think she was but, because you did see yourself differently, so you were wondering if she saw you differently. OT26, p.6, line 178-181</i></p>

**Appendix H – Study 6 Participant details, individual participant themes,
clustering and cross case analysis, and final themes**

Participant details

LM11	
Age (years)	14
School	1
Height (cm)	161
Weight (kg)	-
BMI	-
Age of menarche	Not yet started
PDS average/Category score	1.8/5 Mid-pubertal
Self-perception of timing	Much later

LM12	
Age (years)	13
School	1
Height (cm)	146
Weight (kg)	34
BMI	16
Age of menarche	Not yet started
PDS average/Category score	1.8/5 Mid-pubertal
Self-perception of timing	Much later

LM13	
Age (years)	15
School	2
Height (cm)	155
Weight (kg)	38
BMI	15.8
Age of menarche	15, June
PDS average/Category score	2.8/6 Late puberty
Self-perception of timing	Much later

LM14	
Age (years)	14
School	2
Height (cm)	154
Weight (kg)	41.3
BMI	17.4
Age of menarche	Not yet started
PDS average/Category score	1.4/3 Early puberty
Self-perception of timing	A little later

LM15	
Age (years)	17
School	1
Height (cm)	-
Weight (kg)	52
BMI	-
Age of menarche	16, August
PDS average/Category score	3.2/10 post pubertal
Self-perception of timing	Much later

LM16	
Age (years)	13
School	2
Height (cm)	143.3
Weight (kg)	30
BMI	14.7
Age of menarche	Not yet started
PDS average/Category score	1.4/3 Early puberty
Self-perception of timing	Much later

LM17	
Age (years)	13
School	2
Height (cm)	146.3
Weight (kg)	31.8
BMI	14.9
Age of menarche	Not yet started
PDS average/Category score	1.4/2 pre-pubertal
Self-perception of timing	Much later

LM18	
Age (years)	14
School	3
Height (cm)	157
Weight (kg)	37
BMI	15
Age of menarche	Not yet started
PDS average/Category score	2/4 Mid-pubertal
Self-perception of timing	Much later

LM19	
Age (years)	14
School	3
Height (cm)	153
Weight (kg)	37.5
BMI	16
Age of menarche	Not yet started
PDS average/Category score	1.6/4 Mid-pubertal
Self-perception of timing	Much later

Participant themes and sub-themes

Themes LM11
<p>Importance of a supportive environment</p> <ul style="list-style-type: none">• Dance school as 'family'• Teacher support - huge influence• Peer support• Importance of acknowledging progress and challenges• Importance of not being compared to more physically mature peers• Struggling to cope• Not able to cope alone - teacher intervention with injury and school work• Importance of supportive environment <p>SUB-THEMES: Supportive environment easing stress and facilitating coping, Teacher understanding: Progress, challenges and peer comparison</p>
<p>Being left behind</p> <ul style="list-style-type: none">• Physical injury - ongoing impact• Being left behind• Needing time to catch up• Extended training due to injury• Injuries have stifled progress• Physical challenges associated with lack of development influence confidence• Decrease in performance as others increase• Peer comparison - flexibility• Socially excluded from more developed peers <p>SUB-THEMES: Ongoing impact of physical injury: training and confidence, decreased performance and functionality, Needing time to catch up.</p>
<p>Extent of physical development/Physical maturity as desirable - to an extent</p> <ul style="list-style-type: none">• Lack of development as embarrassing• Importance of visible aspects re lack of development• Desirability of physical outcomes dependent on dance style• Perceptions of pubertal change influenced by dance style• Physical maturity desirable - to an extent• Extent of physical development key <p>SUB-THEMES: Psychological and social impact associated with lack of visible development, Importance of dance style for perceptions and desirability of pubertal change</p>

Themes LM12

Minimal change as beneficial

- Extent of development key to perceptions of change
- Importance of visible changes
- Physical maturity desirable - to an extent!
- Minimal change as positive/beneficial
- Extent of growth spurt key to positive or negative experience
- Importance of flexibility
- Flexibility and not making progress as key concerns

SUB-THEMES: Visible changes, functional changes and progress

Peer support and reassurance

- Developing coping strategies
- Mature attitude towards training
- Observation of peers informs expectations of puberty
- Reassurance from observed peer experiences

Late maturation as positive

- Late maturation as beneficial (observes early maturation as negative for peers)
- Late maturation as positive
- Perception as much later
- Feeling 'lucky' as a late maturer
- Confident in self and ability (based on progress, flexibility)
- No physical injury
- Teacher comments very important to perceptions of progress

SUB-THEMES: Physical and functional ability, perceived performance and aesthetic advantages

Outcome of pubertal changes as make or break

- Career path implications associated with physical outcomes
- Being exposed - dance environment amplifies concern over outcomes
- Outcomes need to conform to the 'right body'
- Implications of pubertal outcomes for career path
- Unknown outcomes with huge implications

SUB-THEMES: Career path implications and 'the right body', unknown outcomes

Themes LM13

Feeling in control

- Rate and extent of growth important - associated with feelings of control
- Importance of feeling in control
- Mature attitude towards her academics and dance
- Mature attitude and ability to cope/manage
- Highly self-motivated

SUB-THEMES: Proactive approach to coping and managing, Importance of feeling in control of physical change

Peer closeness and support

- Being 'in the same boat'
- Getting on with it
- Peer closeness and support
- Supportive environment associated with dance
- Importance of peer support and closeness

SUB-THEMES: Being 'in the same boat', supportive environment

Late maturation as easier

- Late maturation as easier - advice and observation of coping strategies
- Benefit of others' experiences - peer support and advice
- Feels prepared through observation of others' experiences
- No negative experiences of puberty
- No physical injury
- Not concerned by physical or visible changes
- No negative implications
- Perception as a 'bit later'
- Challenges with flexibility and progress

SUB-THEMES: Feeling prepared: Benefit of others' experiences, peer support and advice, extent of negative experiences as minimal

Themes LM14

Being left behind

- Negative performance implications - flexibility
- Puberty as unhelpful
- Decrease in performance as others increase
- Late maturation initially positive and then more difficult
- Unknown outcomes
- Loss of flexibility impacts upon confidence
- Peer comparison with performance - flexibility
- Functional/performance change associated with loss of confidence
- Being 'overdeveloped' or developing too quickly as negative
- Physical development as negative
- Visible changes associated with decrease in self-confidence

SUB-THEMES: Unknown outcomes, decrease in performance as others increase, puberty as unhelpful

Pushing through and preserving

- Positive mental attitude
- Accepting things you can't change
- Progress fuels motivation
- Importance of recognising own improvement and progress
- Dancing as a way to develop responsibility, understanding and self-care
- Unconcerned with appearance

SUB-THEMES: A positive approach, learning and accepting

Empathy and understanding

- Peer support and understanding - advice/reassurance from those who have already been through it
- Peer closeness
- Supportive environment
- Teacher support
- Importance of teacher awareness and understanding
- Peer support - same age peers, beneficial
- Wide support network
- Empathy and understanding are key

SUB-THEMES: Advice and reassurance from peers, Teacher awareness and understanding

Themes LM15

Peer support - looking out for each other

- Peer support - coping
- Pushing through
- Peer support
- Reassurance and encouragement from peers
- Prepared - dev independence and responsibility
- Positive reactions to physical development

Late maturity as negative

- Lack of development as embarrassing
- Ultimately negative - wanting to be treated as/perceived as adult
- Late maturation as a concern, puberty as a relief
- Social exclusion from the narrative of puberty
- Feelings of immaturity and being left behind
- Wanting to feel and be perceived as adult
- Initially positive - good being small

SUB-THEMES: Wanting to feel like and be perceived as an adult, puberty welcomed as a relief

Challenges of puberty in dance environment

- Physical injury
- Challenges of puberty in dance environment - self-consciousness
- Peer comparison - physical development
- Physical development associated with < confidence
- Expectations of slimness

SUB-THEMES: Physical injury, physical development

Themes LM16

Late maturation as advantageous

- Unconcerned re pubertal change
- Observation of peers to learn how to cope
- Determination and self-assurance
- Persistence

Puberty as an inconvenience

- Late maturation implications for professional training
- Physical challenges - maintaining flexibility
- Pressures on body shape amplified in dance environment

Themes LM17

Late maturation as positive

- Unconcerned by physical change
- Perception as in sync with dance peers - positive to feel this way
- Closeness with dance peers
- Late maturation as positive
- Parental influence re level of involvement
- Parental protectiveness re body shape/size comments
- Parental influence - moderating expectation of body shape/size

SUB-THEMES: Being in synch with peers, benefiting from peer and parental guidance

Physical and functional challenges

- Decrease in flexibility as a challenge
- Potential for growth impeding progress in development of flexibility
- Unknowns of body shape and size as a concern

Seeking reassurance and support

- Importance of peer/teacher reassurance
- Wide friendship group
- Importance of social 'escape'/distance from dance
- Peer support

SUB-THEMES: Advice and reassurance from peers, Teacher awareness and understanding

Themes LM18

Advantages of Late maturation

- Advantages of Late maturation - slender body
- Peer experience beneficial
- Happy to be late maturing - benefits of later maturation
- Feeling lucky - not having to deal with it
- Advantages of Late maturation - fitting in/feeling normal
- Less development as embarrassing but more norm in ballet peers
- Advantages of Late maturation - being small
- Visible change not a worry
- Visible change as natural
- Confident and self-assured

SUB-THEMES: Aesthetic benefits, fitting in, advantages of peer experience

Feeling left behind

- Not feeling like a teenager
- Feeling immature 'like a child'
- Social exclusion from narratives surrounding puberty - feeling left behind
- lack of development as embarrassing
- Pretending in order to fit in with social norms/expectations
- Asynchrony between physical and mental feelings of maturity
- Feeling socially excluded

SUB-THEMES: Asynchrony between physical and mental feelings of maturity, feelings of embarrassment and social exclusion

Understanding expectations at puberty

- Importance of 'looking right'
- Importance of extent of growth
- breast development as negative
- puberty as make or break
- greater breast development as negative
- Importance of physical development outcomes
- Physical implications of growth - frustrating and disruptive for progress

SUB-THEMES: Aesthetic expectations, extent of physical development, implications for performance

Themes LM19

Perceived benefits of puberty

- Benefits of maturity - strength
- Puberty as positive
- Benefits of growth for performance
- Maturity beneficial for performance
- Building around an adult body re training
- Being treated as an adult
- Puberty as positive - beneficial for dance

SUB-THEMES: Physical benefits, performance benefits

Late maturation as positive

- Positives of late maturation - not having to deal with inconvenience of puberty
- Peer evaluations of late maturation as positive - good to be small
- Growth starting to effect training but ultimately positive
- Peer advice - Late maturation is beneficial - puberty inconvenient
- Peer support
- Importance of reassurance re peer experiences
- Benefit of peer experience
- Late maturation benefit of fitting in with dance peers more so than gen pop
- Greater acceptance of late maturation in dance

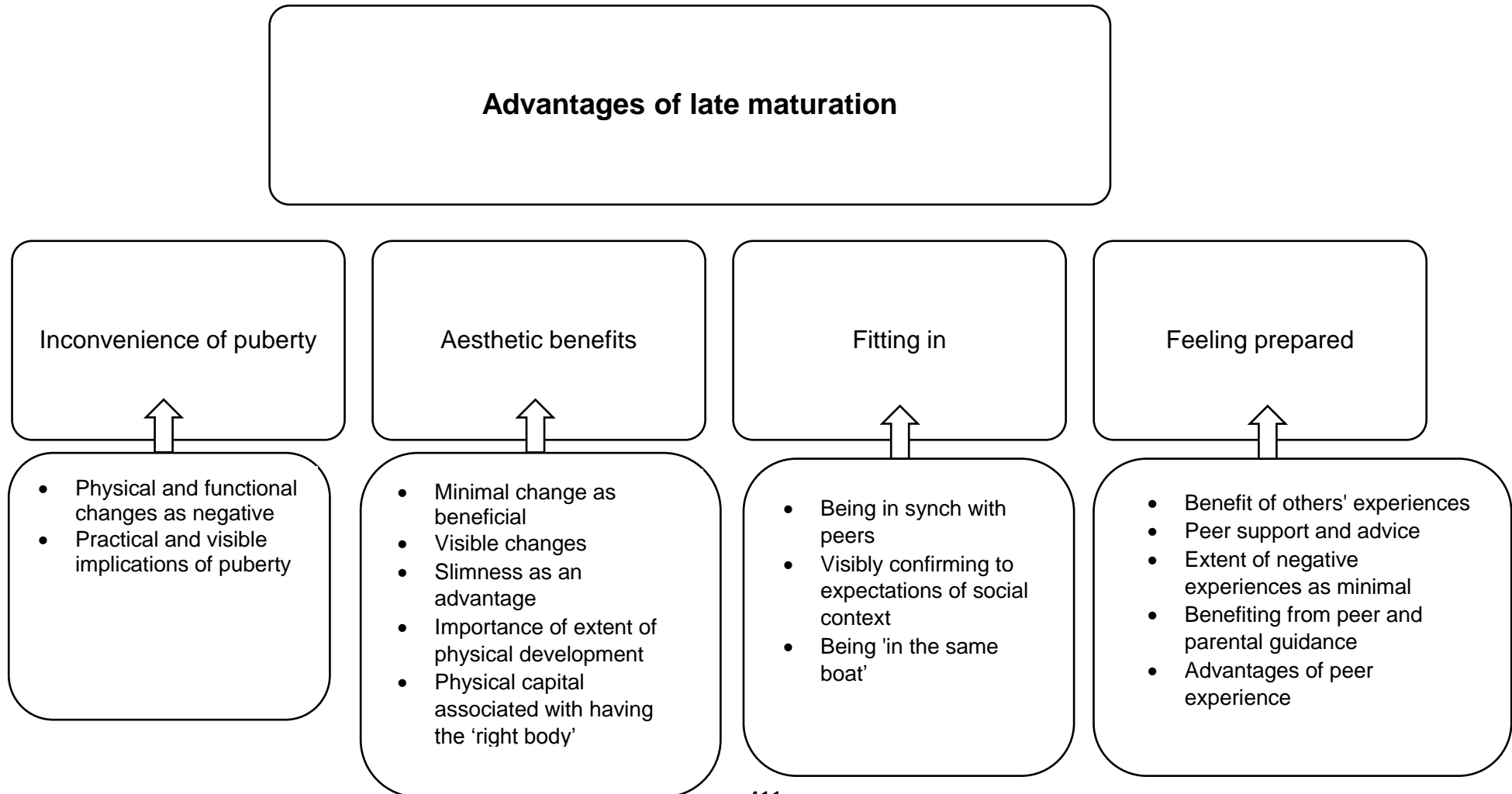
SUB-THEMES: Inconvenience of puberty, aesthetic benefits, benefit of peer experience, fitting in

Lack of development as frustrating

- Peer comparison - smaller than peers
- Impatient - keen to grow
- Lack of growth as frustrating
- Growth may now coincide with auditions
- Wanting to 'look' mature
- Desperate to mature
- Physical injury as a concern for future
- Outcome of puberty as make or break

SUB-THEMES: Feeling left behind, performance implications

Clustering: Themes from cross case analysis



Feeling left behind

Implications of physical injury: needing to catch up

- Feeling left behind: performance implications
- Ongoing impact of physical injury: training and confidence
- Decreased performance and functionality
- Decrease in performance as others increase
- Puberty as unhelpful

Unknown outcomes

- Outcome of pubertal changes as make or break
- Career path implications and 'the right body'
- Understanding expectations at puberty
- Aesthetic expectations, extent of physical development

Feelings of social embarrassment or exclusion

- Feeling socially excluded
- Feeling left behind

Asynchrony between physical and mental feelings of maturity

- Wanting to feel like and be perceived as an adult
- Puberty welcomed as a relief
- Lack of development as frustrating

Seeking reassurance and support

Advice and reassurance from peers

- Peer closeness and support
- Peer support and reassurance
- Supportive environment
- Looking out for each other

Teacher awareness and understanding

- Empathy and understanding
- Teacher understanding: Progress, challenges and peer comparison
- Supportive environment easing stress and facilitating coping

Table k. Advantages of late maturation

Sub-theme	Qualitative evidence
Inconvenience of puberty	<p><i>I don't have to deal with that inconvenience yet LM16, p.2, line 70</i></p> <p><i>I'm quite happy that I've not really grown up yet. LM17, p.6, line 244</i></p> <p><i>Yeah, I enjoy dance, and I'm quite happy that I've not really grown up yet. LM16, p.6, line 244</i></p> <p><i>I like it because everybody moans about it. I just feel so happy because mine's not started yet... Yes, I just feel like it's a bit better because everybody else that has it just gets on with it. I don't think there's much you can do about it. P12, p.3, line 67-72</i></p> <p><i>My sister was like, "You're actually lucky so that you don't have to deal with it." I don't really mind because I know there's this one girl in my year, she recently started, she was desperate to start. I don't feel desperate because it's a bit of a pain. P18 ,p.4 line 103-105</i></p> <p><i>But then there are positive sides because in ballet class you'll be all clean and you don't get mood swings. Well you still get mood swings just not for a week or whatever. Then obviously you still have quite a slender body so it's good. P18, p.7, line 212-215</i></p> <p><i>They just, kind of... a bit of both really, mainly...yes, because they're the same as me, they'd want to grow as well but then they don't really like, when they're, like, on their periods, they don't like that and they say, "You're lucky because you haven't got these yet", and stuff like that. P19 P.5 Line 122-126</i></p> <p><i>I just feel the same as everyone but I kind of feel that everyone, sometimes they don't really like it, when they've got their periods and stuff, and if feel all happy — "I don't have periods yet... Yes, it makes me feel quite happy." P12, p.5, 131-136</i></p>
Aesthetic benefits	<p><i>You see a lot of people going to auditions being turned down for their body shape, in terms of they are overdeveloped for their age, and that kind of thing. I have got friends that that has happened to. They have not got in... with the reason being that they have developed too quickly...So I think, in a way, it can be quite bad. LM14, p.3, line 57-65</i></p> <p><i>For ballet, it's good to look older but you don't want bits, you know what I mean. LM11, p.2, line 36-37</i></p> <p><i>Well at the time, I liked being the small one, yes. Because everyone is like "Oh, you are so small", and so it was good to hear that and stuff. Now I am like, I want to be like bigger and taller. P15, p.5, line 119-121</i></p>
Fitting in	<p><i>Well when I was at my old school, you'd have people in my class who were younger than me, because my birthday is in October, and they'd be a head taller than me and a size C or whatever. It is quite embarrassing because everyone would be developed and then there'd just be me. But then when I came to vocational school there are other people in my year like me so it was better. It's actually probably better to be like this for a ballet dancer than to be all developed line. LM18, p.3, line 82-87</i></p>

	<p>Yes, because for me probably it would be harder then because no one really dances as well so I think development is, sort of, set back a bit through dancing so everyone would be like really developed and I'd just stand out loads whereas with here I feel like it doesn't matter because everyone knows that that's what happens and I definitely feel more accepted here. P19, P.8 228-233</p> <p>Everybody else is in the same situation as me, in the same boat so you've just got to get on with it. 67-68, P13. P.3 I think so. Everybody here is mostly the same body shape, and there's some people who have got really amazing legs and things, at school I don't really have to worry about that. 241-243, P16, p.6</p> <p>Well, I wouldn't say it's more challenging, but they're all going on about how they've all grown up now, and all my friends at dancing, hardly any of them have, so I find it easier at dancing. 225-227 p17, p.5</p>
Feeling prepared	<p><i>I think, like, because being around all my friends and things and they've been going through these changes, because some of them are, like, they've already started and things. I think, from watching them, and how they deal with it, I think I'll be able to deal with it. LM16, p.3, line 118-121</i></p> <p><i>I've not really experienced it. I'm just okay because all the people in my year went through it and they're fine. P12, p.4, line 95-96</i></p> <p><i>I think it prepared me in a way to be honest, I got more advice on how to deal with it and you went along with it. I think it's a good thing when you obviously hear everyone else's experiences. LM13, p.3, line 78-80</i></p>

Table I. Feeling left behind

Sub-theme	Qualitative evidence
Implications of physical injury: needing to catch up	<p><i>I'm growing right now. So it's kind of weird, because everybody else has already grown and they have gotten really flexible, and I'm just starting to lose my flexibility [laughter]. But yes, definitely, I'm quite late in terms of growing and things like that, yes. LM14, p.4, line 96-99</i></p> <p><i>I used to be so small, I thought I was quite small in my year, but I've grown a lot and I'm nowhere near as flexible as people in my year. I've got loads of injuries due to growth LM11, p.3, line 49-51</i></p> <p><i>Everyone says I'm really not confident, because of my flexibility, obviously everyone else is like 'leg up here', and I'm not. So, obviously it's hard watching everyone else get their legs up and I can't do that. But they always just say you're getting better, just keep working on it. But apart from that, just confidence is everything apparently. I don't have a lot LM11, p.4, line 101-105</i></p>
Unknown outcomes	<p><i>a lot of my friends are, like, fully developed and near the point of stopping growing...I'm only just starting. LM14, p.6, line 141-144</i></p>

	<p><i>if you grow the wrong way then you just won't make it as a ballerina so it really depends on how you grow as well. LM18. p.2, line 64-65</i></p> <p><i>I'm not sure, because I'm so focused on becoming a ballet dancer, that's all I want to do. Obviously, later these changes that I don't know if I'll end up getting big developed or if it's not the right shape for ballet, then that would affect it. I'd still be really focussed and I'd have to come to reality. LM12, p.4, line 111-114</i></p> <p><i>...you don't want to grow too much or you don't want to get really tall, or you don't want to have breast development, and stuff, too much. So it's definitely important when you go to auditions for companies... That's the first thing that they ask for. You have to take photos and that's obviously to see... So you think, okay, you have to go through puberty — it's not an option. But developing, but not too much, is ideal. — LM12, p.2, line 45-54</i></p>
Feelings of social embarrassment or exclusion	<p><i>It's a bit embarrassing, but you get over it...Because they're all developed, and I'm just like... not developed at all...Socially, it's embarrassing, because people notice it LM11, p.3, line 69-77</i></p> <p><i>I thought I was the more immature one, because everyone else seemed to be more developed and like they could talk, you know, they would talk about it and stuff and I would just be like "I have no idea because it has not happened to me yet". I don't know, I think of it like 'the young one'. LM15, p.6, line 168-171</i></p> <p><i>I was like, yes, so underdeveloped. Like more underdeveloped than everyone else. And other girls, even in first year, they had like boobs and stuff, and I'm still wearing a vest, that's so embarrassing. LM15, p.5, line 115-117</i></p>
Asynchrony between physical and mental feelings of maturity	<p><i>Well it can be bad sometimes just because you still feel like a child. When other people talk about stuff you don't really understand because you don't have any experience. It's embarrassing...it just is because it makes me feel like I'm not a teenager. LM18, p.7, line 207-212</i></p> <p><i>I think that as well, I just, kind of, want it to happen because, yes, I just feel like, I don't really look mature and I think when you're dancing, like, because I'm getting older you need to have that, like, look of maturity and stuff and I think it would be good for that. LM19, p.4-5, line 114-117</i></p> <p><i>It would make you feel more mature, and like more grown up, which obviously is a good thing at this age. Because we are having to move down so we are having to be mature and stuff. So, I guess it just makes you feel a bit more, like people take you more seriously, if you know what I mean? LM15, p.8, line 235-238</i></p>

Table m. Seeking support and reassurance

Sub-theme	Qualitative evidence
Advice and reassurance from peers	<p><i>Because all my friends are really supportive of you, you can talk to them because they've been through it all. Then you've got your parents as well. Then the teachers are very supportive of that as well, if you've got something or whatever — they're very supportive, yes. LM12, p.7, line 180-183</i></p> <p><i>I think later it's easier to work with I think...Probably because you know what all your friends are doing and how they are coping with it and then it's more advice to be honest. LM13, p.3, line 84-87</i></p> <p><i>I can't really think of anything that would help your training with that. But it does make it a bit more, like because girls obviously have to wear leotards and white, pink ballet tights, so obviously it's a big thing when you do have a period and stuff... Like, girls all look out for each other in the class and just make sure that, you know. LM15, p.3, line 68-74</i></p> <p><i>Also, talking to my friends helps me a lot, I talk to my friends if I'm upset. I'm one of those people that gets emotional, a lot. P11, p.5, line 161-163</i></p> <p><i>Well, they always tell me that it's going to be okay and all that. Because I've found that when I'm going through a growth spurt, I know about it because I'm always eating. 180-182, p.4, P17</i></p>
Teacher awareness and understanding	<p><i>I think teachers know. Like, if you start to lose your flexibility or whatever, then teachers recognise that that's why. You're not just stopping; you are...You are growing, and that kind of thing. Especially here, the teachers are really supportive and they understand. If you are struggling with something, then they will help you. LM14, p.6, line 156-162</i></p> <p><i>Yeah, the teachers are really supportive. When I was in second year, I went through a period where I hated school and I just wanted to leave. And I went to my head teacher every day because he was so supportive but now I have that again, I think it's because... he said it was because of injuries at the time. It was that my knees were not as good, but he thought it was because of that and it was, because now I have that again, but he was really supportive of a lot. LM11, p.6, line 170-175</i></p> <p><i>...one of our jazz teachers...she was like, 'you've improved so much, but I know you're growing and that, maybe once you've stopped you'll just be a lot more flexible'. And like my ballet teacher, he understands; there's me and another boy, he's the same he grows a lot then... he can't... he's not flexible. And he's really supportive of us, he's like 'I know you're growing etcetera'. LM11, p.7, line 213-218</i></p> <p><i>I think the thing that helps me most is when people understand. Like, if you tell somebody that you are growing, or you are having these pains or whatever, and they say, "Oh, yes, I know what you are going through. You can do this, but don't do this. Take it easy." And you think, "Right, they know what has happened. They know that I'm not just, like, not joining in or whatever... I think that really helps me, knowing that somebody understands where I'm coming from and what is going on." LM14, p.10, line 217-279</i></p>

Appendix I – One Dance UK: Placement report and Information Sheets



Summary Report – Growth and Maturation Survey

An online survey was distributed via email to One Dance UK members and via social media. The aims of the survey were to find out about the current provision for education/training on this topic; to learn more about which aspects of growth and maturation dance teachers want to know more about; to develop a greater understanding of where teachers feel the gaps in their knowledge are regarding this topic; and to find out about the types of resources dance teachers would find most useful for CPD in this area.

RESPONDENTS

Dance professionals from a wide range of backgrounds participated in the survey. Thirty seven dance professionals completed the survey, 1 male and 36 female. 91.9% Caucasian, 2.7% black, 5.4% mixed race. The majority of respondents were from London (18.9%), East Midlands (10.8%), North West (8.1%) and South West (8.1%), South East (10.8%), West Midlands (5.4%) and Yorkshire and the Humber (5.4%), East of England (2.7%) and Scotland (2.7%). The rest of the respondents selected 'other' (Europe and USA – 27%).

The average age of respondents was 38.5 years with a range from 23 – 63 years. The majority of teachers reported having been teaching for 11+ years suggesting that most have a good level of experience in the profession. Sixty three percent of teachers reported that the majority of the students they teach are between 10 and 18 years old. While the majority of respondents work with this age group, confidence in knowledge about growth and maturation was varied. This may suggest that growth and maturation is an area which not all dance teachers have access to information about within their initial training and subsequent CPD opportunities. The majority of teachers who responded work in recreational, private dance school contexts (27%), 24.4% in vocational dance teaching, 16.2% in university and higher education contexts and the rest in primary/secondary school (10.8%), community/youth dance context (10.8%) and those who reported working across a range of these contexts (10.8%).

In terms of training, those who responded came from a wide range of training backgrounds, the majority reported being trained at university (undergraduate level) via a BA Hons in Dance or Dance Education. Some mentioned specific dance teacher training courses such as those of the RAD, ISTD and BATD (total 18.9%). The wide range of training backgrounds will be key to consider with regard to any resources developed on this topic in terms of the specific requirements and the way in which information on growth and maturation will be applied to these different contexts. To analyse patterns between the needs of teachers in different contexts a larger sample of respondents would be needed, alternatively, we may be able to develop a greater understanding of this through focus groups with dance professionals who work in different contexts. For example, one teacher wrote "In the recreational schools where I have taught there is absolutely no monitoring of growth spurts or even discussion around this theme". It will be important to consider what level of knowledge, monitoring and management is necessary and feasible in this context and how best to communicate the information to those who teach in a recreational dance context.

GROWTH AND MATURATION KNOWLEDGE: AREAS FOR CPD FOCUS

The topics teachers rated themselves as the least confident in were biological changes at puberty and their effect on health and wellbeing (35.1% reported little to no confidence), impact of maturity timing on physiological/psychological development (37.8% reported little to no confidence) and approaches to managing and monitoring puberty (45.9% reported little to no confidence). Therefore, resources on the topic of growth and maturation should aim to address the areas of maturity timing, managing and monitoring puberty and biological changes at puberty in terms of their effect on health and wellbeing. The written comments given by respondents regarding what they would like to learn more about (detailed in the full report) will be used to guide the content.

The topics teachers rated themselves as the most confident in were physiological changes at puberty and how they affect health wellbeing and performance (56.7% reported good to absolute confidence) and physiological changes at puberty (45.9% reported good to absolute confidence). This would suggest that the physiology of growth and maturation is an area that teachers feel the most comfortable with and yet this is one of the topics (95%) respondents expressed that they would be interested in learning more about – perhaps this is an area in which more advanced training could be provided. Teachers expressed an interest in learning more about best practices during the growth spurt (e.g. what to avoid and how to adapt), the ages at which the growth spurt tends to occur, more information on growth-related injuries, male/female differences and ways to cater to students during the growth spurt (either through strength/conditioning or adaptation of class material).

The majority (89%) of dance teachers who responded were interested in learning more about all topics, with the most interest in physiological changes at puberty, psychological changes at puberty and psychological changes at puberty in relation to health and wellbeing (95%). The high rate of interest in learning more about all aspects of growth and maturation suggests that there is demand for further resources in this area.

The top three topics teachers felt CPD materials were most need for were approaches to managing and monitoring puberty, the impact of maturity timing on physical/psychological development and physiological changes at puberty. Closely followed by psychological changes at puberty in relation to health and wellbeing.

This aligns with the areas that dance teachers reported having the least confidence in (maturity timing and managing and monitoring puberty) and confirms that these may be key areas to focus CPD provision on. It also highlights physiological changes an area that many professionals feel confident in, yet would like to develop further. While biological changes and their implications for health and wellbeing were highlighted as an area which teachers had low confidence in, perhaps teachers do not see its relevance as clearly as the physiological aspects. Perhaps this is an area to focus on in terms of raising awareness.

EXPOSURE TO THE TOPIC OF GROWTH AND MATURATION IN TRAINING/EDUCATION

Over half (59.5%) of teachers reported that they had not received any education or training on this topic. Perhaps this suggests that growth and maturation is not an area that is covered in great depth within dance teaching/training courses or is covered in some, but not all programmes. Further research on the provision of growth and maturation knowledge within teacher training programmes may be useful in order to see what the basic provision is in this area and how greatly it varies across courses and qualifications. If all teacher training

programmes covered the basics then CPD resources could focus on developing and advancing this knowledge. For now, the results from this survey suggest that it is important to cover both the basics and more advanced levels.

Around forty percent of teachers had previously received education/CPD training in this area. Experiences of education in this area addressed a wide range of aspects including psychological and physiological changes through puberty and adolescence. In terms of what they felt was valuable about this training, most teachers described this with reference to outcomes such as direct changes they could make to their teaching practice/applying what they had learnt to the classroom. Some teachers also highlighted the importance of education on this topic for students as well as teachers, which may be worth exploring further. Respondents identified a number of areas they felt were lacking in terms of this training, including practical ways to manage these changes, more regular opportunities to update and advance knowledge on this topic and more detailed courses for experienced teachers. New resources should aim to address these areas for improvement and perhaps should focus on the following:

- Maintaining a practical and applied focus; how to apply knowledge to teaching contexts rather than just providing information
- Providing more regular opportunities to learn about this topic
- Catering to all levels to ensure that more advanced as well as basic knowledge is being offered.
- Offering a time/space to share experiences and practices as well as providing information

Training on this topic was provided via a number of different courses/qualifications, through a variety of courses (e.g. BA Hons, MSc, ISTD, DDE) and CPD/additional training (e.g. Seminars and info through IADMS and Dance UK). This suggests that some courses such as the BA Hons and ISTD qualifications seem to be covering the basics of development, though it also shows that there seem to be a lack of additional training opportunities specifically targeting growth and maturation in dance. Rachel Rist's seminars have been mentioned – it would be good to learn more about these and the content that is covered.

RESOURCES FOR GROWTH AND MATURATION

When looking for information on the topic of growth and maturation, dance teachers reported using the following three resources the most: journal articles (23.8%), the internet (23.8%) and asking colleagues (21%). Perhaps relevant journal articles could be made more readily available to dance professionals – many expressed an interest in updating their knowledge on this area – perhaps some form of online space for discussion/sharing of experiences and practices and somewhere to share the latest articles etc. could be useful.

Teachers surveyed were asked to select the top 3 resources that they would be most likely to use: information sheets (30 votes, 20 of these selecting it as a #1 choice), workshops/HDP talks (27 votes, 16 of these selecting it as a #1 choice), videos (28 votes, 13 selecting it as their #1 choice) and booklets/leaflets (24 votes 13 selecting it as their #1 choice). Other suggestions included infographics (with reference to IADMS infographic by Derrick Brown), internet/online sources and apps.

- Information sheets appear to be a popular choice and would be a suitable way to provide an update on the more basic information.

- Workshops/HDP talks would be the most practical way to communicate more advanced information on the topic of growth and maturation; for teachers to begin to apply the information in a practical context; and for teachers to have a space to share their experiences and practices.
- Videos are a good way to provide both basic information and practical examples to a wider audience. The challenge with this resource is that it would represent a more time intensive option and would perhaps be more realistic as long term aim.
- Updating any current booklet/leaflet information would be worthwhile.
- It is also worth exploring more digital options such as infographics, as a good way to communicate the basics to a wide audience.

PROPOSED FOCUS AND RESOURCES

1. Information sheets covering the basics: *Two - 1 covering physiological changes and 1 covering psychological changes – providing an update on basic info. Both with a brief intro which covers biological processes, explains the changes and how they impact upon performance/wellbeing.*

2. Workshops/HDP talks: (1) Maturity timing, (2) managing and monitoring growth + maturation, (3) Introduction to growth and maturation

Maturity timing (psycho-soc. Aspects/physiological aspects) and managing and monitoring growth + maturation. Both would provide information but also opportunities to practice applying this information and also provide space/time to discuss experiences and practices. These should cater to the more advanced teachers and could be a good forum for discussing how to apply this info across different teaching contexts. A talk on 'Introduction to growth and maturation for dance' to cater to those who haven't had an opportunity to cover the basics or want to update their knowledge (phys, bio and psych).

3. Advocacy campaign to raise awareness - develop a plan to raise awareness on the topic.

The growing dancer: Physiological challenges

This information sheet is Part 1 of a two-part series dedicated to the adolescent dancer. Part 2 addresses the psychological and social changes adolescence brings for young dancers.

This information sheet provides an overview of the physiological changes which happen at puberty, such as increases in height and weight and development of secondary sexual characteristics, and the implications of these changes for young dancers.

Puberty presents both opportunity and challenge for young dancers. On one hand, dancers benefit from improvements in strength, motor skills, and the activation of new motivational tendencies. On the other, sudden changes in size and shape can disrupt flexibility and co-ordination, adversely impacting dance performance and increasing risk of injury. With the onset of puberty, many dancers also become anxious and more self-conscious about their shape and appearance; placing them at greater risk for the development of affective (i.e., emotional) disorders, specifically those related to physical attributes and performance.

This information sheet examines the physical, morphological, and functional changes that accompany puberty, including the differences between boys and girls. It also discusses the implications that such changes may bring for performance and injury risk.

Biological basis of puberty

Early adolescence is characterised by physical changes to the body resulting from the onset of puberty, these changes have a biological basis. Puberty, itself, involves three distinct hormonal events, namely:

➔ **Adrenarche**

➔ **Gonadarche**

➔ **Activation of the growth axis** (starting the growth spurt)

The timing of these events is illustrated in Figure 1; highlighting the gender differences in the onset of each event, and the specific pubertal events and physical changes which are initiated (Blakemore et al., 2010; Petersen & Taylor, 1980).

Puberty

- The process of physical changes through which the child is transformed into its adult state, capable of sexual reproduction
- A hormonally driven process resulting in marked changes physique, form, and function; including notable increases in height and weight, sexual dimorphism, and the appearance of secondary sex characteristics.
- Plays an important role in the activation, reorganization, and rewiring of brain structures; profoundly impacting emotions, motives and drives (Blakemore, Burnett, & Dahl, 2010; Rosenfield, 1991; Tanner, 1962).

Adolescence

- A transitional period of growth and development that occurs between childhood and adulthood.
- Whereas puberty describes only physical maturation, adolescence encompasses physical, cognitive, and socio-emotional maturity (Blakemore et al., 2010).
- Not a single event but a series of interrelated changes which occur over a long interval of time and span several domains of growth and development (Dorn, Dahl, Woodward, & Biro, 2006).

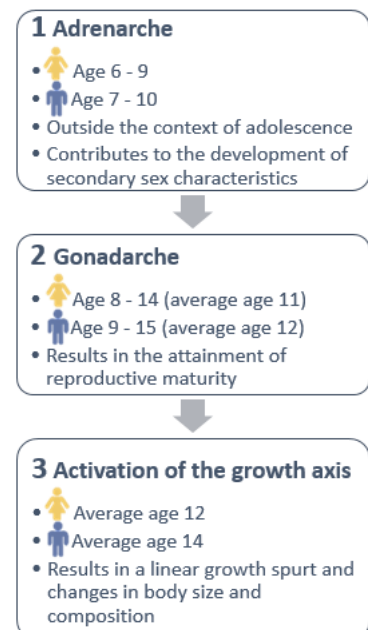


Figure 1. Hormonal events at puberty

Developing a greater awareness of when these hormonal events are likely to occur can enable dance educators to better understand the biological and physical development of their students and to consider this within training and evaluation.

Physical changes

Many physical changes take place during puberty:

- Increase in height and weight
- Changes in the accumulation and distribution of body fat and lean mass
- Development of a variety of secondary sexual characteristics (e.g. breast development)
- Shifts in body proportions.

The sequence of these changes varies significantly between boys and girls. Similarly to the timing of biological changes, a greater understanding of the sequence of specific physical changes can help to inform training practices with adolescent dancers.

Diagrams of the sequence of events at puberty show the averages for boys (Figure 2) and girls (Figure 3) in relation to age. The figures alongside indicate the range of ages within which some of the changes take place and the numbers (below) refer to the stage of development.

Testis & genital development	Penis development	Height spurt & Strength spurt	Pubic hair
Testis development begins between ages 9.5 – 13.5, complete by ages 13.5 - 17	Begins between ages 10.5 – 14.5 Complete between ages 12.5 – 16.5	Height spurt begins between ages 10.5 – 16 Height spurt complete between ages 13.5 and 17.5. Average age at peak height velocity is 14 Apex strength spurt at age 15.5	Stage 2 -3 of development between ages 12-13.5 Stages 3-5 of development between ages 13.5 – 16
Genital development stages 2-3, age 11.5 -12.5. Stages 3-5, age 12.5 -15			

Figure 2. Average sequence of events for boys at puberty in relation to age.

- ➔ Girls tend to mature around 2 years in advance of boys and so will experience physical changes at an earlier age.
- ➔ The growth spurt is likely to have the most significant implications for training and performance. For example, during and after the most rapid periods of growth, increased risk of injury, reduced flexibility, co-ordination and balance are likely.
- ➔ For young female dancers, age of menarche often begins in delay of general population norms, with an average age of 13.1 – 13.9 compared to 12.4 – 12.8 (Burckhardt, Wynn, Krieg, Bagutti, & Faouzi, 2011; Hamilton, Hamilton, Warren, Keller, & Molnar, 1997; Steinberg et al., 2008).

Breast development	Height spurt	Pubic hair	Menarche
Age 8 -13: Stages 2-4 of breast dev Age 13-18: Stage 5 of breast dev	Age 9.5 to 14.5 Average age at peak height velocity is 12	Age 11 - 14	Usually the last physical sign of puberty occurring between ages 10 - 16.5 Average age of onset 12.4 – 12.8

Figure 3. Average sequence of events for girls at puberty in relation to age.

- ➔ Many people believe that engagement in professional dance training results in delayed maturation. While participation in any activity that results in a negative energy balance (i.e., less energy in than expended) can inhibit growth and maturation, there is limited evidence to suggest that dance, per se, is a cause of delayed maturity. Rather, it appears that dance, as an activity, selects for those individuals who possess the most ideal (functional and aesthetic) physiques. As late developing females tend to possess more linear physiques (i.e., lower body mass, higher ratio of lean mass to fat mass), it is not surprising that these individuals are more proportionally represented in dance.

- ➔ An awareness of when the growth spurt is likely to happen for your students and an understanding of the additional challenge and increased injury risk associated with adapting to these changes, during the ‘relearning period’ (Bowerman et al, 2015) will enable realistic expectations of progress during this period and will also enable you to adapt training accordingly.
- ➔ More visible changes, such as breast development for girls, are important to consider in terms of adjustment to new physical proportions and the potential for increased self-consciousness.

These physical changes at puberty significantly alter a young dancers’ body and in turn, have implications for performance, technical ability and injury risk. A key event for young dancers is the growth spurt resulting from activation of the growth axis (for a description of the adolescent growth spurt, see Daniels, Rist, & Rijven, 2001). Though individuals of the same chronological age may vary by up to several years in terms of their biological maturation (chronological age is not a good indicator of physical development at puberty), the average time for this growth spurt to take place among non-dancers is around age 12 in girls and age 14 in boys and takes on average around 3 years from beginning to completion (Malina, Bouchard & Bar-Or., 2004). This age is especially significant as it coincides with a time when most dancers commence more serious training, a greater number of hours of training each week, and take on new physical challenges in training e.g. many young ballet dancers begin pointe work at this age.

Implications for performance

Most changes to physical performance are attributed to the timing of growth spurts and/or anatomical and functional changes in the joints which occur during adolescence (Malina, Bouchard, & Bar-Or, 2004). Basic physical changes such as increases in height, body fat and muscle mass have a **temporary** but significant effect upon physical performance in a number of ways:



Figure 4. Implications of growth upon physical performance and capacity

Gender Differences

Gender differences are also important to consider.

- Girls mature, on average, around 2 years in advance of boys.
- *Sex differences are notable in both strength and motor performance.
- Gender differences in these physical parameters become noticeable around age 14 and may be increasingly challenging for young dancers as these physical factors are key to maintaining and improving dance technique and performance.

In girls **strength** and **motor performance** (i.e. the ability to perform physical skills) have been shown to peak during adolescence and even to decline, while the opposite can be seen in males where strength and motor performance tend to increase throughout adolescence (Espenschade, 1940; Jones, 1938, 1949; Malina et al., 2004). For male dancers these changes will be advantageous, enabling greater power and strength for grand allegro movements and could be emphasised during this period. While for female dancers, some will be at their peak strength and motor performance benefitting their dance performance, and for others who experience reduced strength and motor performance, encouragement may be needed to develop these aspects.

Sex differences in relation to physical performance can be attributed to greater relative fatness in girls and greater leanness in boys, which exert opposite effects on performance. The former has a negative effect on most motor performance tasks and the latter has a positive effect, attributed to increase in size and muscle tissue (Thomas & French, 1985). For both male and female dancers, overall there is likely to be a decrease in technical skill and control, decreased coordination and balance and changes to alignment necessitated by increased limb length relative to the spine which will be challenging for a young dancer to adapt to (Bowerman, Whatman, Harris, & Bradshaw, 2015; Daniels, Rist, & Rijven, 2001).

Flexibility is a particularly important component in dance and can be disrupted by growth of the lower extremities and the trunk during growth spurts (Malina et al., 2004). While average flexibility is reported to increase in girls age 11 - 14 before reaching a plateau, young dancers may not be as flexible as they or their teachers would expect or want for training. It is clear that growth can affect flexibility for young dancers due to the fact that the skeletal system matures in advance of soft tissues. Due to the nature of dance movements any loss in flexibility may be especially evident and challenging to adapt to. These changes will impact upon some of the core dance movements, for example, reduced strength and flexibility will result in lower leg extensions, reduced balance and coordination will affect pirouettes and balance positions and as technical control decreases, risk of injury increases (Daniels et al., 2001).

- ➔ **Adapting the focus of training during this time can help young dancers both physically and psychologically. For example, focussing on development of musicality and artistry as well as working through the relearning period on the more technical aspects will help young dancers to feel they are still progressing with their training and takes the focus away from the challenges of adjusting to a changing body which can easily become negative and frustrating.**
- ➔ **It may be especially helpful to emphasise how movements feel as opposed to how they look during this time, to reduce training load and adapt exercises for students experiencing their most rapid periods of growth.**
- ➔ **Flexibility is most responsive to training during childhood and as a dance teacher this is the ideal stage of development in which to promote this attribute. Due to an asynchrony between skeletal and soft tissue growth at adolescence, flexibility can be disrupted, during this period the focus can be shifted to maintaining flexibility rather than promoting it.**
- ➔ **These changes inevitably lead to young dancers struggling with movements which they are used to being able to perform, this can increase risk of physical injury and psychological effects such as loss of confidence, reduced motivation and increased self-consciousness.**
- ➔ **It is important that young dancers understand that these changes, such as reduced flexibility, are temporary.**

Implications for injury risk

In addition to these functional and physical changes, there are challenges and increased injury risk associated with adapting to these changes. During this 'relearning period' young dancers must relearn technique and re-programme this technique to adjust to new biomechanical challenges, such as decreased strength, power and flexibility and rapid change in limb length (Bowerman et al., 2015; Phillips, 1999). During this period of rapid growth, susceptibility to injury is increased. Factors such as temporary low bone mass and adjustment to new biomechanical challenges can coincide with increased intensity of dance training.

Increases in the mass of the skeleton during puberty are mainly attributed to an increase in skeletal size, not to increased skeletal volume and density. The asynchrony between the rate of growth in stature and accumulation of bone mass reduces the bones' resistance to mechanical stress and therefore increases the risk of injuries such as stress fractures in high impact activities such as dance (Bonjour, Theintz, Buchs, Slosman, & Rizzoli, 1991; Bowerman et al., 2015; Fournier, Rizzoli, Slosman, Theintz, & Bonjour, 1997; Theintz et al., 1992). This is most severe at the point of most rapid growth, around age 11 - 12 for females, 13 - 14 for males, and can continue for 3 to 4 years. This coincides with increases in the intensity of dance training, leaving young dancers at high risk of overuse injuries (Bowerman et al., 2015; Fournier et al., 1997).

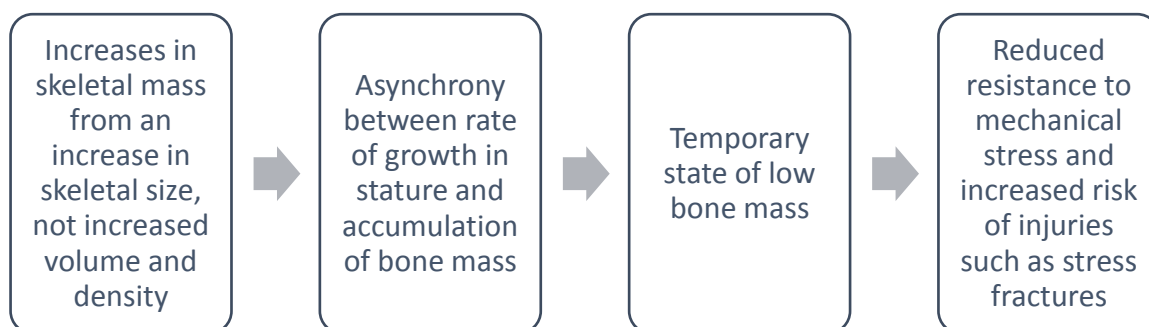


Figure 5. Skeletal growth and injury risk

Young dancers' growth rates are also associated with injury risk (Bowerman, Whatman, Harris, Bradshaw, & Karin, 2014). Differences in foot length growth have been found to be associated with small to moderate increases in risk of lower extremity overuse injuries in elite adolescent ballet dancers. While the sample size in this study was small (N=46) and thus, further research is warranted to substantiate this risk, the study highlights rate of growth as a potential factor which contributes to increased injury risk in young dancers (Bowerman et al., 2014).

The timing of maturation can also have implications for injury risk, in particular for young female dancers who are delayed in maturation where the incidence of fractures has been reported to rise with increasing age at menarche (Warren, Gunn, Hamilton, Warren, & Hamilton, 1986). This increased risk of injury is associated with prolonged hypoestrogenism, referring to a lower than normal level of oestrogen, and is a well-recognised complication of weight loss, dieting and physical training in girls and young women (Tanchev, Dzherov, Parushev, Dikov, & Todorov, 2000; Warren et al., 1986). Delayed growth and maturation lead to a prolongation of the vulnerable growing years, exposing the growth plates to the influence of adverse mechanical factors such as pressure, impact and microtrauma for a longer period (Tanchev et al., 2000). Further injury risk factors identified in adolescent gymnasts, which may be applicable to young dancers, include skeletal immaturity, insufficient rest periods and repetitive movements (DePalma, 2006; Wyatt, 2015).

Summary

Puberty clearly represents a challenging time for young dancers and many of these challenges can be overcome with the guidance of the dance teacher. Awareness of the physical changes that dancers go through during puberty and gender differences, and how these changes impact upon performance and injury risk can equip dance educators to make this transition through puberty as adaptive as possible. There are several ways in which schools and teachers can work towards reducing risk of injury during adolescence. Monitoring and measuring growth and maturation can help to predict most rapid periods of growth, identify maturity timing and inform any adjustments to training schedule and load. Remaining mindful of additional risk factors such as insufficient rest, reduced flexibility and strength and individual differences in maturity timing can enable more personalised approaches to the training of young dancers.

While the physical changes of puberty present challenges to young dancers in terms of technique, performance and injury risk, further conflicts can arise between pubertal changes and physical appearance, which can become increasingly important for young dancers auditioning or being assessed. Desirability of pubertal changes may also depend on the gender of the individual. For example, in dance, pubertal changes may have more apparent advantages for boys, bringing the benefits of strength and power (Buckroyd, 2000; Pickard, 2012). In particular, for young female dancers, the more overt changes such as breast development and increases in fat mass, alongside the temporary changes to their physical capabilities, can have a significant effect upon feelings of self-consciousness, self-confidence, body image and identity. Healthy adaptation to these physical changes is critical; adaptation at this point can heavily influence the trajectory of future psychological wellbeing.

Healthy adaptation to these physical changes is often effected by social context. Involvement in elite sport or dance at adolescence may place considerably higher pressure on successful and rapid adaptation to physical changes. These challenges will be discussed further in part 2 of this series dedicated to the adolescent dancer: *Psychological implications of puberty in dance*.

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Psychological implications of puberty in dance

This information sheet is Part 2 of a two-part series dedicated to the adolescent dancer. Part 1 deals with the physiological changes puberty brings for young dancers and implications for training and performance.

Puberty is a developmental stage associated with marked changes in human drives, rapid changes in hormone levels, psychology and social life (Blakemore, Burnett, & Dahl, 2010; Rosenfield, 1991; Tanner, 1962). As someone who works with young dancers you will observe noticeable changes in how children, think, feel, and react to others as they enter puberty. You will also see differences in what motivates and interests them. It is important to acknowledge that the physical changes of puberty comprise just one set of maturational processes within the period of adolescence; **adolescence** spans the development of cognitive, emotional and social competencies. The term development describes an increase in competence across a number of interrelated domains including social, intellectual, cognitive and emotional competence (Malina et al., 2004).

Psychological development is composed of both cognitive and emotional components.

Cognitive development i.e. how an individual perceives and rationalises things, is related to age and experience, rather than physical maturation; skills such as planning, logic, reasoning, inhibitory control (control of attention and motor responses), understanding consequences and problem solving are not directly linked to puberty and can continue developing into the early twenties (Dahl, 2004). This disparity in timing between the physical and cognitive development can create vulnerability for the young dancer: while a dancer may be physically and sexually mature, with regard to the brain and the body, they may be relatively immature in terms of self-control and the ability to regulate feelings (Dahl, 2004). This disconnect can leave young dancers at risk of developing behavioural and emotional problems, as they try to master strong emotions and complex social situations and behaviours such as sensation seeking and risk taking. Girls who enter puberty at an earlier age are, from a cognitive and socio-emotional perspective, less prepared to deal with the increased pressures and expectations that adulthood bring (Sherar, Cumming, Eisenmann, Baxter-Jones, & Malina, 2010). As a consequence, early maturing girls are, as a group, are more likely to engage in maladaptive coping behaviours and/or health risk behaviours, such as smoking and drinking.

Emotional developments also take place throughout adolescence. Puberty increases desire for specific types of emotional experience, particularly arousal and excitement (Dahl, 2004). A young dancer may seek out experiences such as pushing the boundaries of their physical capabilities in dance, or pursuing new activities altogether unrelated to dance as these appear fresh and exciting. This development has the potential to create both vulnerability and opportunity. Vulnerability created by seeking out these high-intensity feelings through reckless behaviour and opportunities created through harnessing these emotions to work towards positive goals (Dahl, 2004).

The context of dance

While the physical changes experienced during puberty necessitate changes to psychological aspects such as perceptions of self, young dancers must contend with these basic adaptations within a context which subjects them to amplified risk. For example, while individuals are at a high risk of developing eating disorders at adolescence, experiencing adolescence within the context of dance amplifies this risk (Arcelus, Witcomb, & Mitchell, 2014; Brooks-Gunn & Warren, 1985; Klump, 2013).

In a study comparing dance and non-dance students, the social context of dance has been found to amplify detriment to psychological wellbeing associated with puberty. Adolescent dancers reported higher incidences of disordered eating, more negative body image and lower self-esteem compared to their non-dancing counterparts (Brooks-Gunn & Warren, 1985).

→ Many psychological issues such as disordered eating begin at adolescence; how young dancers adapt to physical and social changes at puberty can set the foundations for long term psychological wellbeing.

Dance, as a form of physical activity, has the potential to cause both harm and benefit to the individual. Recreational dance is associated with more positive psychological outcomes such as greater self-esteem and more adaptive motivation, which promotes positive and sustainable involvement in dance (Quin, Frazer and Redding 2007). While vocational dance training has the potential to foster similar health benefits but also exposes young dancers to additional risk for both physical and psychological wellbeing (Buckroyd 2000). Factors which may serve to generate more negative effects in vocational training include greater exposure to high pressure environments, potentially negative learning experiences/environments and expectations for physique and performance level (Annus & Smith, 2009; Buckroyd, 2000). When we consider this alongside the cognitive and emotional developments described above, the adolescent dancer is highly vulnerable to developing problem behaviours and psychological wellbeing is at risk.

Impacts on the Dancer

The potential for these pubertal changes to impact upon psychological wellbeing, dropout and participation in physical activity may be greater in contexts such as dance where there can be high pressure to conform to a particular size and shape and to adapt quickly to physical changes. In the context of dance, positive or negative perception of changes may be influenced by when they mature in relation to their peers and the extent to which they meet the social and physical demands of dance. How these changes are experienced and interpreted by a young dancer can be significant in determining positive or negative health outcomes.

Psychological wellbeing

How well a young dancer adapts to changes at puberty is a key determinant of subsequent psychological wellbeing (Ackard & Peterson, 2001; Summers-Effler, 2004; Tremblay & Frigon, 2005; Tremblay & Lariviere, 2009; Yuan, 2012). Research holds that girls are at greater risk in comparison to boys, with girls reporting more peer pressure to lose weight, more negative comments about weight and appearance and experiencing more long term symptoms (Tremblay & Lariviere, 2009; Yuan, 2012). Key issues for female adolescents include negative body image, low self-esteem, reduced physical self-concept, depression and disordered eating (Brooks-Gunn & Warren, 1985; Cumming et al., 2011; Tremblay & Lariviere, 2009; Yuan, 2012). While, for girls, body satisfaction

tends to decrease with age, for males it tends to improve. In general, boys tend to experience either a limited short-term effect or a positive influence on their psychological wellbeing as a result of physical changes at puberty (Yuan, 2012, 2007; Angold et al, 1998).

Dropout

Research suggests that most adolescent girls do not achieve sufficient physical activity levels for health, particularly when compared to their male counterparts (Fawkner, Henretty, Knowles, Nevill, & Niven, 2014). There are many reasons why adolescence may present a period where girls choose to reduce participation in physical activity, for example, the increase in body fat percentage and changes in body size and shape which are experienced by girls during maturation may not be conducive to performing physical activity (Malina et al., 2004).

Dropout rates in dance training are high compared to other forms of physical activity with estimates of 53% and 55% in longitudinal studies of young dancers (Hamilton, Hamilton, Warren, Keller, & Molnar, 1997; Walker, Nordin-Bates, & Redding, 2012). Although factors associated with dropout vary with dance style and level of performance, puberty is consistently identified as an interval during which risk of drop out is increased. For girls, early menarche and greater breast development have been associated with drop out from dance training (Hamilton, et al., 1997), while later onset of menarche was associated with more successful adaptation to ballet training among dancers aged 14-18 years (Brooks-Gunn & Warren, 1985; 1989).

Research in youth sports has shown that coaches and instructors who adopt positive and adaptive teaching behaviours report lower dropout rates and higher enjoyment and self-esteem from young athletes (Cumming, Eisenmann, Smoll, Smith, & Malina, 2005; Smith, Smoll, & Hunt, 1977; Smoll & Smith, 2002).

Positive teaching behaviours include

- ➔ Reinforcement (for effort as well as for good performance)
- ➔ Mistake-contingent encouragement (Encouragement given to a dancer following a mistake)
- ➔ General encouragement (Spontaneous encouragement that does not follow a mistake)
- ➔ Corrective instruction (given in a supportive manner)
- ➔ Technical instruction (spontaneous instruction in the skills and strategies of dance)
- ➔ Focus on enjoyment and effort

(Smith et al., 1977)

Negative coaching behaviours, such as punishment, failure to respond to good performance or effort, ignoring mistakes, punitive instruction and regimenting behaviours aimed at keeping control, result in lower perceptions of competence, greater anxiety, and less enjoyment of sport and greater levels of drop out (Cumming et al., 2005; Smith et al., 1977; Smoll & Smith, 2002).

The timing of maturation i.e. whether an individual matures in advance, on-time or in delay of their peers, can play a significant role in continued participation and associated health implications (Cumming, Sherar, Gammon, et al., 2012; Fairclough & Ridgers, 2010; Jackson et al., 2013; Sherar et al., 2010). Girls who mature in advance of their peers generally experience greater gains in fat mass during maturation. Greater gains make these individuals more susceptible to a range of negative psychosocial outcomes such as negative body image, disordered eating, low self-esteem and more

negative perceptions of self within environments that accentuate peer comparison and thinness (Brooksgunn, 1988; Brooksgunn & Warren, 1985; Sean P. Cumming et al., 2012).

There are many reasons why a young dancer may dropout of dance classes in addition to the changes of puberty, such as the timing of puberty and increasing school demands. In order to provide the best support for young dancers, it is important to understand the factors that contribute to dropout and how we can work to minimise it.

Consider the environment you provide and how you include the following...

- ➔ Support for young dancers of differing maturity - modifying the content or environment of your classes to support them
- ➔ Positive teaching behaviours – how you can emphasise these more within your teaching practice

Dancers' self-perceptions

How well a young dancer adapts psychologically and behaviourally at this stage is determined by a multitude of factors. The way in which a young dancer perceives themselves and their body is central to determining the positive or negative direction of psychological health outcomes. The physical, cognitive and social changes experienced during puberty and adolescence necessitate changes to these perceptions of self and can affect their development (Blyth et al., 1985; Brinthaupt & Lipka, 2002).

Perceptions of the self are developed through two main sources, direct appraisals and reflected appraisals (Sebastian, Burnett, & Blakemore, 2008). Direct appraisals are based on an individual's reaction to past experiences and events e.g. reflecting on a comment made by a dance teacher or peer; while reflected appraisals are based on an individual's beliefs about how they are seen by others e.g. feelings generated by self-comparison of body size/shape with peers and assumptions of peer evaluations of the body based on initial self-comparisons (Sebastian et al., 2008).

Direct and reflective appraisals are increasingly important during adolescence, a point when self and social comparison becomes more influential; adolescents begin to compare their performance to their own past and to their peers (Brinthaupt & Lipka, 2002; Sebastian et al., 2008). At this point adolescents begin to understand that others are making comparisons and judgements about them and subsequently place higher value on these judgements and comparisons (Sebastian et al., 2008). This awareness of own perceptions of self and the perceptions of others can be reflected in some typical behaviours displayed at adolescence, such as heightened self-consciousness and susceptibility to peer influence (Forbes & Dahl, 2010; Sebastian, Burnett, & Blakemore, 2008). Positive perceptions of the self are associated with greater psychological health and wellbeing while negative perceptions are associated with issues such as depression and anxiety (O'Dea & Abraham, 1999; Sebastian et al., 2008).

The role of the teacher

How pubertal changes are perceived by significant others within a dancers social context has the potential to influence psychological wellbeing. The 'value' of specific pubertal changes may vary depending on the context; the connotations associated with specific changes within that context may influence how changes are responded to (Petersen et al., 1980). For example, external physical changes, such as an increase in weight, height or breast development, may have more immediate social value to a young dancer and are also likely to have a different significance to the individual

and to her social network than less visible changes (Petersen et al., 1980). With the social context playing an important role in healthy psychological adaptation at puberty, the dance teacher has the potential to play a significant role.

The perceptions and reactions of significant figures such as the dance teacher have been shown to play a role in shaping social expectations regarding the body and pubertal changes (Petersen et al., 1980; Pickard, 2013; Tremblay & Lariviere, 2009; Yuan, 2012). Dance teachers can utilise different approaches to promote psychological wellbeing. Awareness of external expectations and individual aspirations and of strategies to make the pubertal transition less stressful for adolescent dancers may enable teachers to create training/learning environments that are more supportive and protective of physical and psychological health (Mitchell, Haase, Malina & Cumming, 2016). Examples of teacher actions to moderate the effects of puberty include indirect approaches such as covering mirrors to divert focus from the body and direct approaches such as discussing pubertal changes openly with students (Mitchell et al., 2016).

Teachers in various dance contexts can work to optimise the development and psychological wellbeing of young dancers through creating more adaptive learning environments through positive teaching behaviours and a combination of direct and indirect actions to make the pubertal transition less stressful.

- i. Cues and comments focus on positive messages and how movements feel as opposed to what the body should look like
- ii. Raise awareness amongst dancers and their parents about the normal and temporary changes associated with maturation
- iii. Create a protective environment using direct and indirect actions such as reducing use of mirrors and guiding dancer aspirations toward appropriate dance pathways.

To help young dancers adapt positively at adolescence and to develop a more positive sense of self, dance teachers can work to...

- Avoid the use of comments which compare one student to another, and otherwise try to create a *positive motivational climate*, which supports students' basic psychological needs. (See our information sheet on Motivational Climate for more information)
- Reduce the use of or focus on the mirror to help students to minimise comparison with others
- Be flexible about uniform during this time. This may be of particular benefit to young dancers who mature in advance of their peers and are adjusting to a changing body.
- Focus time and attention towards aspects other than technique, which may progress more slowly during this time, such as musicality, performance and strengthening. This can help students to build confidence and make progress in other areas.

In summary, the teacher has an important role to play in facilitating the most positive and adaptive transition through puberty. Young dancers place a high value on the comments and opinions of the teacher and these views can be very influential in determining how a young dancer perceives and adjusts to the changes of puberty. There are many ways in which the dance teacher can facilitate healthy responses in their students. These include indirect and direct approaches to try to mitigate any negative effects of puberty, such as covering mirrors, avoiding comparison and creating an open dialogue with students. For further discussion of the challenges of puberty, see the International Association of Dance Medicine and Science fact sheet: The Adolescent Dancer (Daniels, Rist & Rijken, 2001) which focusses on the growth spurt.

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