DENTAL HYGIENE AND THERAPY STUDENTS EXPERIENCES OF PSYCHOLOGICAL WELLBEING IN THEIR UNDERGRADUATE EDUCATION

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ABSTRACT

Background: Dental schools are recognised to be highly demanding and stressful learning environments. Studies which have examined stress and psychological wellbeing of students within the dental undergraduate environment have, for the last four decades, focused on negative measures of psychological wellbeing. In addition, these studies have been exclusively targeted at dental students; and therefore, ignored the education of other dental professionals.

Aims: The aim of this programme of studies was to explore our understanding of stress and positive psychological wellbeing of dental hygiene and therapy students from both a national and international perspective, and then to utilise this knowledge to implement a possible intervention.

Participants and methods: The research involved a mixed-method approach using validated psychological tools, semi-structured interviews, and participation in an intervention workshop. Statistical analyses of quantitative data collected were handled with SPSS™ software. Thematic analyses of students' experiences of stress and wellbeing were undertaken using Braun and Clarke's six stages of thematic analysis.

Results: Data showed that dental hygiene and therapy students reported similar sources of stress to that of dental students. However, at the same time, the participants also reported high levels of positive psychological wellbeing. The qualitative study showed that, for dental hygiene and therapy students, the significance of the meaning they attributed to their undergraduate training mitigated much of their stressful experiences. Scores from the intervention study showed that taking a positive approach to the education of stress and wellbeing within the dental hygiene and therapy curricula had a beneficial impact on the way participants understood their experience of stress.

Conclusions: The results from this programme of studies has made a valuable contribution to our understanding of stress and wellbeing in dental hygiene and therapy undergraduate education. Within the limitations of these studies, stress was seen in a broader context. This research brought into question whether eliminating stress was necessary, or indeed relevant, and concluded that psychological wellbeing needs to be explored further. It highlighted the important role meaning held, and the relationship between meaning and stress. It is concluded the need to argue for psychological

interventions/education to be included within the undergraduate curriculum for all dental professionals.

DECLARATION

Whilst registered as a candidate for the above degree, I have not been registered for any other research award. The results and conclusions embodied in this thesis are the work of the named candidate and have not been submitted for any other academic award.

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DISSEMINATION

Peer Reviewed Publications

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Harris, M. (2016). Stress and the dental hygienist and therapist: Is it just all in a day's work? Oral presentation at the British Society of Dental Hygiene and Therapy Oral Health Conference, Belfast, November, 2016 (Appendix E).

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LIST OF ABBREVIATIONS

ACT .....Acceptance and Commitment Therapy
AHS .....Adult Hope Scale
BSDHT.....British Society of Dental Hygiene & Therapy
CfWI .....Centre for Workforce Intelligence
DASS .....Depression, Anxiety and Stress Scale
DCPs .....Dental Care Professionals
DES .....Dental Environmental Stress questionnaire
DH .....Department of Health
DHDTs .....Dental Hygiene and Dental Therapists
DHDTS .....Dental Hygiene and Dental Therapy Students
DHEA .....Dehydroepiandrosterone
DS.....Dental Students
FGDP .....Faculty of General Dental Practice
GDC .....General Dental Council
NHS .....National Health Service
OHT .....Oral Health Therapists
RAF.....Royal Air Force
SA .....South Africa
SC .....Self-Compassion Scale
SD .....Standard Deviation
SFEC .....Science Faculty Ethics Committee (Uni. Of Portsmouth)
SMM .....Stress Mindset Measure
SNS .....Sympathetic Nervous System
SOC .....Sense of Coherence Scale
SPSS™ .....Statistical Package for Social Science
SPWB .....Scale of Psychological Wellbeing
UK .....United Kingdom
UPDA .....University of Portsmouth Dental Academy
USS .....Understanding Self Scale
VIA-IS .....Values in Action Inventory of Strengths
VQ .....Valuing Questionnaire

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1. INTRODUCTION

1.1 Background

The stimulus for undertaking the current research project was the paper 'Invisible patients' published by the Department of Health (DH, 2010). The paper, a report by the 'Health of Health Professionals Working Group', focused on the health issues facing regulated health professionals within the National Health Service (NHS), and identification of priorities to address them. Mental health issues were one of the health problems identified, and at the time of publication, stress related disorders were thought to account for almost a third of the NHS total sickness absence each year, with an estimated cost of £300-£400 million a year (DH, 2010). However, the most significant part of the report was the acknowledgement that creating and sustaining a healthy workplace and a healthy workforce begins at the very start of professional education, and that education and training bodies have key roles in changing the culture in which health professionals study (DH, 2010).

I am a Senior Lecturer on a Dental Hygiene and Therapy undergraduate programme. I was aware that the research which has examined stress in dental students (DS) was generally negative in its reporting of dental school being a highly demanding and stressful learning environment (Alzahem et al., 2011; 2014; Gorter et al., 2008). Although there are conflicting data on the impact of stress on the academic performance of DS (Sanders & Lushington, 2002), there is evidence in the literature indicating that high levels of perceived sources of stress results in psychological morbidity and emotional exhaustion, which is thought to predispose the students to professional burnout both in their undergraduate education and in their later careers (Deeb et al., 2017; Humphris et al., 2002). Studies conducted on stress among DS worldwide report consistent findings of the main sources of stress, such as factors relating to clinical practice, patient management issues, the need to meet academic and clinical requirements, and interactions with clinical staff (Alzahem et al., 2011; Naidu et al., 2002; Polychronopoulou & Divaris, 2009).

However, despite the plethora of research which has been carried out identifying and qualifying stress among dental students, I was also aware that there was virtually no

literature which had examined the psychological wellbeing of the group of student Dental Care Professionals (DCPs) whom I had been teaching over the last twelve years, namely dental hygiene and therapists (DHDTS). DHDTS are important members of the dental team whose scope of practice includes the treatment and management of periodontal disease and caries in both adults and children. In particular, DHDTS play a crucial role in educating and motivating the public about the importance of prevention in controlling oral diseases. Indeed, the numbers of DHDTS predicted to graduate in the future is set to rise (CfWI, 2014). Thus, I recognised a large gap in our understanding of an important group of dental professionals, which I wanted to contribute to. My only real knowledge of stress and wellbeing in DHDTS was from my observations as a teacher, which did not seem to align with the pessimistic and negative picture which was painted in most of the dental literature. Also, drawing from my own experience of dental hygienist education in the Royal Air Force (RAF) which I recalled as very stressful, but at the same time I have always reflected on it as the most fulfilling period of my twelve years in the RAF.

With the notion that a healthy workforce begins at the very start of professional education (Kay & Lowe, 2008; DH, 2010), the aim of my research was to explore our understanding of stress and psychological wellbeing of DHDTS, but in a broader context than that which had previously been examined and reported. Accordingly, the hypothesis was that a more holistic and optimistic view of the psychological wellbeing of DHDTS and DS would emerge using a number of research instruments and methodological approaches. The importance of this research is, that according to recent studies, DCPs in the United Kingdom could provide up to 70% of oral health care by the year 2025 (CfWI, 2014; Evans, Chestnutt, & Chadwick, 2007; Wanyonyi, Radford, Harper, & Gallagher, 2015), and so are an important group of dental professionals to investigate.

To achieve the aim of understanding the psychological wellbeing of DHDTS in their undergraduate education, the objectives were fourfold:

1. To carefully select a range of valid and reliable instruments which measure positive and negative psychological wellbeing in a cohort of DHDTS, including a comparison group of dental students, studying at the same institution. (Chapter 2)

2. To investigate DHDTS stress and wellbeing from a national and international perspective, so comparisons could be made between institutions in different countries. (Chapter 4)

3. To use a qualitative approach of semi-structured one-to-one interviews to triangulate the quantitative data to develop our understanding of DHDTS psychological wellbeing. (Chapter 3)

4. To make use of the quantitative and qualitative data to deliver a brief intervention to enhance the wellbeing of DHDTS, so that they could best manage their mental health in their professional-academic roles. (Chapter 5)

To achieve the aim and objectives of the research presented in this thesis, the contextual framework that psychological wellbeing is not determined by the presence or absence of sources of stress, but is determined by the meaning that is given to the stressor, was adopted.

The introduction in Chapter 1 will first briefly explain the reasons why dental undergraduate education might be considered stressful for a student. It will then proceed to outline what we understand about stress and wellbeing in dental education from the literature which has reported on DS. However, it will question the validity of the measurements which have been used in most of the DS studies over the last thirty-seven years. It sets the scene for the present thesis as the only research to explore positive, as well as negative, perceptions of psychological wellbeing in either DHDTS or indeed, DS undergraduate education.

Second, this introduction will provide an explanation of how I, as a dental professional, and not a psychologist, understand the main reducers of psychological wellbeing (i.e. stress, anxiety, and depression), and their links to the measurements used in this programme of studies.

Third, positive psychological concepts and literature will be presented to further our understanding of a holistic approach to psychological wellbeing. This will include theories that inform our knowledge and understanding of the concepts of meaning, values, goals, and other dimensions of positive wellbeing, and their links to the measurements used in this programme of research.

Lastly, a synopsis of the published papers from this programme of research will be presented, which will be concluded with a discussion and conclusion of the thesis.

1.2 The Stressful Learning Environment

Dental school is known to be a highly demanding and stressful learning environment (Alzahem et al., 2011; 2014). Data from studies have shown that the five-year curriculum for dental students (DS), which involves the acquisition of theoretical knowledge, clinical skills, and interpersonal skills, are reported as challenges unlike anything many of the students would have faced before (Divaris et al., 2008; Polychronopoulou & Davis, 2009). Despite the differences in educational systems, philosophies, and available resources, the requirement for an undergraduate dental student to perform non-reversible procedures in such a confined space, whilst also being personally responsible for a patient's health and safety, in conjunction with a demanding theoretical component, are reported to be common high sources of stress for dental students globally (Humphries et al., 2002; Muirhead & Locker, 2007; Naidu et al., 2002; Peker, Alkurt, Usta, & Turkbay, 2009).

Likewise, the undergraduate curriculum for DHDTS involves the acquisition of theoretical knowledge, clinical skills, and interpersonal skills to successfully complete a three-year programme which, as with DS, requires the students to perform non-reversible procedures in a confined space, and be personally responsible for a patient's health and safety (GDC, 2015). For example, throughout their undergraduate programme, DHDTS need to demonstrate their knowledge and understanding of scientific theories, as well as demonstrating clinical competency in procedures such as treating advanced gum disease; carrying out restorations on teeth; extracting primary teeth; taking radiographs; all of which could potentially cause harm to a patient. The DS curriculum includes all of these procedures, but in addition includes more complex procedures such as extracting adult teeth and carrying out crown and bridge work, for example. Common to both clinical programmes of study, (DS and DHDTS) is that undergraduate education consists of a packed curriculum of theoretical knowledge and practical application throughout the whole duration of the programme. Furthermore, as both groups of students have lengthy academic years due to the clinical commitment associated with the programme, they have much less vacation time per year than

students in other disciplines, which is also a common source of stress reported in the literature (Alzahem et al., 2011; 2014). To summarise, the main differences between DS and DHDTS undergraduate education is the length of the training programme (five years versus three years), and the complexities and range of the dental procedures which each group of students are allowed to perform within their scope of practice. In the UK, this is dictated by the governing body of the dental profession, the General Dental Council (GDC, 2013a; 2015).

The compact curriculum for both DHDTS and DS described above is one of the main reasons why examining the poor mental health of students has been a focus of research into sources of stress within dental training for the last thirty-seven years (Alzahem et al., 2011; Garbee, Zucker, & Selby, 1980; Humphris et al., 2002; Newbury-Birch, Kamali, & Lowry, 2002). It is a widely-held belief that stress within the dental profession often starts during undergraduate education (DH, 2010; Humphris, 1999; Kaye & Lowe, 2008; Patel et al., 2011). Some studies have also shown that unhealthy behaviours, such as high alcohol and drug intake have been used by some dental students as a coping strategy for stress (Barber & Fairclough, 2006; Newbury-Birch et al., 2002). For example, Barber and Fairclough (2006) showed that dental undergraduates were drinking more than the Department of Health recommended weekly limit (0-21 units for males, 0-14 units for females), were binge drinking, and more worryingly, reported that they sometimes used illegal drugs. However, a subsequent study conducted four years later, painted a more optimistic view of the lifestyles of dental undergraduates, and showed there to be much lower rates of alcohol consumption and drug use by this group of students than was shown in the 2006 study (Underwood, Fox, & Manogue, 2010).

Most of the perceived sources of stress in dental education and training appear to be common in dental students from different countries (Humphries et al., 2002; Muirhead & Locker, 2007; Naidu et al., 2002; Peker et al., 2009). Indeed, two recent systematic reviews concluded that researchers consistently reported examinations and grades, workload, patient care, and graduation requirements amongst the top stress-provoking factors (Alzahem et al., 2011; Elani et al., 2014). Furthermore, some DS reported feeling overwhelmed by their experience in dental school to the extent that their physical and mental health, as well as their social life, was negatively affected (Dahan & Bedos, 2010).

Although this previous research into stress in DS has provided a valuable insight into the dental training environment, there is a large gap in the literature when it comes to examining stress in other members of the dental team. To date, the research has been exclusively aimed at student dentists (Alzahem et al., 2011; Elani et al., 2014; Sanders & Lushington, 2002). However, dental hygiene and therapy students have for many years undergone undergraduate training in a similar environment, with similar academic pressures, yet their psychological wellbeing has not been explored. This is thus the focus of this programme of research.

1.3 The Importance of Measurement

Exploring psychological wellbeing is a broad concept which incorporates multiple dimensions, which need multi-item scales, as opposed to single-item indicators, as a valid and reliable measure (Ryff, 1989a; 1989b; Smout, 2014; Snyder et al., 1991). Furthermore, measuring DHDTS psychological wellbeing requires measurements which are underpinned by established theories, and not peculiar notions which do not correspond to the broader body of knowledge (McDowell, 2006). For example, Ryff's Scale of Psychological Wellbeing (SPWB) (Ryff, 1989b) draws on the convergence of criteria generated from the three theoretical perspectives of life-span development theories, clinical theories of personal growth, and mental health literature that articulate the nature of wellness as a measurement of positive psychological wellbeing (Ryff, 1989b). This is in contrast to the body of research of DS stress which has generally relied on a one-dimensional scale which measures only sources of stress in the dental environment, to report on the psychological wellbeing of students (Alzahem et al., 2011; 2014).

The importance of measurement can be drawn from our experiences as clinicians. It is generally considered that the use of a range of measurements to measure the condition of the teeth and gums, as well as other clinical findings to get an accurate, multidimensional diagnosis of a patient's oral health status, is a philosophy which is considered 'good' clinical practice in the field of dentistry (FGDP, 2016). Indeed, this multi-dimensional approach to the skill of diagnosis is the philosophy which underpins the clinical teaching of the University of Portsmouth Dental Academy (UPDA), where I have been a senior lecturer for the last thirteen years. For example, any oral health

diagnosis should involve the collation of information from what the patient has told you about their own general health and oral health experiences; it may involve the need to take radiographs; it will require charting of the teeth and periodontal condition, and any other general observations which the clinician deems as relevant. All of these individual measurements, when looked at together, provide a holistic view of the oral health status of a patient, and ultimately, the diagnosis of the oral condition.

This holistic approach to measurement is lacking in the DS stress literature. The focus on measurements of only poor psychological wellbeing shows that psychological wellbeing has been operationalised in a very narrow manner and has neglected important facets of positive psychological health (Alzahem et al., 2011; 2014; McDowell, 2006). For example, there are no studies which have measured stress in conjunction with measures of what the literature suggest is positive wellbeing, such as purpose in life or personal growth for instance (Baumeister & Wilson, 1996; Ryff, 1989a). The studies have mainly used just one (occasionally two) measurements of the negative aspects of stress or other psychological morbidity to report on the psychological wellbeing of dental undergraduate students (Alzahem et al., 2011; 2012). A large study which examined psychological stress and health in undergraduate dental students in a group of European schools (Gorter et al., 2008), like numerous other studies in the field of dental undergraduate training, relied on the traditional medical model of measuring the presence or absence of physical symptoms of ill-health to examine the association of stress to negative wellbeing. Focusing on only the negative aspects of stress, other studies also showed that stress was associated with high levels of burnout (Davis, Tedesco, & Meier, 1989; Deeb et al., 2017), poor physical health (Gorter et al., 2008), and was detrimental to academic performance (Silverstein & Kritz-Silverstein, 2010). Although an earlier study which examined stress and academic performance found little support for associating high scores for perceived sources of stress with reduced academic performance (Sanders & Lushington, 2002).

To operationalise the current research in a broader context than the existing literature, we first need to understand what are the reducers of psychological wellbeing. That is, we need to understand the nature of the prolonged negative emotions of stress, anxiety and depression.

1.4 Prolonged Negative Emotion

1.4.1 Stress

Stress is a negative emotion that often arises out of the meaning we give to a situation. Indeed, Sapolsky (2004) has used the term 'psychological filter' to define how various people participating in the same event, may differ dramatically in their perception of that event as stressful or not (Sapolsky, 1996; 2004). Data from studies have shown that factors such as past similar experiences, as well as perceived demand and perceived ability to respond to that demand, can make a situation benign, or potentially stressful (Ellis, 2001; Goldstein & McEwan, 2002; Sutherland & Cooper, 1990). In other words, it is not the nature of the event itself which causes the stress, but how some individual thinks that they can cope with it. The perceived demand is what we equate to as the meaning which is given to the event. It is the subjective perspective which individuals take in their meaning-making to the situation which will lead to either a dysfunctional (i.e. stress, anxiety, or depression), or a functional (non-threatening) meaning to the (benign) situation being constructed (Ellis, 2001).

1.4.1.1 Stress and self-worth

This notion of functional versus dysfunctional meaning has been demonstrated in numerous studies which have shown how the same stimulus has been perceived as a threat by one person, a challenge by another, and as largely irrelevant by a third (Crum & Lyddy, 2014; Jamieson, Mendes, & Nock, 2013; Snyder & Mann Pulvers, 2001). For example, a common source of stress as a threat, is the dysfunctional meaning often given to a self – "I am only worthwhile if I am successful". That is, the person's self-worth becomes contingent on how well one performs (and usually how well they are viewed by others) (Ellis, 2001; Hall, Row, Wuensch, & Godley, 2013; Neff, 2003a; 2003b; 2011). To the self that holds this view, it is their truth and of great importance to them, whether it actually reflects reality or not. For example, a student with this belief will develop more stress when completing assignments or studying for exams, than a student who sees their self-worth as immutable (or at least unrelated to their academic performance). For the latter student, it is only about understanding and learning the material. For the former, it is about who they are as a person.

These 'conditions' of self-acceptance that individuals impose on their feelings of self-worth, can often result in people accepting themselves only when they have done well and won the approval of others. Their personal identity is strongly linked with 'what they have done', as opposed to 'who they actually are' (Ellis, 2011; Neff, Hseih, & Dejittherat, 2005). Moreover, in situations where they have not performed as well as they had wished, they may experience low self-worth, and identify themselves as a 'failure', as opposed to the perspective 'I have not performed well on this occasion'. This is likely (i.e. sees self as failure) to increase stress for the next task (i.e. past similar experience) (Dweck, Chiu, & Hong, 1995; Ellis, 2001; Neff, 2011). Within the academic arena, it is quite easy to imagine how a 'high-performing' student might feel the added pressure of examinations. Academics (and students) create expectations (i.e. meaning about high marks as a measure of a 'successful' student) which can trap the student into stress. This expectation means the student must constantly 'live up' to the image of being 'the best' (Baumeister & Wilson, 1996; Ellis, 2011). However, in instances where they may not have performed as well as hoped, high performing students may sometimes be reluctant to discuss their under-performance with their peers, which without the benefit of social support, can often result in isolation for that individual (Neff, 2003a; 2005; 2011; Hall et al., 2013).

Paradoxically, a 'low- performing' student, who does not see their self-worth as contingent on doing well, may possibly be at an advantage. In contrast to the 'conditional' self-acceptance of the high-flyer, the low-performing student may have 'unconditional' self-acceptance which, although they may desire to perform well and have others' approval, it is not an absolute 'must'. Nor is it attached to how they see themselves. It is only a 'desire', and thus the situation of sitting an examination elicits a non-threatening meaning (Ellis, 2001). This is an important notion, as from my own personal experience in the field of academia, it is often the low-performing student, who will be offered (and benefit from) additional institutional support, such as additional skills tutorials for example. Whilst the high-flyer student is assumed (in this case, wrongly) to be coping well, and is often left beneath the radar, when they may, for example, benefit from counselling sessions in self-acceptance.

1.4.1.2 The adaptive stress response

When an individual does appraise the situation (the stressor) as exceeding their resources to cope and thus endangering their wellbeing, it reduces the body's

homeostatic balance. This in turn, triggers the stress response to re-establish homeostasis (Goldstein & McEwan, 2002; Lazarus & Folkman, 1984; Sapolsky, 1996; 2004). This 'fight, flight, freeze' stress response is a compensatory reaction to a stressor which activates the sympathetic nervous system (SNS) to mobilise the body for action (Canon, 1935; Goldstein & McEwan, 2002). The hypothalamus at the base of the brain instructs the pituitary gland to release hormones which cause increased secretion of adrenalin and noradrenalin from the adrenal medulla. It acts within seconds of the stress response to prepare the body for action (Bartlett, 1998; Herbert, 1999; Sapolsky, 1996; 2004). Glucocorticoids, such as cortisol, are steroid hormones secreted by the adrenal gland to back up the activity of the adrenalin and noradrenalin over the course of minutes or hours. To provide muscles with the energy they need for an emergency, stored glucose and fat are released from cells, via the circulatory system (Bartlett, 1998; Herbert, 1999; Sapolsky, 1996; 2004). This results in an increase in heart rate, blood pressure, and breathing, to transport the nutrients. Simultaneously, there is an inhibition of digestion, growth, reproduction and immunity (Sutherland & Cooper, 1990; Sapolsky, 1996; 2004).

1.4.1.3 The downside of stress

This process that maintains homeostasis (allostasis) in the aftermath of acute or prolonged (chronic) stress, causes wear and tear on the body and brain, which can be maladaptive (Lazarus & Folkman, 1984; Lovallo, 1997; McEwan, 2007; 2008; Sapolsky, 1996; 2004). Studies have shown that the mere thought of a perceived stressor (for example, worrying about next month's mortgage payment, or being late for a deadline at work) can trigger the stress response. Over time, and level of magnitude, this may result in allostasis overload, and negatively impact on individual's health, performance, and wellbeing (Crum & Lyddy, 2014; Sapolsky, 1996; 2004; Sutherland & Cooper, 1990). Moreover, as well as an altering of the appetite, sleep deprivation, and gastro-intestinal disorders, stress is one of the main risk factors associated with cardio vascular disease. Chronically high blood pressure (hypertension), caused by prolonged stress, may cause blood vessels to rupture, which increases the risk of a heart attack (Glaser & Kiecolt-Glaser, 2005; Miller, Stetler, Carney, Freedland, & Banks, 2002). This is one of the main reasons which perpetuates the notion that all stress should be avoided (Crum & Lyddy, 2014).

1.4.1.4 The upside of stress

In contrast to this historical negative perception of the stress response, more recent researchers have demonstrated that, in certain situations, the stress response can have a positive impact on individual's health, performance, and wellbeing (Crum & Achor, 2013; Crum & Lyddy, 2014; Jamieson & Mendes, 2012; Jamieson, Mendes, & Nock, 2013). This latest research has examined the positive impact of stress at both the physiological level and the psychological level, as a relationship to an individual's perception of stress as a challenge rather than a threat (which is a change in meaning) (Jamieson et al., 2013; Crum & Achor, 2013). For example, one could change the meaning of completing assignments or studying for examinations to make it an opportunity to show the establishment what you do know (a challenge), as opposed to thinking everyone will find out what you do not know (threat). With a challenge response, individuals feel focused rather than fearful, and their senses are alert (Jamieson et al., 2013). At the physiological level, there is less of the stress hormone cortisol released than in a threat response. Conversely, high levels of Dehydroepiandrosterone (DHEA), which is the hormone which helps a person's brain grow stronger to recover and learn from stress are present (Seery, 2013; Wemm et al., 2010). On the other hand, when a stress response is perceived as a threat, cortisol levels are high (which is associated with impaired immune function), and DHEA levels are low (Seery, 2013; Wemm, Koon, Blough, Mewalt, & Bardi, 2010). Jamieson et al. (2013), have also shown that when stress is appraised as a challenge, the response is characterised by improved cardiac efficiency and dilation of the peripheral blood vessels. In contrast, the threat response results in decreased cardiac efficiency which constricts the peripheral blood vessels in preparation for the flight, fight, or freeze response. Likewise, Crum and Achor (2013) showed that when individuals were taught to rethink their stress response (e.g. rapid breathing is getting more oxygen to your brain) as a sign that their body was energised to prepare for a challenge (i.e. to rethink their stress response as helpful), that although their hearts were still pounding, their blood vessels stayed relaxed, and their performances were enhanced (Crum & Achor, 2013).

1.4.1.5 The upside of social support

The appraisal (or meaning) given by an individual to a stressor can also be modulated by psychological factors such as social support (Sapolsky, 1996; 2004; Snyder & Mann Pulvers, 2001). The social support stress-buffering hypothesis (see

Cohen & Wills, 1985 for review) suggests that social support can reduce the cardiovascular reactivity in stressful situations. However, it is the psychological benefit from both perceived social support, and received social support, that is important to individuals for coping in stressful situations (Haber, Cohen, Lucas, & Baltes, 2007). Perceived social support describes an individual's potential to access supportive resources in everyday life, without necessarily accessing that support. Whereas received social support refers to actual support which an individual receives in a situation (Wills & Shinar, 2000). Social support is also a two-way process, and studies have shown that in stressful circumstances, the giving of social support can be as effective to an individual, as receiving it (Baumeister & Leary, 1995; Taylor, 2002). Moreover, it is the type and quality of the relationship to the support provider (e.g. friend versus authoritarian figure) which has been shown to have an impact on the stress-buffering effect of the support (Bland, Melton, Welle, & Bigham, 2012). Indeed, studies have shown that listening, as well as talking, to friends, family, and other significant people (as opposed to authoritarian figures) in times of stress, had a calming and protective effect, which acted as a buffer to the stressor (Ben-Zur, 2009; Lundberg, McIntire, & Creasman, 2008). Lack of social support, on the other hand, was shown to lead to engagement in unhealthy activities such as sedentary behaviour, alcohol use, and too much or too little sleep. All of which are reported as being signs and symptoms of poor coping strategies to a stressor (Thorsteinsson & Brown, 2008).

1.4.1.6 The downside of social support

Whilst most of the literature heralds the virtue of social support as a buffer to stress, there is emerging evidence which suggests that it has limitations (Condon & McCarthy, 2006; Reinhardt, Boerner, & Horowitz, 2006). Data have shown that in some situations, a high amount of received social support is often perceived as overprotection, which paradoxically increases stress through threatening an individual's basic need for autonomy (Cimarolli, Reinhardt, & Horowitz, 2006; Reinhardt et al., 2006). Autonomy refers to the desire for one's own behaviour to be intrinsically motivated, as opposed to coming from external sources. This reflects the experience that behaviour is an expression of the self (Weinstein & Ryan, 2011). In an autonomy-supporting environment, individuals tend to experience stressful situations as a challenge rather than a threat, and cope with them successfully (Weinstein & Ryan, 2011). On the other hand, an overprotective environment has been shown to induce an individual's feeling of being controlled, and thus undermining their subjective sense

of self-efficacy (Zniva, Pauli, & Schulz, 2017). Furthermore, self-efficacy and self-worth can also be undermined if the social support which has been given is perceived as having been given grudgingly (Rook, 2015). For example, if the social support given is perceived as an obligation, rather than a genuine desire to help, which, from my own experience within academia, may be an issue with the personal tutor support system which is implemented within many universities.

1.4.1.7 Predictability of stress

Perception of the predictability of stress can also influence how a stressor is appraised, as it allows a person to cope through knowing that something bad is going to come. It also allows them to know when the stressor is going to be over with (Sapolsky, 1996; 2004; Snyder & Mann Pulvers, 2001). A good example is when a nervous patient undergoing dental treatment is told by the clinician that the procedure will take a certain length of time. In this instance, it is not about how much of a stressor there is, it is about the removal of one of the aspects of uncertainty. However, for some individuals, even in predictable situations, they are unable to 'get over' a stressor, and the repercussions of experiencing the stressful situation can lead them to develop a state of heightened vigilance to that event, which manifests as anxiety (Dugas et al., 1998; Sapolsky, 1996; 2004).

1.4.2 Anxiety

Anxiety arises when an 'over the top' negative meaning (usually a series of thoughts) is given to a situation or thing, so that the situation or thing is now seen as scary or dangerous in some way, often when the situation or thing is not present (Dugas et al., 1998). Anxiety consists of a combination of unpleasant thoughts and feelings, as well as internal physiological changes associated with activation of the SNS (Goldstein & McEwan, 2002; Sapolsky, 1996; 2004). For example, if there is a snake in the room, you react negatively out of fear; but if you scare yourself with regular thought of snakes when you have never seen one in real life, that is anxiety. Physical symptoms of anxiety are the same as the fear response (the fight, flight, freeze response) and consist of internal physiological changes associated with activation of the SNS (Goldstein & McEwan, 2002; Sapolsky, 1996; 2004), as well as anxious thoughts and feelings. The symptoms of anxiety can vary in intensity: Apprehension, tension, and nervousness are experienced at low to moderate levels of anxiety, whereas high levels of

anxiety are characterised by an overwhelming fear, and sometimes even panic behaviour (Ainsworth, 2000). Moderate to high levels of anxiety may also be reflected in restlessness, trembling, and shortness of breath. With increasing anxiety, there is also increased heart rate, raised blood pressure, rapid breathing, and muscular tension (Ainsworth, 2000). Anxiety is not an immediate fear of escaping something real; it is a cognitive distortion that over estimates the risk and likelihood of a bad outcome either coming up, or seeing a past event in over-negatively terms (Dugas et al., 1998; Sapolsky, 1996; 2004).

Often people mistake low level anxiety for stress (Dugas et al., 1998). However, stress is something which is experiential in the here and now, whereas anxiety is worrying about the effects that a past stressor had, or what a future stressor may have on an individual. Individuals experiencing low levels of anxiety think about adversities that have a high probability of occurring, such as a student feeling anxious about failing an examination if she does not study for it, so she studies for it. In this example, the student can preventatively do something (such as revision) to stop the undesirable from happening. Higher anxiety occurs when individuals' think of lower probability adversities occurring, such as the student who has studied hard and knows the subject well, worrying (unnecessarily) that they will be marked down in the examination; or the student who fails one difficult exam and has irrational thoughts that they will be excluded from the course, even though they may have passed everything else (Ellis, 2001).

Sometimes, because experiencing anxiety is unpleasant, it prompts people to behave in a way which will help them to avoid or minimise the threat. Theoretically, this is defined as 'avoidance coping' (Carver, Scheier, & Weintraub, 1989; Kennerley, 1990). For example, in the DHDT learning environment, a student may have had a stressful experience when they previously administered a local anaesthetic to a patient who complained that it was painful. The student now actively tries to avoid giving local anaesthetic by focusing on parts of the patient's treatment plan which does not require the patient to be anaesthetised, in case the patient complains that it was painful again. However, research has shown that this maladaptive approach of simply avoiding the physical presence of external stressors may not lead to reductions in anxiety. This is because individuals have the capacity to remember negative past experiences, and to anticipate their happening again (Snyder & Mann Pulvers, 2001). Thus, a vicious circle

of avoidance, as a way of coping with a stressor, is established. For the student in this example, she has not 'got over' the stressor, and has developed a state of heightened vigilance for this particular patient that she will complain that the local anaesthetic administered was painful. Even though that may not be the reality. In more severe instances, the continual use of poor coping strategies, such as experiential avoidance of external stressors may be an indication that an individual has developed a sense of 'learned helplessness', which, among other behavioural expressions, is one of the features associated with the more serious mental health condition of depression (Ainsworth, 2000; Seligman, 1975)

1.4.3 Depression

Depression is a disease which affects how individuals feel, think, and behave, as well as how their bodies work (Ainsworth, 2000). Emptiness, hopelessness, pessimism, and apathy are some of the feelings often reported by depressed people to describe their mood, with anhedonia (loss of pleasure) in activities which were previously enjoyed, as a defining feature in the diagnosis (Ainsworth, 2000; Clark & Beck, 1989; Clark, Beck, & Alford, 1999; Sapolsky, 1996; 2004). Depression is also strongly linked to stress and anxiety (Lovibond & Lovibond, 1995). Indeed, to define, understand and measure the negative emotional states of depression, anxiety and stress, Lovibond and Lovibond (1995) developed the Depression, Anxiety and Stress Scale (DASS) which has the capacity to discriminate between the three related states, and is one of the measurements which will be used in this programme of studies.

As depression deepens, the cognitive abilities of the brain are affected. This can negatively affect concentration and memory, which leads sufferers to feel overwhelmed and frustrated at their lack of ability to problem solve. Furthermore, this can result in major distortions in the way sufferers see the world around them (Ainsworth, 2000; Clark et al., 1999). Within the world of higher education, this distorted view of the world included students with depressive symptoms reporting a higher number of experiences of negative events compared to the non-depressed students. Thus, increasing the likelihood that they would also use maladaptive coping mechanisms to deal with stress (Zong et al., 2010).

Similar to the notion of avoidance-coping for individuals with anxiety, people with depression can often develop a learned helplessness which manifests as a distorted belief that they have no control over any aspects of their lives (Seligman, 1975). For example, when a negative event occurs, rather than 'getting over it', they maintain their depressive stance by overgeneralising it ("This always happens to me and it's never going to get better whatever I do"). In this, the one event affects their perception of their whole life experience, rather than it being only a component of their lives (Ainsworth, 2000). Furthermore, these individuals sometimes lack the motivation to even attempt at a coping response in a new situation, instead they just 'give up', even when they could have control and mastery of that new situation (Seligman, 1975).

Depressed people often avoid others as they assume it will 'go badly'. In turn, they are often avoided by the people around them, increasing their isolation. They thus often lack the benefit of social support (Ainsworth, 2000). Family and friends, who have tried to be supportive in the past, eventually become less sympathetic and disengage from the individual, leading to the vicious cycle of increased emptiness, hopelessness, pessimism, and apathy for the sufferer. Indeed, a study of depression, stress, and social support among dental students in America showed that students with depressive symptoms had significantly lower levels of social support compared with those without such symptoms, and their isolation was even more apparent when their reported levels of stress were high (Laurence, Williams, & Eiland, 2009).

Although very important aspects of mental health; stress, anxiety and depression are only one side of the coin to our understanding of psychological wellbeing. This introduction will now continue to present a more holistic approach to our understanding of mental health, and link this understanding to the measurements used in this programme of research. First, drawing on the literature, it will provide an overview of the importance of meaning to positive psychological wellbeing. It will go on to discuss in more detail the symbiotic relationship of personal values and their association to goal pursuit, and then conclude to discuss the importance of a multi-dimensional approach to our holistic understanding of psychological wellbeing.

1.5 Psychological Wellbeing

1.5.1 The Importance of Meaning

"There is nothing in the world, I venture to say, that so effectively helps one to survive even the worse conditions as the knowledge that there is a meaning in one's life." Viktor Frankl, Man's Search for Meaning.

Depression, anxiety, and stress, although these are all emotions, that arise in response to specific meanings given to a situation or event. It should therefore not be surprising that positive psychological wellbeing also arises in response to specific meanings given to a situation, event, or indeed, life (Steger, Frazier, Oishi, & Kaler, 2006). Data have shown that those who felt their life to be meaningful reported less depression and anxiety, had greater self-esteem and felt greater satisfaction with their lives (Debats, van der Lubbe, & Wezemen, 1993; Weinstein & Cleanthous, 1996; Zika & Chamberlain, 1992). Baumeister and Vohs (2005) suggested that meaning and purpose are interpretations of subjective experiences that individuals give to impose stability and make sense of the world, and are global ways of understanding one's life (Feldman & Snyder, 2005). Moreover, that simply putting thoughts and emotions into language facilitates one's ability to construct meaning (McAdams, 1993; Esterling, L'Abate, Murray, & Pennebaker, 1999). For example, Crescioni and Baumeister (2013), found that when individuals talk about finding meaning in their lives, they seek to interpret their experiences in terms of a meaningful life story, which depict actions and decisions that are influenced from core values which contribute to the fulfilment of one or more crucial goals (Crescioni & Baumeister, 2013). Indeed, having values and goals are two of the components which contribute to a meaningful life (Baumeister, 1991).

1.5.1.1 The four needs for meaning

Baumeister has described four distinct needs for meaning which serve as a profile of what people specifically want in terms of achieving a meaningful understanding of their lives (Baumeister, 1991). First, a sense of purpose (Ryff, 1989a; 1989b) in which they perceive that their current behaviours are linked to future desired outcomes. This form of meaning can be found through the pursuit of objective goals, which are ideas of the possible future that the person wants to make come true, as well as more subjective states of fulfilment (Baumeister, 2005; Sommer, Baumeister &

Stillman, 2012). Undergoing years of education to secure a satisfying job would be an example of planning one's life around an objectively determined goal, for example DHDTS education. The everyday pressures of undergraduate education, as well as the intrinsic desire for understanding and knowledge, may be more meaningful and purposeful to students when they think about the long-term goal of qualification into a profession (Sommer et al., 2012). Therefore, in this sense, it may be the process of working towards the goal is just as important for a sense of purpose than actual achievement of that goal (Snyder, 2002; Sommer et al., 2012).

This concept of finding meaning in present suffering by looking to a future goal is described in Victor Frankl's (1985) account of holocaust survivors. Frankl described how the prisoners who could not see any future goal overlooked opportunities to make something of their existing (albeit horrendous) camp life. He described how prisoners occupied themselves with retrospective thoughts which robbed the present of its reality, making their present life meaningless, and in turn, they allowed themselves to decline both physiologically and psychologically, and die prematurely (Frankl, 1985). The survivors, on the other hand, were those prisoners who turned camp experiences into inner triumphs, and bore their suffering by looking to the future to survive (Frankl, 1985).

A second need for meaning are goals that have derived from a strong set of personal values (Dahl, Plumb, Stewart, & Lungdren, 2009). These reassure the person that they are 'doing the right thing', and that their actions are morally justified (Baumeister & Vohs, 2005; Sommer et al., 2012). In this way, when actions or goals are shaped by values, they allow individuals to justify themselves and their courses of actions as 'good'. The third need for meaning is that people want to believe that they can make a difference (Ryff, 1989a; 1989b). The sense of efficacy, even if it is an illusion, allows individuals to interpret events in ways that support the belief that they have control over their outcomes, and that they can make a difference in some important way (Baumeister, 2005; Sommer et al., 2012). Lastly, people want a sense of positive self-worth, which can be pursued as an individual, or as a group, to establish that they are good, admirable, worthy individuals with desirable traits (Baumeister & Wilson, 1996; Baumeister & Vohs, 2005; Sommer et al., 2012).

Having multiple domains to tap into sources of meaning, such as work, family and leisure activities, acts as a protective barrier against meaninglessness (Baumeister,

1991; Baumeister & Vohs, 2005). If one or more sources of meaning do not work out, meaningfulness can still be achieved by drawing on the other sources. It also means less pressure for one source to satisfy all four needs for meaning. For example, family may satisfy the three needs for values, sense of efficacy, and self-worth. However, work may also in addition, satisfy the need for purpose (Baumeister, 1991; Baumeister & Vohs, 2005; Steger, 2006; Wong, 2014a), all of which are guided by strong personal values (Feldman & Snyder, 2005).

1.5.2 Values

Goals are derived from one's values, therefore individuals often use goal setting as a means for living a valued life (Luoma, Hayes, & Walser, 2007). Indeed, a strong set of personal values give an individual the ability to form goals which build a sense of meaning in life (Feldman & Snyder, 2005). On the other hand, a lack of engaging in patterns of goal-related behaviour that are consistent with values, can lead people to feel that their life lacks meaning (Dahl et al., 2009). As "desired global qualities of ongoing action" (Hayes, Bond, Barnes-Holmes, & Austin, 2006, p.16), values are about how one wants to act on an ongoing basis. They are freely chosen, and are an expression of what matters to us (Harris, 2009), and will be measured in this programme of studies by use of the Valuing Questionnaire (VQ) (Smout et al., 2014). Values are directions; they are not destinations (Harris, 2008; 2009; Dahl et al., 2009). Indeed, using the compass as a metaphor, values are described as the direction of travel, and goals as the waypoints to help move in that direction. Furthermore, values can never be completely attained. Rather, they function as motivation for goal setting throughout life (Dahl et al., 2009; Harris, 2008). For example, a person may have values which include connecting with people and making a difference. To serve these values within their personal life domain, an individual may make solid plans to meet up with a lonely grandparent at different times throughout the year, or help at the local youth club. However, within the domain of their professional life, a person may choose a career, such as a health care worker, which also serves their value of connecting with others, and making a difference. The overarching values may remain consistent throughout life, but the content may vary according to each condition. Indeed, flexibility of applying values-based goals allows individuals to maintain patterns of

valued behaviour throughout their life (Dahl et al., 2009; Flaxman, Blackledge, & Bond, 2011).

Values must be sustainable in the long term, and activities that are intrinsically reinforcing are more likely to be sustainable. Thus, engagement in intrinsically reinforced activities is a key aspect of valued living (Dahl et al., 2009). The more time spent in such activities across many life domains, the better. In contrast, when people focus excessively on seeking extrinsic reinforcement, their values are likely to be thwarted. A good example is how university students learn that they need certain grades to progress, and that getting good grades (extrinsic reinforcement) often become more important than the potentially intrinsically reinforcing activity of learning itself. In such instances, the extrinsic reinforcement (the outcome) for an activity that might otherwise be intrinsically reinforcing (the process), categorises the activity as less fulfilling, and simply becomes just a means to an end (Dahl et al., 2009; Deci & Ryan, 2000).

Living a valued life also requires the willingness to persist in the face of difficulty when taking steps in that valued direction (Dahl et al., 2009). The tendency to avoid unpleasant feelings and thoughts can trap an individual into experiential avoidance of behaviour that does not support their long-term values (Dahl et al., 2009; Flaxman et al., 2011). In other words, valued living will sometimes require the need to find intrinsic reinforcement, even inside an activity that may have some negative aspect. For example, one may value other people's opinions in order to develop as a person, but one may not always like what is said!

Throughout a lifetime, it is inevitable that to reach certain goals, individuals will prioritise activities in the service of certain values, while curtailing or omitting others (Dahl et al., 2009). A common example is when individuals prioritise work-related goals, which serve core values (such as making a difference), over family-related goals, which also serve other core values (such as having a loving and caring relationship). Designating one valued direction as more important than another can be helpful when it is a temporary measure. However, if the temporary imbalance becomes more permanent, it can result in a narrowing of the behavioural repertoire, and a reduction in the quality of life (Lee & Powers, 2002; Moen, Ericsson, & McClain, 2002). It may therefore threaten the function of values as motivation for goal setting throughout life.

1.5.3 Hope Theory

Goal setting requires future thinking (Snyder, 1994a; Snyder, Rand & Sigmon, 2005). Indeed, Snyder's hope theory suggests that all human behaviour is anchored by goals, and as such, individuals with an abundance of motivation for goals, and concrete plans for the future to achieve their goals, should experience more positive life outcomes (Snyder, 1994a; 1994b; Snyder, Cheavens, & Sympson, 1997). Hope is specifically defined as "the process of thinking about one's goals, along with the motivation to move towards those goals (agency), and the ways to achieve those goals (pathways)" (Snyder, 1995, p. 355), and will be measured in this programme of studies by use of the Adult Hope Scale (AHS) (Snyder et al., 1991). Agency thinking is the individual's perception for success in meeting goals. Pathways thinking is the individual's perception of ability to generate successful plans to meet those goals, regardless if the goal has obstacles or not (Snyder et al., 1991; 1997; Snyder, 2002).

Important external factors influencing goal pursuit are incorporated into the individual's cognitive analysis of agency and pathways (Snyder et al., 1991). For example, a student's goal of achieving a good grade in an examination will require them to plot multiple pathways, such as attending lectures, engaging in self-directed study, taking notes, and peer learning, to achieve the good grade. If the student does not succeed in achieving a good grade, they may pursue alternative pathways, such as attending optional skills tutorials, or meeting with the lecturer, to enhance their performance. According to Snyder et al. (1991), for an individual to have 'high hope' there must be continuous agency-pathway and pathway-agency iterations throughout all stages of goal-directed behaviour. However, Tong, Fredrickson, Chang, & Xing Lim (2010), argued that hope is only associated with agency and not pathway, and that the AHS, which measures hope, only taps into a general sense that goals can somehow be obtained, regardless of one's ability to obtain them. Furthermore, they suggested that there is a discrepancy between Snyder's model of hope, and the nature of hope as understood by other researchers and the layperson (Tong et al., 2010). More specifically, they suggested that Snyder's model was most relevant to situations where people are still able to change the environment in their favour, unlike many situations where personal influence would be irrelevant, such as traumatic situations, where individuals are aware of what may be desired may often be beyond a person's reach or capabilities.

1.5.3.1 'High-hopers' and goal attainment

Pursuing personal goals, rather than goals dictated by others have been shown by Sheldon and Elliot (1999) to make people feel good when they achieve them. For Snyder et al. (1991), 'high hope' individuals are those who pursue goals which are intrinsically motivated, and who have the perception of sufficient agency and pathway for a given goal. This generates as a focus on success, rather than failure. Indeed, this 'can-do' attitude (agentic thinking) increases the probability that they will attain their goals (Snyder et al., 1991; Snyder et al., 2002). They often establish 'small-step' goals that are sequenced towards a long-term goal (Snyder, 1994a, 1994b), and in this sense, can be viewed as "smart investors" in goal pursuit (Snyder et al., 1997, p. 110). Furthermore, by having multiple goals across various arenas of their life, 'high hopers' experience multiple positive emotional states associated with goal attainment (Snyder et al., 1991; Snyder et al., 2002). This is also associated with living a meaningful and valued life (Baumeister, 1991; Baumeister & Vohs, 2005 Dahl et al., 2009). In contrast, due to their focus on failure rather than success, 'low hopers' establish fewer 'all-at-once' goals, that are often too big and overwhelming, and thus experience much fewer goal-related positive emotional states (Snyder et al., 1991; Snyder et al., 2002).

1.5.3.2 'High-hopers' and academic success

In addition to pursuing multiple goals, 'high hopers' also select and attain more difficult goals, but they do not perceive their goals as more difficult. Based on previous performance, they select high effort goals (stretch goals), that satisfy the desire to learn new skills and master new tasks (learning goals). Indeed, it is often the process of the 'getting there', which is the pleasure (Snyder, 1994a, 1994b; Snyder et al., 1997). Moreover, they can still sustain their agency and pathway in the face of obstacles to their goals, which has been shown to result in higher academic achievement (Snyder et al., 1991; 1997; 2002). In a six-year longitudinal study, Snyder et al. (2002) found that hope predicted higher graduation rates, and that 'high hope' students were more engaged in learning, and less likely to engage in poor coping skills to deal with stressors in the academic environment. Instead, 'high hope' students tended to deal directly with the stressor, such as studying harder for examinations. Similarly, researchers in a subsequent study found that students who exhibited higher levels of hope, were less likely to procrastinate on writing term papers, studying for exams, and reading weekly assignments, than were those with lower hope scores (Alexander & Onwuegbuzie, 2007). In contrast, a more recent study which examined the role of agency and pathway

in relation to academic performance found there to be inconsistencies with hope theory predictions related to academic success (Crane, 2014). More specifically, the study showed that when agency thinking was high, pathway thinking was generally unrelated to examination performance or perceived control over performance. The study concluded that agency thinking (and not pathway thinking) was the most reliable predictor of goal pursuit and actual performance (Crane, 2014).

Hope theory suggests that 'high hopers' are deemed to have the ability to 'let go' of problematic goals. Indeed, they expect mistakes to happen, and do not question their innate talent, but can reason that on the particular occasion, they did not use the best strategy (i.e. it is how they handle meaning). In using information about not reaching their goal as diagnostic feedback, they tend to replace 'failed' goals with either new goals completely, or new pathways for the same goal (Snyder et al., 1997; 2002). On the other hand, 'low hopers' tend to take an easier route, through the selection of low effort goals. However, unlike 'high hopers', they tend to disengage from goals when confronted with obstacles (Snyder et al., 1991; 2002). As discussed here, goals are integral to the theory of hope, but research has shown that they are also a fundamental aspect to the wider dimensions of psychological wellbeing.

1.5.4 Ryff's Six Dimensions of Psychological Wellbeing

Almost thirty years ago, in challenging the notion that psychological wellbeing could be measured by using a single-item scale, Ryff (1989a; 1989b) implemented the concept of a multi-dimensional approach, which articulated the different challenges individuals encounter as they strive to function positively (Ryff, 1989a; 1989b; Ryff & Keyes, 1995; Ryff & Singer, 1998). Drawing from the convergence of criteria generated from the three theoretical perspectives of life-span development theories (Allport, 1961; Buhler, 1935; Erikson, 1959); clinical theories of personal growth (Jung, 1933; Maslow, 1968; Rogers, 1967); and mental health literature (Birren & Renner, 1980; Jahoda, 1958), Ryff (1989a; 1989b) proposed that there were as many as six distinct aspects of psychological wellbeing that articulated the nature of wellness. From this, Ryff developed a measurement of positive psychological wellbeing (Ryff, 1989a), which will be used in the studies in this thesis.

First, Ryff suggested that holding a positive attitude towards oneself, and one's life, is a central feature of mental health. It is a characteristic of self-actualisation, optimal functioning, and maturity (Ryff, 1989a; 1989b). Furthermore, that perceiving the self as a person of worth, and recognising one's personal strengths and weaknesses, are key components of self-acceptance (Erikson, 1959; Jung, 1933; Rogers, 1967). This is also one of the four needs for meaning in life described by Baumeister (Baumeister, 1991; Baumeister & Wilson, 1996).

Second, Ryff (1989a; 1989b) suggested that having satisfying and trusting relationships with others, and the capability to demonstrate empathy, affection, and intimacy, are convergence of criteria from the theorists' description of the fully functioning person as being able to show a basic trustworthiness of human nature, and the ability to respond to other individuals (Allport, 1961; Birren & Renner, 1980; Maslow, 1968; Rogers, 1967). Having positive relations with others can be both beneficial as a coping strategy to stress, and a potential core value to direct goal-related behaviour (Bland et al., 2012; Dahl et al., 2009). For instance, the giving and receiving of peer support from fellow students in times of stress requires the ability to respond to other individuals. Choosing a career (such as dental hygiene and therapy) facilitates an environment where one will connect with others, and thus serves the purpose for valued living.

Third, drawing on the concept of the person having an internal locus of evaluation (Rogers, 1967), Ryff described autonomy as the individual who has the qualities of self-determination, independence, and regulation of behaviour from within. That is, autonomy reflects the tendency for individuals to evaluate themselves by their own standards, and resist social pressures. This, according to Deci and Ryan (2000), is one of three core needs essential for healthy psychological functioning. Within the field of education, there is literature which has examined the necessity for learning environments to be supportive of the need for autonomy (Deci & Ryan, 2000; Assor, Kaplan, Kanat-Maymon, & Roth, 2005; Reeve, 2006). This is so that students have the ability to explore choices and opportunities which are based on self-directed passions (intrinsic motivation), as opposed to educators imposing specific criteria (extrinsic motivation), in an effort to control student direction (Deci & Ryan, 2000; Assor, Kaplan, Kanat-Maymon, & Roth, 2005; Reeve, 2006). Indeed, within the teaching and learning environment, research has shown that the basic psychological need for

autonomy (i.e. intrinsic motivation), is associated with high academic performance, a decreased susceptibility to negative peer influences, and a decrease in reported depressive symptoms (Allen, Porter, & McFarland, 2006; Ten Cate, Kusurkar, & Williams, 2011).

The fourth concept was that of environmental mastery, which reflects the ability to create and choose opportunities to suit one's personal needs and values. Perspectives of the lifespan theorists suggested that active participation in, and mastery of, the environment is achieved by individuals who participate in a wide sphere of activities. They also take advantage of environmental opportunities to achieve their goals of advancing in the world. (Allport, 1961; Birren & Renner, 1980; Buhler, 1935; Jahoda, 1958).

The fifth distinct aspect of wellbeing is personal growth. Perspectives of the clinical theorists emphasised the importance of the continued development of one's potential to expand as a person. Openness to experience, and the willingness to be a process are attributes of a person who lives their life as a participant in a fluid, ongoing process (Rogers, 1967). Indeed, Maslow (1968), suggested that the human being is simultaneously that which they are, and that which they yearn to be, and that 'the process of growth, is becoming a person' (Maslow, 1968).

Lastly, Ryff (1989a; 1989b) identified purpose in life as a key feature for psychological wellbeing. Having a sense of purpose, or overarching aim for one's life, suggests that an individual has committed to a set of clear goals for life which are underpinned by their values (Baumeister & Vohs, 2005; Dahl et al., 2009; Smout et al., 2014; Snyder et al., 1991). It refers to the tendency to derive meaning from life's experiences and a sense of goal directedness which guides behaviour. (Schaefer et al., 2013). At a biological level, purpose in life has been shown to predict both lower levels of allostatic overload and better emotional recovery from negative stimuli, and therefore may increase resiliency to stress and depression (Schaefer et al., 2013; Zilioli, Slatcher, Ong, & Gruenewald, 2015). At a psychological level, it has been shown to be a strong predictor of an individual's perception of autonomy, and likewise may also increase resiliency to stress and depression. (Zilioli et al., 2015).

1.6 The Current Research

The review of the literature has examined aspects of psychological wellbeing. It has portrayed a holistic view of psychological wellbeing through a discussion of what are the main reducers of, and the promoters for, psychological wellbeing. The review has outlined the scientific background for this thesis, and has discussed the established theories which underpin the measurements used in this programme of research, which consists of seven chapters.

Chapter 2 presents the first paper and is an exploratory cross-sectional study, which captures base-line data of stress and psychological wellbeing in DHDT students. This was an important study for two main reasons: First, it achieved the first objective of this programme of studies which was to use a carefully selected range of valid and reliable instruments to measure positive and negative psychological wellbeing in a cohort of DHDTS, including a comparison group of dental students, studying at the same institution. Validity of an instrument is the extent to which a concept is accurately measured; reliability is the extent to which the instrument consistently has the same results if it is used in the same situation on repeated occasions (Oppenheim, 1992). The instruments selected for this study have been repeatedly used in multiple studies in the field of psychology and have all shown similar findings (for example, Crouch, Mack, Wilson & Kwan, 2017; Marques, Gallagher & Lopez, 2017). Furthermore, the instruments have shown construct validity through positively correlating with other instruments which have measured similar variables (convergent validity), and negatively correlating with other instruments which have measured different variables. Second, it is the first study to show stress and psychological wellbeing within the field of dental undergraduate training in a more optimistic light than suggested by previous research. This paper has been published with co-authors (supervisors) in the British Dental Journal (Harris, Wilson, Holmes, & Radford, 2017a).

Chapter 3 was the planned follow-on qualitative study of DHDTS personal experiences of what they found stressful in their undergraduate programme, and how they dealt with that stress. Here we discussed the phenomena of values and meaning as a coping mechanism to a stressor, and suggested an alternative approach to stress management within the curriculum. This paper, likewise, has been published with co-

authors (supervisors) in the British Dental Journal (Harris, Wilson, Hughes, & Radford, 2017b).

Chapter 4 was a collaboration between the United Kingdom and Australia. In this study, we replicated the survey which was administered in the first exploratory study. The study showed comparisons of stress and psychological wellbeing among UK and Australian DHDT students, as well as comparing these findings to our base-line data. This paper has been accepted with minor corrections with co-authors (supervisors) in the European Journal of Dental Education (Harris, Wilson, Hughes, Knevel, & Radford).

Chapter 5 was an intervention study designed as a pilot workshop for future incorporation into the undergraduate curriculum. This chapter illustrates the real potential for a low-cost intervention as a mechanism for (all) undergraduate students to improve their coping skills in relation to stress. This paper has been published with co-authors (supervisors) in the Annual Clinical Journal of Dental Health (Harris, Wilson, Hughes, & Radford, 2018).

Chapter 6 discusses the overall findings from this programme of studies. It highlights the limitations of the studies and puts forward ideas for future research to address these limitations. The chapter finally concludes that curriculum interventions into increasing our understanding of psychological wellbeing should be perceived as a beneficial component of dental undergraduate training.

Chapter 7 is a short Chapter which documents my personal reflections on how I have developed as a researcher from undertaking this programme of research.

2 PERCEIVED STRESS AND WELLBEING AMONGST DENTAL HYGIENE AND DENTAL THERAPY STUDENTS

2.1 Abstract

Aims: To explore Dental Hygiene and Dental Therapy Students' (DHDTS) perception of stress and wellbeing during their undergraduate education and establish base-line data for further studies of this group of dental professionals.

Participants and methods: A questionnaire was distributed to Years 1, 2 and 3 DHDTS and final year outreach Dental Students (DS) (as a comparison group), at the University of Portsmouth Dental Academy (UPDA), during summer 2015. Data were collected on students' perception of levels of stress and wellbeing. Statistical analyses were undertaken using SPSS™ software. Mann-Whitney U tests with Bonferroni corrections were used and the level for a statistically significant difference was set at $p<0.002$.

Results: A response rate of 81% (DHDTS) and 85% (DS) was achieved. Clinical factors and academic work were perceived as stressful for both DHDTS and DS, with no significant difference between the groups. The majority of respondents reported levels of depression, anxiety, and stress to be within the normal range. All students reported high levels of positive wellbeing, with DHDTS scoring significantly higher than DS in the dimensions of personal growth, purpose in life, self-acceptance and positive relations with others ($p<0.002$).

Conclusions: DHDTS and DS identified sources of stress within their undergraduate education, but also perceived themselves as positively-functioning individuals.

2.2 Introduction

For Dental Students (DS), the dental school curriculum and environment is known to be highly demanding and a stressful learning experience (Al-Samadani & Al-Dharrab, 2013). Data from studies have demonstrated the impact of stress on DS, and the perceived sources of stress in diverse academic settings (Divaris et al., 2008; Gorter et al., 2008; Humphris et al., 2002). For example, two recent systematic reviews concluded that researchers consistently reported examinations and grades, workload, patient care, and graduation requirements amongst the top stress-provoking factors (Alzahem et al., 2011; Elani et al., 2014). Some DS reported feeling overwhelmed by their experience in dental school to the extent that their physical and mental health, as well as their social life, was negatively affected (Dahan & Bedos, 2010).

Other members of the dental team are educated in a similar environment to that of DS. Dental Hygiene and Therapy Students (DHDTS) undertake a degree or a diploma programme, which requires the development of theoretical and critical thinking skills, in parallel with acquiring the clinical skills, to carry out relatively complex clinical operative procedures. Similar to DS education, DHDTS in the UK need to have competency in a range of skills, within their scope of practice (GDC, 2013), in order to qualify and register as 'safe beginners' after graduation (GDC, 2015). Therefore, after only up to 3 years of education (4 years in Scotland), compared to 5 years for DS, and with very limited access to post qualification placement (Clow & Mehra, 2006), DHDTS on graduation, have to be confident, competent, and resilient, so that they can manage patients independently. However, DHDTS stress levels, unlike DS, have yet to be explored. Furthermore, as their responsibilities are increasing with a change in legislation (GDC, 2014), their wellbeing needs to be investigated.

In the future, DHDTs, according to the Centre for Workforce Intelligence, could be providing 40-50% of oral health care by the year 2025 (CfWI, 2014), which is a more conservative estimate compared to other studies which puts this figure at approximately 70% (Evans at al., 2007; Wanyonyi et al., 2015). It is thus argued, a profession that contributes significantly to the oral care provision of the public is worthy of in-depth study regarding stress and wellbeing.

Psychological stress occurs when a person appraises a situation as exceeding their resources to cope and endangering their wellbeing (Lazarus & Folkman, 1984). The

stress response ('fight', 'flight', 'freeze') is a mechanism adapted for dealing with short-term physical emergencies (Sapolsky, 1996; 2004). For such short-term emergencies the stress response is vital, but in the face of chronic stress, the constant demand to the body system is considered to be detrimental to health (Sapolsky, 1996; 2004).

Whilst the detrimental effects of stress may be significant, recent research has shown that stress can also have a positive effect on physiological functioning (Jamieson et al., 2013). More specifically, by positively reappraising stress as a tool to aid performance, participants in one study demonstrated a more adaptive physiological response to stress. This was measured by greater cardiac output and less vasoconstriction, compared with participants assigned in other conditions (Jamieson et al., 2012; 2013). In another study, Crumb et al. (2013) demonstrated how the meaning of stress can alter the evaluation of the stress as a challenge (enhancing) rather than a threat (debilitating). In this instance, individuals are able to create an adaptive stress response by modifying the amount of cortisol that is released (Crum et al., 2013). Similarly, other research also shows how potentially stressful events such as parenting, intimate relationships and work achievements, when described as being profoundly meaningful, as opposed to merely stressful, give lives structure and purpose (Baumeister, Vohs, Aaker, & Garbinsky, 2013).

Most research into stress in dental undergraduate students has equated psychological wellbeing with the presence or absence of stress, or psychological disorders such as depression (Abu-Ghazaleh, Rajab, & Sonbol, 2011; Laurence et al., 2009; Silverstein, & Kritz-Silverstein, 2010). However, research has shown that there are multiple dimensions which contribute to a sense of positive psychological wellbeing (Ryff, 1989a; Ryff, 1989b). Positively-functioning individuals establish goals, direction, and purpose, which give them a sense of meaning in life. They are self-determined, and will take advantage of environmental opportunities (even if they are stressful) to continue to develop and grow (Ryff, 1989a; Ryff, 1989b).

Meaningful goal pursuit is central to Snyder's theory of hope (Snyder et al.,1991). Specifically, hope is thought to be "the process of thinking about one's goals, along with the motivation to move towards those goals (agency), and the ways to achieve those goals (pathways)" (Snyder, 1995 p355), regardless of the ease or the difficulty of obtaining them (Snyder, et al.,1991; Snyder, Cheavens, & Sympson, 1997). Individuals also use goal setting as a means for increasing their engagement in valued-living.

Moreover, it is often the journey to goals, rather than the destination, that gives fulfilment (Smout et al., 2014). Values are personally chosen life directions, based on subjectively experienced principles which guide our behaviour. They are not about what 'others expect' us to do, but are about what we 'want to do' (Smout et al., 2014).

In summary, previous research into stress amongst dental undergraduates has focused on the negative aspects of stress, and ignored measurements of positive wellbeing (such as goals and values). Furthermore, it has been exclusively targeted at the stressors experienced by the DS, and not included DHDTS, who follow very similar clinical training patterns. Accordingly, the aims of this study, to address this gap, were:

1. To explore the current sources of stress and wellbeing in DHDTS.
2. To include a comparison group of DS, so comparisons could be made with existing research into stress and wellbeing during dental student education.
3. To establish baseline data that will facilitate further research into the stress and wellbeing of DHDTS.

2.3 Participants and Methods

Ethical approval was gained from the University of Portsmouth Research Ethics Committee (Appendix F), and an anonymous, self-reported online questionnaire (Table 1) was administered to 72 DHDTS (Years 1, 2 & 3) and 80 Year 5 outreach DS (as a comparison group) at the University of Portsmouth Dental Academy (UPDA) in June 2015 (Radford, Holmes, Dunne, & Woolford, 2015). Completion of the survey was taken as consent to participate in the study. The survey was distributed over a four-week period in June 2015, representing the end of the examination period and the completion of the academic year. Qualtrics™ software used for the survey captured the students' year of study and age. Gender was not captured, as this would identify the very small number of male DHDTS. The survey consisted of five well-used measurement instruments (Appendix G-K), which all had excellent reliability and validity, and included the: Dental Environment Stress questionnaire (DES); Depression Anxiety Stress Scales (DASS-21); Scales of Psychological Wellbeing (SPWB); Valuing Questionnaire (VQ); and the Adult Hope Scale (AHS).

Table 1. Dental Environment Stress questionnaire items and domains

DES Individual item stressor	Domain
Moving away from home Environment in which to study Lack of home atmosphere Other problems with accommodation	Living accommodation
Making friends Financial responsibilities Personal physical health Intimate Relationships Necessity to postpone marriage Necessity to postpone children Having multiple roles Conflict with spouse/mate over career development Lack of time for relaxation Having children in the home Having reduced holidays compared with other students Fear of going out due to crime Dependencies (e.g. drugs, alcohol)	Personal factors
Expectation versus reality of dental school Approachability of staff Criticism about academic or clinical work Rules and regulations of the dental school Discrimination due to race, nationality, gender or social class	Educational environment
Amount of assigned course work Difficulty of course work Fear of being able to catch up if falling behind Competition for grades Fear of failing course or year Uncertainty about dental career Examinations Lack of input in decision making process in dental school	Academic work
Concerns about manual dexterity Transition from preclinical to clinical Learning precision manual skills Completing clinical requirements Concern about treatment grades awarded Difference in opinion between clinical staff concerning treatment Shortage of allocated clinical time Patient management Confidence in own clinical decision making	Clinical factors

The DES (Garbee et al., 1980) was chosen as it is the most widely used measurement in the dental setting, within the existing literature. A modified version was used (Naidu et al., 2002), consisting of thirty-nine items describing stressors specifically relating to dental undergraduate training. The response to each item was rated on a five-point scale: 0 = not pertinent, 1 = not stressful, 2 = slightly stressful, 3 = moderately stressful and 4 = very stressful. The mean score was calculated for each item of the DES to evaluate stress levels and a total score was calculated by summing all responses. The items were grouped into five stressor domains: living accommodation, personal factors, educational environment, academic work and clinical factors.

The DASS – 21 (Lovibond & Lovibond, 1995), a shorter version of the full survey (DASS – 42), was adopted. It consisted of three self-reporting scales constructed to measure the negative emotional states of depression, anxiety and stress. Each of these contained 7 items. Participants responded using a 4-point severity and frequency scale to rate the extent to which they had experienced each over the past week: 0 = did not apply to me at all, 1 = applied to me to some degree, or some of the time, 2 = applied to me to a considerable degree, or a good part of the time and 3 = applied to me very much, or most of the time. Separate scores for depression, anxiety and stress were calculated by summing the scores for each. These were then multiplied by 2 to fit with the DASS - 42 scale. Table 2 shows the authors' recommended cut-off scores for the labels of 'normal', 'moderate' and 'severe', in relation to depression, anxiety and stress.

Table 2. Cut-off scores for DASS – 21 severity labels (normal, moderate, severe)

	Depression	**Anxiety**	**Stress**
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely severe	28+	20+	34+

The SPWB (Ryff, 1989a), six self-reporting scales consisting of 14 items, was selected to measure the dimensions of autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance. The response

to each item was rated on a six-point scale: 1 = strongly disagree, 2 = moderately disagree, 3 = slightly disagree, 4 = slightly agree, 5 = moderately agree and 6 = strongly agree. There is no specific score for defining high or low wellbeing, therefore thresholds for 'pure' positive and negative scores were set at >56 and <42 respectively.

The VQ (Smout et al., 2014), a self-reporting 10-item scale, was adopted to measure the extent to which DHDTS (and comparatively DS) lived out their values across their life. The VQ was used to measure how much participants were living according to their personal values, rather than what their values were per se. This instrument was originally designed to track clients' progress towards living according to their values in Acceptance and Commitment Therapy (ACT) (Dahl et al., 2009), but it is not client specific so can be used with the general population. Indeed, a very recent Australian study has also used the VQ as one of the instruments in a survey of Australian undergraduate students (Fischer, Smout, & Delfabbro, 2016). Participants responded using a six-point format ranging from 0 = not at all true, through to 6 = completely true. The 10-item scale has 2 subscales: 5 items totalled which measures progress towards valued living and 5 items which measures obstruction towards valued living. Subscale scores were calculated by summing the scores of the 5 items in each sub-scale to get a score for the progress domain and a score for the obstruction domain.

Finally, the AHS (Snyder et al.,1991), a self-reporting 12-item scale was selected. It consists of two subscales that measure 'agency' (goal-directed energy) and 'pathways' (planning to accomplish goals). Of the total 12 items, 4 measure agency and 4 measure pathway. The remaining 4 items are 'fillers'. Participants responded using an eight-point scale: 1 = definitely false, 2 = mostly false, 3 = somewhat false, 4 = slightly false, 5 = slightly true, 6 = somewhat true, 7 = mostly true, 8 = definitely true. Individual scores for agency hope and pathway hope were calculated by summing the scores of the 4 items in each. There is no specific score defining high and low hope, however an early study by the author of the AHS, suggested that 'high hope' and 'low hope' equated to a combined agency and pathway score of >60 and <35 respectively (Snyder, LaPointe, Crowson, & Early, 1998).

Statistical analysis carried out using SPSS v22™ included frequency distributions, reliability analysis, and correlation analysis. The data were checked for normality, kurtosis and skew. Mann-Whitney U tests with Bonferroni corrections were used to reduce the chances of obtaining false-positive results (type 1 errors) as multiple pair

wise tests were performed on a single set of non-parametric data. The level for a statistically significant difference was set at $p<0.002$.

2.4 Results

Cronbach's alpha ranged from .79 to .87 for all of the scales, except the DES where it was slightly lower at .68. The reliability of all the scales was within the acceptable limits. The response rate was 81% for DHDTs (n=58), and 85% for DS (n=68). The mean age for DHDTS was 25 years, with a range of 19 to 38 years. The mean age for DS was 23 years, with a range of 21 to 32 years.

The 81% and 85% response rate for DHDTS and DS respectively, represented a good response to the first investigation of DHDTS perceived sources of stress and wellbeing. Out of the 58 DHDTS who responded, 53 provided useable data.

Table 3 compares the domain-specific sources of stress mean DES scores for DHDTS and DS. There were no statistically significant differences between the DHDTS and the DS for any of the domains of the DES. Academic work and clinical factors were reported stressful by both groups.

Table 3. Domain-specific sources of stress mean DES scores for DHDTS and DS

DES Domain (max score within each domain)	Mean (SD) **DHDT** (n=58)	Mean (SD) **DS** (n=62)	***p* value**
Living accommodation (16)	7.67 (3.93)	6.69 (2.70)	0.108
Personal factors (52)	18.58 (7.77)	17.40 (8.05)	0.499
Education environment (20)	7.32 (2.65)	8.86 (3.40)	0.006
Academic work (32)	21.43 (5.50)	18.68 (5.44)	0.003
Clinical factors (36)	20.70 (6.48)	18.09 (6.46)	0.046

Table 4 presents the highest individual item stressors defined by DHDTS for each year of study. Examinations were reported as a high source of stress across all of the Years. They were however the only high source of stress for Year 2 DHDTS and Year 5 DS. Year 1 and Year 3 DHDTS listed the same three top sources of stress as being: fear

of failing course/year, examinations, and fear of being able to catch up if falling behind. Fear of failing the course/year scored the highest. Year 3 DHDTS additionally equally listed the difference in opinion between clinical staff in third place.

Table 4. The stressors with the highest score (3 or above) for each year of study

Year	Stressor (Domain)	Mean (SD)
1 DHDT	Fear of failing course/year (Academic)	3.61 (0.77)
	Examinations (Academic)	3.28 (1.07)
	Fear of being able to catch up if falling behind (Academic)	3.06 (1.21)
2 DHDT	Examinations (Academic)	3.28 (1.07)
3 DHDT	Fear of failing course/year (Academic)	3.50 (0.73)
	Examinations (Academic)	3.38 (0.80)
	Fear of being able to catch up if falling behind (Academic)	3.06 (1.12)
	Difference in opinion between clinical staff (Clinical)	3.06 (0.92)
5 DS	Examinations (Academic)	3.16 (0.83)

Table 5 shows the dimensions of SPWB mean scores for DHDTS and DS. Both DHDTS and DS mean scores were above the threshold for a negative score (<42), with a trend towards the threshold of a positive score (>56), for both groups, in all dimensions, except purpose in life. Four out of the six dimensions were statistically significant ($p<0.002$), with DHDTS scoring higher than the DS in personal growth, purpose in life, positive relations with others and self-acceptance.

Table 5. Dimensions of SPWB mean scores for DHDTS and DS

SPWB dimension (max score = 84)	Mean (SD) **DHDT** (n=53)	Mean (SD) **DS** (n=55)	***p* value**
Autonomy	55.80 (7.85)	53.83 (5.75)	0.079
Environmental mastery	57.22 (7.24)	54.20 (4.52)	0.007
Personal growth	64.73 (5.89)	55.13 (4.22)	0.000*
Positive relations with others	59.50 (7.87)	55.03 (5.52)	0.000*
Purpose in life	61.62 (8.51)	49.58 (4.85)	0.000*
Self-acceptance	57.01 (9.92)	53.05 (5.23)	0.000*

* Bonferroni correction $p<0.002$

Table 6 shows the mean scores for the DASS-21, AHS and VQ for the DHDTS and DS. The majority of depression, anxiety and stress scores for both groups were within the recommended cut-off scores for the label 'normal' (0-9 for depression, 0-7 for anxiety, 0-14 for stress) (Lovibond & Lovibond, 1995). Both DHDTS and DS reported fairly high levels of agency hope, pathway hope (Snyder et al., 1998), and progress towards values; all also reported fairly low levels of obstruction towards values. There was no statistical difference between the two groups.

Table 6. Mean scores of DASS-21, AHS and VQ for DHDTS and DS

DASS-21, AHS and VQ subscales (max score within each subscale)	Mean (SD) **DHDT** (n=58)	Mean (SD) **DS** (n=68)	***p* value**
DASS-21			
Depression (42)	7.26 (8.01)	4.94 (6.50)	0.052
Anxiety (42)	8.0 (7.73)	5.14 (5.53)	0.035
Stress (42)	12.20 (8.99)	7.79 (6.57)	0.004
AHS			
Agency (32)	24.85 (4.97)	24.03 (4.66)	0.291
Pathway (32)	23.22 94.89)	24.23 (4.58)	0.180
VQ			
Progress (30)	19.51 (6.73)	18.31 (5.7)	0.208
Obstruction (30)	9.96 (7.01)	9.33 (6.28)	0.650

2.5 Discussion

The reported domain-specific sources of stress mean DES scores and individual item stressor scores showed similar trends for both DHDTS and DS. These were comparable to reported findings of what students, in diverse educational settings, had previously reported in studies as being their main sources of stress (Divaris et al., 2008; Gorter et al., 2008; Humphris et al., 2002).

Living accommodation, personal factors, and the educational environment were not particularly stressful DES domains for either DHDTS or the DS (Table 3), and corresponded with the existing literature (Divaris et al., 2008; Gorter et al., 2008; Humphris et al., 2002). The two domains of academic work and clinical factors, which included items such as examinations, fear of failing, and completing clinical requirements, were also similar to other studies in which dental students reported them to be highly stressful (Alzahem et al., 2011; Elani et al., 2014). Moving beyond the existing literature, this study showed a trend that DHDTS found academic work (21.43 out of 32) more stressful than clinical factors (20.70 out of 36), but it was not statistically significant.

Data also showed that the educational programme per se was perceived by DHDTS as highly stressful, but specifically the academic components (Table 4). The high individual item stressors reported by Year 1 DHDTS demonstrated that they recognised the high level of attainment required to attain a professional qualification and practice clinical dentistry.

In Year 2, DHDTS reported only one high level source of stress (examinations), but then increased again in Year 3, to the same sources, and similar levels, as in Year 1. This trend of academic stress may just reflect the nature of this particular DHDT training programme, which is an honours degree and places equal emphasis on academic assessment, as well as clinical attainment, throughout all the three years of training. There may also have been a level of under-confidence of academic ability for a percentage of DHDTS, who have been in the work place, and have returned to study after being away from it for a considerable length of time. Furthermore, year 1 and year 3 are entry and exit points respectively, and this may have increased the stress perceptions of students in comparison to the middle year.

Transition from preclinical to clinical work was not reported as being highly stressful for Year 2 DHDTS. This finding is inconsistent with that from other studies of DS which have looked at DES individual item stressors across each year of study and found that Year 3 DS reported the same transition as being highly stressful (Alzahem et al., 2011; Naidu et al., 2002). Unlike some dental undergraduate programmes, that focus on theory and laboratory-based skills education in the first two years, the UPDA curriculum introduces clinical experience at a very early stage in Year 1 (after 3 months), which may have been a contributing factor which lessened the perceived stress of transition to practice for the studied DHDTS.

Likewise, in contrast to the findings of previous studies (Alzahem et al., 2011; Elani et al., 2014), clinical factors such as completing clinical requirements and shortage of allocated clinical time were not reported as the highest stressor for either DHDTS or DS in this research. Historically, within the literature these items have been reported as highly stressful, particularly to DS in their final year of study (Alzahem et al., 2011; Elani et al., 2014). Clinical factors may be less stressful than academic work for the DHDTS studied, because a considerable percentage of them had previous experience working as dental nurses in general dental practice. In this respect, they were likely to have the maturity to cope with stressful patient management issues and already had a level of clinical orientation.

Both DHDTS and DS reported scores of psychological wellbeing that were indicative of students who were positively-functioning individuals (Table 5). Measures of self-determination (autonomy), and the ability to take advantage of opportunities (environmental mastery), showed similar trends for both groups, and are dimensions that bring a sense of meaning to life (Baumeister et al., 2013; Ryff, 1989a; Ryff, 1989b). They are also attributes and qualities that hold high importance to the professional identity of future clinicians.

However, the measures of continual development and openness to experience (personal growth), goals and intentions (purpose in life), the ability to respond to other individuals (positive relations with others) and a positive attitude to oneself and others (self-acceptance), were significantly higher ($p<0.002$) for the DHDTS than the DS. The scores for DHDTS in the dimensions of personal growth, purpose in life and self-acceptance, were similar to, or higher than, scores rated as 'high wellbeing' in a recent study examining physical activity levels and psychological wellbeing amongst 700

university students (Yerlisu Lapa, 2015). It was not too surprising that there was a difference in scores for personal growth and positive relations with others as DHDT training is female-dominated, and studies have shown that personal growth and positive relations are particular dimensions which are more central to female conceptions of their development, than they are to males (Ryff, 1989a; Ryff, 1989b). The difference in purpose in life scores between the two groups is unclear. It may be that the more prestigious and higher earning career of dentistry invites those who are initially more career driven "I want to be a dentist" than DHDTs who are likely to be seeking career progression. Self-acceptance is associated with self-confidence and self-reliance, which are attributes that are developed with age and experience. The mean age of the DHDTS (25yrs) was two years older than the DS (23yrs), and the scores for self-acceptance reflected more self-confidence in the mature DHDTS than that of the younger DS.

The reported levels of agency hope and pathway hope (Table 6), showed a tendency for both DHDTS and DS to embark on meaningful goal pursuit, and to have plans to meet those goals. Previous studies have shown that students who score highly in these sub-scales are more likely to focus on success rather than failure. Moreover, they can sustain their motivation by utilising goal setting as a challenge for high academic achievement, even under circumstances of stress (Snyder et al.,1991; 2002).

It was reassuring that the majority of DHDTS and DS did not report levels of depression, anxiety or stress mean scores that would generally be considered outside of the normal range (Lovibond & Lovibond, 1995) (Table 6). Some studies have examined psychological morbidity in association with dental undergraduate stress (e.g. depressive symptoms), but different instruments have been used across the studies, and so it is difficult to make comparisons (Abu-Ghazaleh et al., 2011; Laurence et al., 2009; Silverstein & Kritz-Silverstein, 2010).

Compared to a recent study which measured students' progress to values (Fischer et al., 2016), the higher scores for progress towards values, and the low scores for obstruction to values for both groups (Table 6), showed that DHDTS and the DS were students who reported to be living according to their values (Smout et al., 2014). Although valued living is a subjective experience, 'wanting to do' the right thing, in the best interest of the patient for example, is an attribute of professionalism (GDC, 2015), and is another quality that is of critical importance to a future clinician.

2.6 Conclusions

This study was an investigation into the perceived sources of stress and wellbeing in DHDTS. Through surveying a group of DS studying at the same institution, at the same time, comparisons could be made with previous studies. This study found that the reported sources of stress for this sample of DHDTS (and DS), showed similar trends to the existing studies of DS undergraduate education. However, moving beyond the existing literature, it also assessed positive wellbeing.

This study showed that DHDT students and DS reported high levels of perceived stress, specifically in the academic domain of the DES. However, at the same time, the majority in both groups reported high levels of positive psychological wellbeing and normal ranges of stress, anxiety and depression. In contrast to previous studies, which have made the assumption that stress in dental undergraduate training is debilitating, this study showed that DHDT and DS undergraduate training was indeed perceived as academically stressful, however, at the same time, the students also reported to be positively-functioning individuals.

3 DOES STRESS IN A DENTAL HYGIENE AND DENTAL THERAPY UNDERGRADUATE PROGRAMME CONTRIBUTE TO A SENSE OF WELLBEING IN THE STUDENTS?

3.1 Abstract

Aims: To use a qualitative approach to further explore the stress and wellbeing of dental hygiene and dental therapy students (DHDTS) during their undergraduate training.

Participants and methods: Semi-structured individual interviews to explore motivation, goals, and perceived stress, were conducted with eight DHDTS from across all three years of study at the University of Portsmouth Dental Academy (UPDA). Thematic analysis of the data was undertaken using Braun and Clarke's (2006) six phases of thematic analysis.

Results: Three main themes of 'fulfilment', 'the learning environment', and 'perception of stress' were identified. Within these themes, a further twelve sub-themes were identified. Analysis suggested that a strong sense of passion to become a clinician mitigated most, but not all, of the stressful experiences of the DHDTS undergraduate learning environment.

Conclusions: DHDTS perceived sources of stress during their undergraduate programme were strongly linked to a sense of meaningfulness.

3.2 Introduction

Research has predominantly used the Dental Environment Stress (DES) (Garbee et al., 1980) questionnaire to explore perceived sources of stress in dental undergraduate students (Al-Samadani & Al-Dharrab, 2013; Alzahem et al., 2011; Elani et al., 2014). However, there are gaps in the literature when it comes to exploring stress amongst other members of the dental team, for example Dental Hygiene and Dental Therapy Students (DHDTS), who are educated in a similar environment to dental undergraduate students (Gordon et al., 2016). Most studies exploring dental student stress, have equated psychological wellbeing with the presence or absence of stress, or psychological disorders such as depression (Abu-Ghazaleh et al., 2011; Laurence et al., 2009; Silverstein & Kritz-Silverstein, 2010). However, studies have also shown that there are multiple dimensions which contribute to a sense of positive psychological wellbeing. This body of knowledge suggests that positively-functioning individuals establish goals, direction, and purpose, which give them a sense of meaning in life (Ryff, 1989a; Ryff, 1989b).

A recent study (Baumeister et al., 2013) suggested that a stressful life can also be a meaningful life where the stress of pursuing goals feeds a sense of purpose. Linked to this, the study further suggested that individuals often will accept short-term costs, for example pain, anxiety and stress, in order to come out better in the long run. Further research has supported this (McGonigal, 2015), and concluded that stress should not be seen as a weakness, but as a sign that something you care about is at stake. The literature also states that how the stress is appraised by an individual defines whether it is perceived as a challenge (enhancing) or a threat (debilitating) (Jamieson et al., 2012; 2013; McGonigal, 2015).

Another recent study (Harris et al., 2017a) used valid and reliable measures of wellbeing (Ryff, 1989a; Ryff, 1989b; Smout et al., 2014) in conjunction with the widely-used DES to explore stress and wellbeing in DHDTS. This study showed that DHDTS reported similar levels of stress to that of dental students. However, the DHDTS, unlike the dental students, also reported high scores in the psychological wellbeing dimensions associated with meaning; more specifically, goals, purpose in life, personal growth, and valued living (Ryff, 1989a; Ryff, 1989b; Smout et al., 2014). The findings of this

research, which provided baseline data on student stress and wellbeing, provided the stimulus for this qualitative follow-on study.

Valued living is described as the successful consequence of meaningful goal pursuit that is intrinsically reinforced, and serves an individual's core values (Dahl et al., 2009; Smout et al., 2014). Using the compass as a metaphor, values have been described as the direction of travel, and goals as the waypoints that help individuals move in that direction (Dahl et al., 2009). For example, an individual may have a core value of making a difference to society, and chooses a career (goal) as a heath care professional, which serves that value. Living a valued life requires the successful balance of aligning our goals and values across all of the different domains of life, so that over-prioritising activities which serves one value is not to the detriment of other personal values (e.g. work-life balance) (Aube, Fleury, & Smetana, 2000; Dahl et al., 2009).

In the past, stress and wellbeing in the dental undergraduate programme has primarily been examined using quantitative methodology (Alzahem et al., 2011; Elani et al., 2014). Furthermore, the literature has revealed little new knowledge in the results and conclusions of studies over the last three decades (Al-Samadani & Al-Dharrab, 2013; Alzahem et al., 2011; Elani et al., 2014; Garbee et al., 1980). The need for further enquiry into this field, and the qualitative approach adopted within the current research, which captures students' experiences of stress and wellbeing from their own perspectives, rather than imposing pre-defined theoretical categories to simulate their experience of the world, is thus indicated. Indeed, a qualitative approach may provide a new opportunity to recognise phenomena (e.g. meaning), that has previously been omitted by researchers' reliance on quantitative methodology.

Against this background, the aim of this study was to develop further our shared understanding of stress and wellbeing in the dental learning environment. Building on the former body of knowledge and earlier quantitative research, it qualitatively explores these considerations with one student community of DHDTS undertaking their training at the University of Portsmouth Dental Academy (UPDA).

3.3 Participants and Methods

Ethical approval (Appendix L) was gained from the University of Portsmouth Science Faculty Ethics Committee (SFEC 2016 – 052). Participants were advised verbally and in writing, that all information they provided was confidential and that their data would be anonymised. They were given the interview schedule and participant information sheet (Appendix M) four days before the interview to ensure that consent to participate in a recorded interview was both informed and valid. It was initially intended to recruit twelve participants to the study as according to Ando, Cousins, and Young (2014), data saturation in thematic analysis can be achieved with this number of participants. However, a sample of eight DHDTS from UPDA (11% of total student population), who had provided their e-mail address to be contacted for a follow-up interview after completion of an online survey, were ultimately recruited to participate in semi-structured interviews of approximately 45 minutes duration. The participants were from Years 1 (n=1), 2 (n=5), and 3 (n=2) of the BSc (Hons) in Dental Hygiene and Therapy, to ensure that their experiences reflected the undergraduate programme in its entirety. The interviews were conducted by the first author (MH), who was not actively involved in their education. Seven of the interviews were conducted in a small meeting room at UPDA, which was the preferred venue for the participants. One interview was conducted by telephone. All of the interviews were conducted in July 2016, after the results of the annual examinations. All of the participants were female.

3.3.1 Data collection

An interview schedule designed to explore perceived motivation, goals (in particular, goal failure) and stress in DHDTS, was piloted on two former students, and adapted in light of their feedback (Appendix N). The study participants were firstly asked to talk about their motivation to study dental hygiene and therapy. A second block of questions asked about their perceived causes of stressful experiences within the learning environment (e.g. handling goal failure as well as criticism of their work); as identified from previous work and the literature. For example, participants were asked "we all fail to get all of our goals sometimes; what do you do if this happens to you?" and "how do you deal with being observed and having your performance with patients assessed and

graded?" The third block of questions was designed to explore the perceptions of stress within the learning environment as enhancing or debilitating.

3.3.2 Analysis

Interview transcriptions were sent to the participants, who were asked to confirm their accuracy prior to the analysis being carried out. Thematic analysis of all of the data was undertaken using Braun and Clarke's (2006) six phases of thematic analysis:
1. Familiarising oneself with the data; 2. Generating initial codes; 3. Searching for themes; 4. Reviewing themes; 5. Defining and naming themes; 6. Producing the report (Braun & Clarke, 2006). The recorded interviews were manually transcribed as it is regarded to be a key phase of data analysis within interpretative qualitative methodology, and as an approach, was considered an excellent way for the researcher to become immersed within the data (Bird, 2005). Initial codes were generated from across the entire data set and then collated into potential themes. These themes were then reviewed and further defined, and named. Twenty five percent of the data were analysed independently by the two second authors experienced in qualitative methodology (JCW and DRR), and three themes encompassing twelve sub-themes were identified.

3.4 Results

Table 7 shows the 3 themes and 12 sub-themes developed from the data.

Analysis of these themes suggested that the strong sense of passion to become a clinician mitigated most, but not all, of the stressful experiences of the dental learning environment.

Table 7. The 3 themes and 12 sub-themes developed from the data

Themes	Sub-themes
Theme 1: Fulfilment	Unfulfilled past
	Enjoying the present
	Expecting to be helpful and useful in the future
Theme 2: The learning environment	Learning from peers
	Differing feedback
	Negative feedback a necessity
	Examinations as barometer of current capabilities
	Examinations as failed attempts to measure capabilities
	Accepting failure as part of learning
	Rejecting failure
Theme 3: Perception of stress	Negative perception of stress
	Stress as enhancing

In the first theme labelled fulfilment, the participants described their motivation for becoming a DHDT. Within the data the first sub-theme of an unfulfilled past emerged. Here participants expressed an overwhelming desire to feel needed and be training for a profession which they felt made a difference to people's lives.

Six out of the eight participants had been dental nurses in the past. However, there was a distinct sense of lack of fulfilment, and even frustration at their restricted involvement in patient care in that role. For example, one participant described herself as "*reaching a ceiling*" as a dental nurse. Another, reflecting on the lack of utilisation of additional skills that she had hoped would have expanded her role as a dental nurse, stated:

> *'I did an oral health education course and really liked the patient contact. I liked working at that level, which being an assistant (sic dental nurse) didn't allow.' (SS1)*

The second sub-theme, 'enjoying the present', the degree programme itself was a source of fulfilment for all of the participants. The mature students, who had been away

from formal education, described the programme as an opportunity to realise they were more academically capable than they had previously given themselves credit for. On the other hand, the younger participants who had progressed directly from A level studies, discussed their sense of fulfilment from the acquisition of life skills that the programme promoted:

> *'I feel more confident talking to people that I don't know. Like at first, I was a bit nervous - my communication skills weren't as good as what they are now and they've really improved, and that benefits me outside of Uni (sic University) as well.' (SS4)*

In the third sub-theme of 'expecting to be helpful and useful in the future', participants described how responsibility, patient engagement, and making a difference were key motivators to their perception of their future roles as DHDTs. The majority described their desire to "*help patients more directly*" and "*be in the driving seat*". This sense of purpose was particularly strong for one participant who stated:

> *'Thinking you only get a limited time doing what you're doing and knowing that you have some sort of a contribution to society, someone else's life, it's not just waking up and doing what you're supposed to do.'(SS8)*

Another participant also valued the flexibility of her future job role in relation to the potential of a good work-family balance:

> *'I knew that hygiene and therapy is something that you can do part-time or full-time and often people do work part time in different practices, because as a woman in the future at some point a family is something that I would probably consider and it's quite nice that that it is a career that would adapt around that.' (SS3)*

In the second theme labelled 'The learning environment', participants described their experiences of teaching and learning at UPDA. The first sub-theme labelled 'learning from peers', participants identified peer learning as a fundamental aspect of their progression through the programme. The majority of participants described how they enjoyed being part of larger peer-learning networks within their cohort, whilst a small minority relied on one or two significant others. Some participants also described maximising opportunities to learn from others outside of the university whilst they were undertaking paid work. One participant who was working as an agency dental nurse at weekends, stated:

> *'Just watching clinicians work and letting them know that I'm on this course. They've been really helpful in showing me things and giving me tips along the way. Just shadowing them and just seeing how they work and how it's kind of natural to them.' (SS7)*

Participants also identified peer support to be as equally important as peer learning:

> *'It's quite nice when you do talk to others and they say 'yes, it happened to me last week' because you can feel very on your own. It's not until you all sit down and talk to each other that you realise that others feel the same. If you didn't have anyone to speak to, peer wise, you'd go a bit mad, I think. It's nice to be able to talk and realise that you're not alone.' (SS2)*

In the sub-theme 'differing feedback', all participants discussed the various ways that they learnt from tutors. However, there were mixed opinions in relation to dealing with the differing advice received from the clinical teaching staff. Some participants found it more difficult to accept conflicting advice than others, with one participant stating:

> *'It's very difficult if you have maybe the same patient and 2 appointments with them, and the first one someone tells you to do something and you get to the second appointment and a different tutor will say something different. It means that you struggle at the start to actually figure which is the right answer and then eventually as time goes on I think you find your own answer.' (SS3)*

Whereas the majority of participants felt that conflicting opinions reflected the reality of what it will be like in practice:

> *'In practice, everyone is different and as a clinician, so you're not stagnant just having one person's opinion, you have lots of different opinions which is good.' (SS2)*

> *'Everyone has different experiences – everyone has a different job and has trained in different areas. Although there are text-book answers, every clinician has a slightly different take on things. To be a well-rounded learner you need to have different opinions from different people. If you have only one view all of the time, then you don't learn different ways of looking or approaching things.' (SS1)*

In the third sub-theme, negative feedback was perceived as a necessary evil to learn from and develop. Most interviewees described negative feedback as "*not pleasant*" or sometimes "*disappointing*", with some participants describing how they "*beat themselves up*", but then viewed it as a challenge:

> *'No-one likes negative feedback, I get quite a bit disappointed, but I think I need that to be able to learn to be able to progress. I beat myself up at first, but come out the other end. I think right, OK, then as a challenge, how am I going to make sure this doesn't happen next time? Or how can I change it to be better.' (SS2)*

> *'Initially it's not pleasant, but I think you definitely do just get used to it. It's not pleasant, but that is the best way. As a learning experience, if you're not being observed and graded then you're not going to learn or improve.' (SS5)*

Unsurprisingly, in the fourth sub-theme 'examinations as barometer of current capabilities', all participants identified successfully passing the programme as their long-term goal. Passing examinations were perceived to be a 'barometer' to show their capabilities to themselves and others in the establishment:

> *'I enjoy exams, which is a little bit strange because it's kind of a marker to show what I can do. I feel like you spend all year working really hard, and if it was just tick boxes and didn't have those exams, you wouldn't be able to realise not only your potential, but others wouldn't realise it either.'(SS6)*

Some of the participants described how examination success in one year 'pushed' them to think about making it better for the next time, as one participant said:

> *'When I got my marks each year, I would think how can I make that better for next time.' (SS1)*

Interestingly, the sub-theme 'examinations as failed attempts to measure capabilities', revealed how two of the interviewees felt somewhat 'cheated' by the examination process itself. One participant quite bluntly stated:

> *'I felt like I wasn't showing off my true ability in those exams, because I revised a lot more and did a lot more revision compare to other people who didn't revise all the topics. I felt my revision wasn't reflected in those exams.' (SS4)*

In the penultimate sub theme 'accepting failure as part of learning', the majority of participants identified goal failure as something that they accepted as part of being a student. For one participant, goal failure was described as a tool to aid resilience, whereas another described it as a form of self-acceptance:

> *'I think there's nothing constructive that ever happens from just being negative about something – if you keep trying –what doesn't kill you, makes you stronger, more resilient. If something really doesn't happen, maybe it wasn't meant to be. If you keep saying no in one field, maybe go another path; pave your own way.' (SS8)*

> *'I kind of don't expect everything to go perfect; I tend to just deal with things as they happen. When I first started revising I thought OK, I'm going to work as hard as I can, but if I have to retake, I'll have to retake; I didn't think that I'm going to get this first time, it might take a few goes, but I will get there eventually.'(SS7)*

'Rejecting failure', which was the final sub-theme, showed how for a minority of participants, goal failure was difficult to accept:

> *'I don't like it when things go wrong. I don't like to accept it. I want everything to be perfect. At the time, I keep thinking about it, like why did I do that? It's when I go home I realise*

then OK. Once I go home and realise what's happened – that's when it sinks in and that's when ….aah, I could have done this, when I didn't.' (SS4)

Data for the final theme labelled 'Perception of stress', emerged from responses by participants when they were asked how they physiologically reacted to stressors within the learning environment (examinations, feedback, and goal failure). Most participants described symptoms such as "*shaky hands*", "*sweating*", and an overarching worry to "*not let the patient know*" that they were anxious.

In the first of the two sub-themes, 'negative perceptions of stress', the majority of students perceived the physiological symptoms of stress to affect their performance in a negative way:

'I do feel like it did affect me. Whereas if I didn't have those nerves, because I knew what I was doing, it was all in my mind, it just didn't come out that way because I felt nervous.' (SS6)

'That initial feeling before you go into an exam, especially a practical exam was just horrible – it's not healthy at all, but I think that once you're in the exam, you kind of relax and everything just flows, but that initial horrible feeling before you go in to an exam, I just think is really unhealthy, and doesn't do anybody any good.' (SS2)

In the second sub-theme 'stress as enhancing', a small minority of students described the physiological symptoms as either enhancing their performance or as a challenge:

'At first I get nervous and then it kind of makes me write quicker – the adrenaline. I don't think it affects my knowledge – it's still in my mind – I've never had a mind blank from being nervous, it's just not a nice feeling.' (SS4)

'It's that feeling in your stomach, it's that scared, horrible feeling and I get it with presentations – right before. They're just temporary things, because of something – you know why you're feeling that and in a way, it's good – you just feel human; they're not a bad thing - it's good to be put under stress for a bit to see how you cope with it.' (SS7)

3.5 Discussion

The findings of this study suggested that the majority of participants derived a sense of fulfilment from aspects of their undergraduate programme that they perceived as stressful. The participants described a strong sense of purpose, where their current experiences of the undergraduate programme were understood within the context of their ambition to be future clinicians (Baumeister & Vohs, 2005; Baumeister et al., 2013;

Feldman & Snyder, 2005). Although all the participants described their objective goal as passing the degree programme, many also described a subjective state of fulfilment that undertaking the programme provided. This is consistent with the literature which suggests that it is often the journey to the goal which may be more meaningful than its attainment. What is more, individuals who achieve desirable end states will often form new goals as a means of maintaining a sense of purpose (Snyder, et al., 1991; Sommer et al., 2012).

Motivation to become a dental hygienist and therapist served the values which the participants reported as around 'wanting to make a difference' and 'being needed'. Moreover, the clinical elements of the programme which involved treating patients as a student, meant that the participants were able to portray current valued living as learners, as well as envisaging a valued life as future clinicians (Baumeister & Vohs, 2005; Feldman & Snyder, 2005). Furthermore, the subjective belief that they could actually make a difference, meant that participants in this study also demonstrated a sense of efficacy, which in addition to self-worth, purpose, and values, is one of the four levels of meaning described by Baumeister and Vohs (2005).

Self-acceptance of criticism of one's work requires the motivation to endure the stress of receiving (negative) feedback in exchange for the learning opportunity of receiving it (Crum et al., 2013). Indeed, participants in this study highlighted aspects of the learning environment that were difficult, negative, and disappointing. However, most participants showed their maturity and discussed how they utilised the feedback as an opportunity to learn and grow; even where there were instances of conflicting opinions from faculty (the clinical teaching staff). Additionally, 'beating themselves up' also highlighted the issue that some participants reported a lack of self-compassion and found it difficult to take the perspective on their experiences as simply a part of being a student (Dahl et al., 2009). More specifically, these participants tended to set the level of expectation for themselves within the context to that of a qualified clinician, rather than the level of a learner.

Goal attainment is central to Snyder et al. (1991) theory of hope. Specifically, hope is defined as "the process of thinking about one's goals, along with the motivation to move towards those goals (agency), and the ways to achieve those goals (pathways)" (Snyder, 1995, p. 355), regardless of the ease or the difficulty of obtaining them (Snyder, Cheavens, & Sympson, 1997). Studies have shown that students can sustain their

motivation by utilising goal setting as a challenge for high academic achievement, even under circumstances of stress (Snyder, 1995; Snyder et al., 2002). Indeed, a number of participants described how positive emotions from successful attainment of yearly examinations, encouraged them to set 'stretch goals' (Snyder et al., 1991) for higher academic achievement for the next year. On the other hand, some participants reported how reflecting on failed goal attempts led them to alter their pathway to goal pursuit. This is in line with the literature that showed that 'high hope' individuals have the ability to 'let go' of problematic goals. Moreover, they expect mistakes to happen, and do not question their innate talent, but rather conclude that in this case, they did not use the best strategy. They will replace failed goals with either new goals completely, or new pathways for the same goal (Snyder et al., 1997). Snyder et al (1991) have also described a 'high-hope' individual as someone whose repertoire of goal pursuit contains learning goals as well as performance goals. However, the majority of participants in this study tended to report goal setting in relation to the more long-term goals of passing the end of year examinations (performance goals). This is not surprising as Western culture puts great emphasis on students getting good grades rather than the process of learning (learning goals) (Dahl et al., 2009). Likewise, the literature suggests that 'competition for grades' is one of the high sources of stress in dental student undergraduate training (Alzahem et al., 2011; Elani et al., 2014).

Although stress can and does pose a threat to health and wellbeing, recent research has suggested that stress can also be enhancing (McGonigal, 2015). Studies have shown that subtle differentiations of mind-set can engender meaningful changes in an individual's psychological and physiological state (Crum et al., 2013; McGonigal, 2015). More specifically, it has suggested the more an individual adopts a stress is enhancing mind-set, the more likely that stress will have an enhancing effect on their health, performance, and wellbeing. Conversely, if one views stress as debilitating, the stress is likely to have a deteriorating effect (Crum et al., 2013).

Most of the participants in this study perceived stress as affecting their performance in a negative way. This is not considered surprising as individuals are typically encouraged to avoid stressful situations whenever possible, or actively control unavoidable or inevitable stress (Crum et al., 2013). Furthermore, the participants attempt to control unavoidable stress, paradoxically resulted in increased anxiety which they perceived affected their performance, and perpetuated the mind-set that stress was

debilitating. On the other hand, the minority of participants who described a stress enhancing and enabling mind-set, suggested that stress enabled them to write quicker in examinations. This group also described examinations as a basis for reward and challenge.

A number of the sub-themes identified reflected the notion of belongingness. This included 'expecting to be helpful and useful in the future', 'supporting and learning from peers', and 'accepting failure as part of learning'. As well as the literature which has shown the importance of belongingness in relation to the needs for meaning in life (Stillman & Baumeister, 2009), belongingness in dental education has been defined as "a deeply personal and contextually mediated experience in which a student becomes an essential and respected part of the dental educational environment where all are accepted and equally valued by each other and which allows each individual student to develop autonomy, self-reflection and self-actualisation as a clinician" (Radford & Hellyer, 2016, p. 539). Indeed, the DHDT students in this study certainly expressed notions of developing autonomy, self-reflection, and self-actualisation as members of the profession.

Most research on dental student stress has focused on the negative aspects of stress (Alzahem et al., 2011; Elani et al., 2014). This has resulted in some researchers advocating a curriculum change to reduce stress in the dental undergraduate programme (Divaris et al., 2008; Naidu et al., 2002; Polychronopoulou & Divaris, 2009; Silverstein & Kritz-Silverstein, 2010). However, stress often results from activities that are meaningful, and reducing stress may result in reducing the meaning of the activity (Baumeister & Vohs, 2005; Baumeister et al., 2013; Feldman & Snyder, 2005; McGonigal, 2015). Indeed, this study has shown that participants' perceived sources of stress in their undergraduate programme were very strongly linked to meaningfulness, therefore we would argue that reducing the sources of stress in the undergraduate programme may also reduce the meaningfulness of the course. Rather than introducing curriculum change, the researchers in this study recommend interventions to raise awareness of the meaningful relationship of stress as a coping mechanism to build resiliency (Crum et al., 2013).

Within the limits of the study, it confirmed the notion found in existing literature which has associated stress in life with meaningfulness. However, whilst this study has offered some further insights into stress and wellbeing amongst DHDTS, some caution

is required. The interview data were drawn from a relatively small sample. Whilst it may be argued that this is consistent with qualitative research approaches described within the literature, the generalisability of the findings and conclusions drawn here to other situations and contexts must be determined by the reader.

3.6 Conclusions

This study has provided further understanding of stress and wellbeing in the dental learning environment. It has also provided new insight and a richer understanding of the previous quantitative study, in which DHDTS reported to be positively functioning individuals at the same time as perceiving their training to be highly stressful (Harris et al., 2017a). Indeed, as the findings of this study were comparable with the findings of the previous quantitative study of the same student cohort, the authors contend that it has provided further evidence of the meaningful nature of stress in Dental Hygiene and Dental Therapy undergraduate education.

4 PERCEIVED STRESS AND WELLBEING IN UK AND AUSTRALIAN DENTAL HYGIENE AND DENTAL THERAPY STUDENTS

4.1 Abstract

Introduction: This study aimed to explore United Kingdom (UK) and Australian (Aus) Dental Hygiene and Dental Therapy Students' (DHDTS) perception of stress and wellbeing during their undergraduate education. Upon qualification, DHDTS in the UK register as Dental Therapists (DT), and in Australia they register as Oral Health Therapists (OHT).

Participants and methods: A questionnaire was distributed to Years 1, 2 and 3 DHDTS at the University of Portsmouth Dental Academy (UPDA) in the UK, and La Trobe Rural Health School in Australia. The questionnaire consisted of five well-used measurement instruments which included the: Dental Environment Stress questionnaire (DES); Depression Anxiety Stress Scales (DASS-21); Scales of Psychological Wellbeing (SPWB-9); Valuing Questionnaire (VQ); and the Adult Hope Scale (AHS) to collect data on students' perception of levels of stress and wellbeing.

Results: A response rate of 58% (UK) and 55% (Australia) was achieved. Clinical factors and academic work were perceived as stressful for DHDTS in both the UK and Australia. The Australian DHDTS perceived stress in the educational environment was significantly higher ($p<0.002$) than the UK DHDTS. The majority of respondents reported levels of depression, anxiety, and stress to be within the normal-to-moderate range. All students reported high levels of positive wellbeing, with no significant differences between the two groups.

Conclusions: DHDTS in the UK and Australia identified sources of stress within their undergraduate education, but also perceived themselves as positively-functioning individuals.

4.2 Introduction

Studies have shown that the dental school undergraduate environment is a highly demanding and stressful learning experience for a number of students (Al-Samadani & Al-Dharrab, 2013; Alzahem et al., 2011; Divaris et al., 2008; Elani et al., 2014). Three recent studies which examined stress and wellbeing among dental hygiene and dental therapy students (DHDTS) in the United Kingdom (UK) and in South Africa (SA) (Gordon et al., 2016; Harris, 2017a; 2017b), showed that DHDTS perceived sources of stress within their undergraduate programme were comparable to reported findings amongst dental students (Dahan & Bedos, 2010; Laurence et al., 2009). In one of these studies (Harris et al., 2017a), valid and reliable measures of wellbeing (Ryff, 1989; Smout et al., 2014; Snyder et al., 1991) in conjunction with the widely-used Dental Environment Stress questionnaire (DES) (Garbee et al.,1980), were used to explore dimensions of wellbeing, as well as stress. The study demonstrated that DHDTS reported similar sources of stress to that of dental students (e.g. examinations and grades, workload, and graduation requirements). However, the DHDTS, unlike the dental students, also reported high scores in psychological wellbeing dimensions. Specifically in: goals, purpose in life, personal growth, and living a valued life (Harris et al., 2017a; 2017b).

In a second study (Harris et al., 2017b), the same researchers used the baseline data on DHDTS stress and wellbeing, to formulate semi-structured interview questions to conduct a qualitative follow-on study. This study showed that the majority of participants derived a sense of fulfilment from aspects of their undergraduate programme that they perceived as stressful (Harris et al., 2017b). Moreover, thematic analysis suggested that a strong sense of passion to become a clinician mitigated most, but not all, of the stressful experiences of the DHDTS undergraduate learning environment (Harris et al., 2017b). For example, participants highlighted aspects of the learning environment that were difficult, negative, and disappointing (e.g. criticism of their clinical work). However, they utilised the feedback as an opportunity to learn and grow; even where there were instances of conflicting opinions from the clinical teaching staff (Harris et al., 2017b).

Whilst these studies have contributed to the gap in knowledge, and offered insight into stress and wellbeing amongst DHDTS in two institutions, there needs to be a

clearer understanding of perceived stress and wellbeing among DHDTS in other institutions, and in other countries. For example, what role the institutional environment and curriculum has on students' perceptions (Humphris et al., 2002). The aim of this study therefore was to compare the perceived sources of stress and wellbeing in DHDTS studying in a dental school in the UK and in Australia, so that we can understand if both groups of students experience similar or different levels of stress and wellbeing throughout their training to become qualified clinicians within their scope of practice. Moreover, considering that the role of the dental undergraduate provider is to equip DHDTS with the appropriate skills to join their profession, it is vital that (as with dental students) their stress and wellbeing is explored. To contextualise the study, Table 8 presents the DHDTS curriculum for UPDA in the UK, and La Trobe Rural Health School, which is currently one of only a few accredited programmes in Australia that prepares graduates to restore teeth in adults of all ages. The educational approach for both the study samples were similar with respect to the use of digital portfolios to track students' progress throughout the course. However, unlike the UK DHDTS, where the practical elements of the course are tutor-lead, the majority of the pre-clinical sessions for the Australian DHDTS uses a 'flipped classroom' concept. This is where students prepare before attending the session by engaging in pre-reading and watching instructional videos. In the pre-clinical session itself, the Australian DHDTS are expected to try and start the procedure without additional tutor demonstrations, with supervision and personal feedback provided (including additional specific demonstrations where necessary). Upon qualification, DHDTS in the UK register as Dental Therapists, and in Australia they register as Oral Health Therapists.

Table 8. DHDTS curriculum for centres in UK and Australia showing module titles and credits assigned to each module

DHDTS year of study	University of Portsmouth Dental Academy, UK Teaching and learning modules (number of credits)	La Trobe Rural Health School, Australia Teaching and learning modules (number of credits)
Year 1	1. Foundations of Clinical Practice (20) 2. Introduction to Behavioural Science (20) 3. Introduction to Human Sciences (20) 4. Personal and Professional Development (20) 5. Pre-Clinical Practice (40)	1. Introduction to Oral Health Sciences (30) 2. Individual Determinants of Health (15) 3. Human Biosciences A (15) 4. Social Determinants of Health (15) 5. Human Biosciences B (15) 6. Pre-Clinical Oral Health Practice (30)
Year 2	1. Advanced Behavioural Science (20) 2. Advanced Human Science (20) 3. Dental Radiology and Dental Imaging (20) 4. Professional Development and Team Work (20) 5. Clinical Practice (40)	1. Principles of Public Health Practice (15) † 2. Medicine for Dentistry (15) 3. Oral Medicine, Special Needs Dentistry and Pharmacology (15)‡ 4. Research in Dentistry (15)§ 5. Clinical Oral Health Practice (60)
Year 3	1. Clinical Practice in the Wider Community (20)† 2. Management and Leadership for DCP practice (20) 3. Oral Surgery and Oral Medicine (20)‡ 4. Research in DCP practice (20)§ 5. Comprehensive Clinical Practice (40)	1. Evidence Based Oral Health Practice (30) 2. Adult Dental Therapy (15) 3. Integrated Oral Health (75)

†, ‡, §: Similar modules delivered at different times within the UK and Australian curriculum.
Dental Radiology and Dental Imaging is a standalone module in Year 2 in UK; and integrated into Oral Health Practice modules in Years 1, 2, and 3 in Australia.

4.3 Participants and Methods

Ethical approval (Appendix O) was gained from the University of Portsmouth Research Ethics Committee (SFEC 2015-078), and an anonymous, self-reported online questionnaire was administered to 72 DHDTS at the University of Portsmouth Dental Academy (UPDA) in the UK, and to 83 DHDTS at La Trobe Rural Health School in Australia. Completion of the survey was taken as consent to participate in the study. The survey was distributed over the four-week examination period, when both the UK and Australian students were 6 months into their academic year. Qualtrics™ software used for the survey captured the students' year of study and age. Gender was not

captured, as this would identify the very small number of male DHDTS. The survey consisted of five well-used measurement instruments, which all had excellent reliability and validity, and included the: Dental Environment Stress questionnaire (DES) (Garbee et al., 1980) (Appendix G-1); Depression Anxiety Stress Scales (DASS-21) (Lovibond & Lovibond, 1995) (Appendix H-1); Scales of Psychological Wellbeing (SPWB-9) (Ryff, 1989) (Appendix I-1); Valuing Questionnaire (VQ) (Smout et al., 2014) (Appendix J-1); and the Adult Hope Scale (AHS) (Snyder et al., 1991) (Appendix K-1).

The DES (Table 9) was chosen as it is the most widely used measurement in the dental setting, within the existing literature (Garbee et al., 1980). A modified version was used (Naidu et al., 2002), consisting of thirty-nine items describing stressors specifically relating to dental undergraduate training. The response to each item was rated on a five-point scale: 0 = not pertinent, 1 = not stressful, 2 = slightly stressful, 3 = moderately stressful and 4 = very stressful. The mean score was calculated for each item of the DES to evaluate stress levels and a total score was calculated by summing all responses. The items were grouped into five stressor domains: living accommodation, personal factors, educational environment, academic work and clinical factors.

The DASS-21 (Lovibond & Lovibond, 1995), a shorter version of the full survey (DASS-42), was adopted. It consisted of three self-reporting scales constructed to measure the negative emotional states of depression, anxiety and stress. Each of these contained 7 items. Participants responded using a 4-point severity and frequency scale to rate the extent to which they had experienced each over the past week: 0 = did not apply to me at all, 1 = applied to me to some degree, or some of the time, 2 = applied to me to a considerable degree, or a good part of the time and 3 = applied to me very much, or most of the time. Separate scores for depression, anxiety and stress were calculated by summing the scores for each. These were then multiplied by 2 to fit with the DASS-42 scale. Table 10 shows the DASS authors' recommended cut-off scores for the labels of 'normal', 'moderate' and 'severe', in relation to depression, anxiety and stress, which is based on Lovibond and Lovibond's normative data (Lovibond & Lovibond, 1995).

Table 9. Dental Environment Stress questionnaire items and domains

DES Individual item stressor	Domain
Moving away from home Environment in which to study Lack of home atmosphere Other problems with accommodation	Living accommodation
Making friends Financial responsibilities Personal physical health Intimate Relationships Necessity to postpone marriage Necessity to postpone children Having multiple roles Conflict with spouse/mate over career development Lack of time for relaxation Having children in the home Having reduced holidays compared with other students Fear of going out due to crime Dependencies (e.g. drugs, alcohol)	Personal factors
Expectation versus reality of dental school Approachability of staff Criticism about academic or clinical work Rules and regulations of the dental school Discrimination due to race, nationality, gender or social class	Educational environment
Amount of assigned course work Difficulty of course work Fear of being able to catch up if falling behind Competition for grades Fear of failing course or year Uncertainty about dental career Examinations Lack of input in decision making process in dental school	Academic work
Concerns about manual dexterity Transition from preclinical to clinical Learning precision manual skills Completing clinical requirements Concern about treatment grades awarded Difference in opinion between clinical staff concerning treatment Shortage of allocated clinical time Patient management Confidence in own clinical decision making	Clinical factors

SPWB-9, the shorter version of the SPWB (Ryff, 1989), was used. It comprised of six self-reporting scales consisting of 9 items, which measured the dimensions of autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance. The response to each item was rated on a six-point scale: 1 = strongly disagree, 2 = moderately disagree, 3 = slightly disagree, 4 = slightly agree, 5 = moderately agree and 6 = strongly agree. There is no specific score for defining high or low wellbeing, therefore thresholds for 'pure' positive and negative scores were set by the authors of the study at >36 and <27 respectively for the purpose of the study, to show participants trends in the direction of either positive or negative psychological wellbeing. For example, a score of 36 or above in each dimension of the SPWB-9 showed that participants reported to at least slightly agree that the positive measures of psychological wellbeing applied to them.

Table 10. Cut-off scores for DASS – 21 severity labels (normal, moderate, severe)

	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely severe	28+	20+	34+

The VQ (Smout et al., 2014), a self-reporting 10-item scale, was adopted to measure the extent to which DHDTS lived out their values across their life. The VQ was used to measure how much participants were living according to their personal values, rather than what their values were per se. This instrument was originally designed to track clients' progress towards living according to their values in Acceptance and Commitment Therapy (Dahl et al., 2009), but it is not client specific and has been used with the general population. Indeed, a very recent study has also used the VQ as one of the instruments in a survey of Australian undergraduate students (Fischer et al., 2016). Participants responded using a six-point format ranging from 0 = not at all true, through to 6 = completely true. The 10-item scale has 2 subscales: 5 items which measures progress towards valued living and 5 items which measures obstruction towards valued living. Subscale scores were calculated by summing the scores of the 5

items in each sub-scale to get a score for the progress domain and a score for the obstruction domain.

Finally, the AHS (Snyder et al., 1991), a self-reporting 12-item scale was selected. It consists of two subscales that measure 'agency' (goal-directed energy) and 'pathways' (planning to accomplish goals). Of the total 12 items, 4 measure agency and 4 measure pathway. The remaining 4 items are 'fillers'. Participants responded using an eight-point scale: 1 = definitely false, 2 = mostly false, 3 = somewhat false, 4 = slightly false, 5 = slightly true, 6 = somewhat true, 7 = mostly true, 8 = definitely true. Individual scores for agency hope and pathway hope were calculated by summing the scores of the 4 items in each. There is no specific score defining high and low hope, however an early study by the author of the AHS, suggested that 'high hope' and 'low hope' equated to a combined agency and pathway score of >60 and <35 respectively (Snyder et al., 1998).

Statistical analysis carried out using SPSS v22™ included frequency distributions, reliability analysis, and correlation analysis. The data were checked for normality, kurtosis and skew. Mann-Whitney U tests with Bonferroni corrections were used. The level for a statistically significant difference was set at $p<0.002$.

4.4 Results

Cronbach's alpha ranged from 0.68 to 0.88 for all of the scales (SPWB: 0.88 (Aus), 0.87 (UK); DASS-21: 0.88 (Aus), 0.82 (UK); AHS: 0.88 (Aus), 0.78 (UK); DES: 0.80 (Aus), 0.69 (UK); VQ: 0.68 (Aus), 0.69 (UK)). The reliability of all the scales was within the acceptable limits, albeit the VQ for both study samples, and the DES for the UK sample was at the lower end. The response rate was 58% for the UK (n=42), and 55% for Australia (n=46). The mean age for the UK was 26 years, with a range of 19 to 39 years. The mean age for Australia was 23 years, with a range of 18 to 49 years.

Table 11 compares the domain-specific sources of stress mean DES scores for the UK and Australia. Scores for living accommodation, personal factors, academic work and clinical factors showed similar trends for both the UK and Australian students, and were similar levels to those reported in a previous study (Harris et al., 2017a). However, within the domain of the educational environment, the scores were significantly higher ($p<0.002$) for the Australian students than the UK students.

Table 11. Domain-specific sources of stress mean DES scores for UK and Australia

DES Domain (max score within each domain)	Mean (SD) **UK** (n=39)	Mean (SD) **Aus** (n=41)	***p* value**
Living accommodation (16)	6.51 (3.60)	8.26 (3.77)	0.019
Personal factors (52)	16.87 (6.55)	17.84 (7.99)	0.270
Education environment (20)	7.41 (2.77)	11.15 (4.14)	0.000*
Academic work (32)	20.41 (5.34)	21.95 (7.13)	0.107
Clinical factors (36)	19.70 (5.86)	19.20 (7.83)	0.823

* Bonferroni correction $p<0.002$

Table 12 presents the stressors within the educational environment domain of the DES for each year of study for the UK and Australia. Sources of stress within the educational environment were not reported as particularly high (above 3) in any year of study for the UK students. For the Australian students, Year 1 scores were similar to the UK. For both Year 2 and Year 3 DHDTS, criticism about academic or clinical work was reported as a high source of stress, with approachability of staff also a high source of stress to the Year 3 students.

Table 12. The stressors within the educational environment domain of the DES for each year of study for UK and Australia (high stress score = 3 or above)

Year	Sources of stress within the educational environment domain	Mean (SD) **UK**	Mean (SD) **Aus**
1	Expectation versus reality of dental school	2.00 (1.09)	2.47 (1.18)
	Approachability of staff	1.64 (1.03)	2.00 (1.12)
	Criticism about academic or clinical work	2.36 (1.03)	2.06 (1.03)
	Rules and regulations of the dental school	1.18 (0.60)	1.71 (0.92)
	Discrimination due to race, nationality, gender or social class	0.73 (0.65)	1.00 (1.00)
2	Expectation versus reality of dental school	1.77 (1.01)	2.71 (1.39)
	Approachability of staff	1.77 (0.73)	2.57 (0.79)
	Criticism about academic or clinical work	2.46 (0.78)	3.14 (0.69)
	Rules and regulations of the dental school	1.54 (0.78)	2.29 (1.13)
	Discrimination due to race, nationality, gender or social class	0.54 (0.51)	0.43 (0.53)
3	Expectation versus reality of dental school	1.60 (0.99)	2.71 (1.31)
	Approachability of staff	1.13 (0.35)	3.06 (1.08)
	Criticism about academic or clinical work	1.80 (0.86)	3.18 (0.80)
	Rules and regulations of the dental school	1.20 (0.68)	2.65 (1.32)
	Discrimination due to race, nationality, gender or social class	0.73 (0.70)	1.47 (1.46)

Table 13 shows the dimensions of SPWB mean scores for UK and Australia. The instrument used was the SPWB-9, which is the shortened 9-item version of the SPWB. Both UK and Australia mean scores were above the threshold for a negative score (<27), with a trend towards the threshold of a positive score (>36), for both groups, in all dimensions. There was no statistical difference between the two groups.

Table 13. Dimensions of SPWB mean scores for UK and Australia

SPWB dimension (max score = 54)	Mean (SD) **UK** (n=34)	Mean (SD) **Aus** (n=36)	***p* value**
Autonomy	36.97 (7.26)	33.54 (6.29)	0.064
Environmental mastery	37.78 (6.25)	34.30 (7.58)	0.086
Personal growth	44.36 (5.07)	42.39 (5.95)	0.213
Positive relations with others	40.73 (8.45)	39.29 (7.30)	0.317
Purpose in life	43.41 (6.59)	39.25 (5.89)	0.006
Self-acceptance	39.68 (7.72)	35.50 (9.13)	0.057

Table 14 shows the mean scores for the DASS-21, AHS and VQ for the UK and Australia. The majority of depression and stress scores for both groups were within the recommended cut-off scores (Lovibond & Lovibond, 1995) for the label 'mild' (10-13 for depression, 15-18 for stress). The cut-off scores for anxiety fell within the label 'moderate' (10-14), and were higher than those reported in the previous UK study (Harris et al., 2017a). Both UK and Australian students reported fairly high levels of agency hope, pathway hope, and progress towards values; students also reported fairly low levels of obstruction towards values. There was no statistical difference between the two groups.

Table 14. Mean scores of DASS-21, AHS and VQ for UK and Australia

DASS-21, AHS and VQ subscales (max score within each subscale)	Mean (SD) **UK** (n=42)	Mean (SD) **Aus** (n=46)	***p* value**
DASS-21			
Depression (42)	11.57 (9.18)	13.06 (10.18)	0.440
Anxiety (42)	10.78 (8.85)	13.08 (9.58)	0.216
Stress (42)	17.43 (8.07)	17.20 (9.96)	0.850
AHS			
Agency (32)	25.67 (3.67)	22.45 (5.93)	0.010
Pathway (32)	25.30 (3.55)	21.90 (5.97)	0.004
VQ			
Progress (30)	19.84 (5.74)	17.74 (6.94)	0.237
Obstruction (30)	10.32 (5.48)	13.25 (6.88)	0.048

4.5 Discussion

Four out of the five domain-specific sources of stress mean DES scores showed similar trends for both the UK and Australia, and were comparable to reported findings in a previous study of UK DHDTS (Harris et al., 2017a). The scores also corresponded with the existing literature of what dental students, in diverse educational settings, had previously reported in studies as being their main sources of stress (Al-Samadani & Al-Dharrab, 2013; Alzahem et al., 2011; Divaris et al. 2008; Elani et al., 2014).

Living accommodation and personal factors were not particularly stressful DES domains for either the UK or Australian DHDTS, and were similar to a previous UK study (Harris et al., 2017a). This present study also showed a trend that both UK and Australian DHDTS perceived the domain of academic work, which included items such as fear of failing the course/year, examinations, and fear of being able to catch up if falling behind as more stressful than clinical factors (Table 11), which is in contrast to the recent South African study of perceived stress in oral hygiene students (Gordon et al., 2016). This showed that third year students reported individual clinical factors as their top sources of stress. It is not too surprising that the academic domain was perceived as stressful, as Western culture puts great emphasis on students getting good grades (Dahl et al., 2009), and is evident within the previous literature which has reported 'competition for grades' as one of the high sources of stress in dental undergraduate training (Alzahem et al., 2011; Elani et al., 2014).

Although the domain of the educational environment (Table 12), which included items such as criticism about academic or clinical work, approachability of staff, and expectation versus reality of dental school, was not perceived as stressful to the UK DHDTS, it was however, significantly higher ($p<0.002$) for the Australian DHDTS. In particular, both Years 2 and Years 3 Australian DHDTS reported criticism about academic or clinical work as a high source of stress, which was similar to that reported by students in the South African study (Gordon et al., 2016), with approachability of staff an additional high source of stress to the Year 3 students (Table 12). These were also the same sources of stress reported by third year dental students in a recent Australian study (Astill et al., 2016). In this study the authors attributed the reported stressors to the increased contact time with staff in the clinical setting, and frustration for students to try and adopt differing techniques advised by different clinical staff. The

reasons for the differences between DHDTS in our study could be explained by the variation of how the curriculum is delivered in the UK and Australia (Table 8). Firstly, due to the tight scheduling of their programme, the Australian DHDTS had only a very short summer break between completing Year 2 and commencing Year 3 studies. Therefore, feeling fatigued may have negatively influenced the students' perception of the teaching staff feedback. Secondly, the Australian curriculum puts a strong focus on clinical experience in diverse rural settings for students in Year 3. Perhaps the concern of treating patients safely in an unfamiliar environment was an added source of stress. This would be in line with the literature that suggests that the significance (meaningfulness) given to a situation can create a stressful response if something one cares about is at stake (McGonigal, 2015). In contrast, the UK DHDTS in our study had a six-week summer break between all years of study, and had gained most of their clinical experience in the same primary care setting throughout their undergraduate programme. However, it was interesting to note that the Year 1 Australian DHDTS did not report criticism about academic or clinical work as particularly stressful. Indeed, the Australian DHDTS reported it lower than that of the Year 1 UK DHDTS, which may reflect the 'flipped classroom' approach of the Australian delivery of the pre-clinical sessions. The third reason for the differences between DHDTS in this study may be due to the inclusion of the 'personal and professional development' module which is delivered to UK DHDTS in Year 1, and the 'professional development and team work' module which is delivered in Year 2. Neither of these modules exist within the Australian DHDTS curriculum. These modules teach UK DHDTS aspects of professionalism and teamwork at an early stage of their undergraduate education, and perhaps may have equipped the UK DHDTS to cope better with staff feedback on their work.

Both the UK and Australian DHDTS reported scores of psychological wellbeing that were indicative of students who were positively-functioning individuals (Table 13). Measures of continual development and openness to experience (personal growth), goals and intentions (purpose in life), and the ability to respond to other individuals (positive relations with others), were particularly high for both groups. This, in addition to being the characteristics of a good clinician, also corresponded with the literature associating wellbeing dimensions with meaning (Baumeister & Vohs, 2005; Baumeister et al., 2013; Feldman & Snyder, 2005; Stillman & Baumeister, 2009). For example, studies have shown that having a high purpose in life and compassion for oneself and

others, can bring meaning to stressful situations by interpreting the stress as a challenge (enhancing), rather than a threat (debilitating) (McGonigal, 2015; Neff, 2011). Furthermore, self-acceptance of one's work requires the motivation to endure the stress of receiving (negative) feedback in exchange for the learning opportunity of receiving it (Crum et al., 2013). Indeed, the Australian DHDTS (Years 2 and 3) in this study reported criticism about academic or clinical work as highly stressful. However, at the same time the students also reported high scores of personal growth. These findings are comparable with a recent qualitative study in which DHDTS described how they utilised 'negative' feedback as an opportunity to learn and grow, even in the instances of conflicting opinions from the clinical teaching staff (Harris et al., 2017b).

Neither group reported levels of depression or stress that would be considered outside of the normal range (Lovibond & Lovibond, 1995) (Table 14), and were comparable with a previous UK study (Harris et al., 2017a). However, the mean score levels of anxiety for both the UK and Australian DHDTS were in the range considered as moderate (Lovibond & Lovibond, 1995), and were higher than those reported in the previous UK study (Harris et al., 2017a). The difference in anxiety scores was most likely due to the timing of the distribution of the survey. The previous survey in the UK centre was administered in the month of July, which corresponded to the end of the academic year, and examinations and results were published. The survey for this study was administered in the examination period, when anxiety levels would be expected to be higher.

The reported levels of agency hope and pathway hope were similar for both the UK and Australian students (Table 14). Establishing goals is strongly linked to a sense of purpose which provides direction and a sense of meaning in life (Baumeister & Vohs, 2005; Feldman & Snyder, 2005). Furthermore, research has shown that 'high hope' students focus on success, not failure, and can sustain their motivation by utilising goal setting as a challenge for high academic achievement, even under circumstances of stress. For example, studies have shown how positive emotions from successful goal attainment encourage individuals to set 'stretch goals' for higher academic achievement, whilst also having the ability to alter their pathway to goal pursuit, or indeed, to 'let go' of problematic goals if need be (Snyder et al., 1997; 1998; 2002).

The scores for progress to values, and obstruction to values (Table 14), showed that both the UK and Australian DHDTS reported to be living according to their

values. Valued living is the successful consequence of meaningful goal pursuit that is intrinsically reinforced, and serves an individual's core values (Dahl et al., 2009; Smout et al., 2014). For example, an individual may have a core value of making a difference to society, and therefore choose a career (goal) as a health care professional (e.g. DT/OHT), that serves that value. Moreover, having core values is a quality of professionalism that is of critical importance to future clinicians involved in patient care.

Most research on dental student stress has focused on the negative aspects of stress (Al-Samadani & Al-Dharrab, 2013; Alzahem et al., 2011; Elani et al., 2014). This has resulted in some researchers advocating a curriculum change to reduce stress in the dental undergraduate programme (Divaris et al. 2008; Naidu et al., 2002). However, stress often results from activities that are meaningful, and reducing stress may result in reducing the meaning of the activity (Baumeister & Vohs, 2005; Baumeister et al., 2013; Feldman & Snyder, 2005; McGonigal, 2015). Minor curriculum changes such as calibration of staff feedback could be explored. However, the researchers in this study also recommend interventions to raise the awareness of the meaningful relationship of stress as a coping mechanism to build resiliency (Crum et al., 2013).

4.6 Conclusions

This study was an investigation into perceived sources of stress and wellbeing in DHDTS in a school in the UK and a school in Australia. Within the limits of this study, reported sources of stress and wellbeing for these two cohorts of DHDTS showed similar trends to the previous initial studies of UK DHDTS undergraduate education.

This study showed that DHDTS in the UK and Australia reported numerous and intensive stressors, specifically in the academic and educational domains of the DES. However, at the same time, the majority in both groups reported high levels of positive psychological wellbeing and normal ranges of stress and depression, and a moderate range of anxiety. This study further demonstrated that DHDTS undergraduate training in both the UK and Australia was indeed perceived as academically and educationally stressful. However, in line with previous studies, the students reported scores as positively-functioning individuals. Future curriculum interventions should explore the main reducers of wellbeing (i.e. stress), and implement ways to reduce exposure to stressors wherever possible. However, providers of education should also take the

holistic view of psychological wellbeing as not merely the presence or absence of stress, but rather the degree to which individuals are fully functioning to realise their true potential (Waterman, 1993).

5 EVALUATING A ONE HOUR RESILIENCY WORKSHOP DELIVERED TO DENTAL HYGIENE AND DENTAL THERAPY STUDENTS: A PILOT STUDY

5.1 Abstract

Aims: To examine whether the delivery of a short duration workshop to educate Dental Hygiene and Dental Therapy students (DHDTS) on developing a more positive relationship between stress and meaning, with a follow-up on-line journal workbook, would alter how DHDTS understood stress.

Participants and methods: A questionnaire was distributed to Years 1, 2 and 3 DHDTS at the University of Portsmouth Dental Academy (UPDA), during spring 2017. Data were collected on students' perception of levels of wellbeing, mindset, and sense of coherence before, and three weeks after, attending an optional resilience workshop. Statistical analyses were undertaken using SPSS™ software. Paired Samples tests were carried out and the level for a statistically significant difference was set at $p<0.05$.

Results: The response rate for participants who had completed both pre-and post-workshop questionnaires, and attended the workshop, was 26% (n=19). There was a significant increase ($p<0.05$) in reported levels of self-compassion and manageability of situations (coherence) after attending the workshop. All respondents reported a positive shift in their perception of valued living, understanding of self, and stress mindset, but they were not significant.

Conclusions: Taking part in a one-hour workshop, and completing a post session workbook, had a positive effect in the way DHDTS understood stress, and shows promising results of the positive impact that such workshops could have on the resiliency and wellbeing of students in the dental undergraduate training environment.

5.2 Introduction

Over the last three decades, the literature exploring stress and wellbeing in the dental undergraduate environment has focused on the negative aspects of stress, with researchers often advocating curriculum change to reduce the sources of stress in the dental undergraduate programme (Divaris et al., 2008; Naidu et al., 2002; Polychronopoulou & Divaris, 2009; Silverstein & Kritz-Silverstein, 2010). Despite the plethora of studies (Alzahem et al., 2011; Dahan & Bedos, 2010; Elani et al., 2014; Humphris et al., 2002) which have examined the sources of stress in dental students (DS), little has been done to reduce stress as part of the curriculum in dental programmes. Indeed, a recent systematic review which examined stress management in DS, identified a total of seven studies which met the criteria of the review (Alzahem et al., 2014). In this review, Alzahem et al. (2014) found that most of the participants liked the interventional programme, and they found it useful, yet only four studies were able to show any significant stress reduction. However, the underlying assumption in this research was that stress is always negative and must be reduced (Alzahem et al., 2014; Alzahem, van der Molen, De Boer, 2015).

The negative view of stress, and the recommendations to reduce the amount of stress in dental undergraduate training, is in contrast with the emerging research which views stress through a more optimistic lens (Baumeister et al., 2013; McGonigal, 2015). Indeed, Baumeister et al. (2013) suggested that a stressful life can also be a meaningful life where the stress of pursuing goals feeds a sense of purpose. Linked to this, the study further suggested that individuals often will accept short-term costs, for example pain, anxiety and stress, in order to come out better in the long run. Subsequent research (McGonigal, 2015) further supported this, and concluded that stress should not be seen purely as a problem to be eliminated, but as a sign that something you care about is at stake.

Two recent studies in the field of dental undergraduate education to adopt such a positive approach, examined stress and wellbeing among dental hygiene and dental therapy students (DHDTS) in one centre in the United Kingdom (UK) (Harris et al., 2017a; 2017b). These studies showed that DHDTS perceived sources of stress within their undergraduate programme were comparable to reported findings amongst DS (Alzahem et al., 2011; Dahan & Bedos, 2010; Divaris et al., 2008; Elani et al., 2014;

Humphris et al., 2002; Naidu et al., 2002; Polychronopoulou & Divaris, 2009; Silverstein & Kritz-Silverstein, 2010). However, the DHDTS, unlike the dental students, also reported high scores in psychological wellbeing dimensions, specifically in: goals, purpose in life, personal growth, and living a valued life (Dahl et al., 2009; Ryff, 1989a; Smout et al., 2014; Snyder et al., 1991; 2002;). One of these studies (Harris et al., 2017b) also found that participants' perceived sources of stress in their undergraduate programme were very strongly linked to meaningfulness. For example, the majority of the participants derived a sense of fulfilment from aspects of their undergraduate programme which they perceived as stressful. However, the participants still perceived stress as detrimental to their academic performance, and also tended to lack self-compassion in instances where they under-performed. The researchers concluded that rather than introducing curriculum change to reduce stress, as advocated in the previous literature, interventions to raise awareness of the meaningful relationship of stress as a coping mechanism to build resiliency should be implemented (Harris et al., 2017b).

Other studies have shown the positive effect of interventions which raise conscious awareness of the nature of stress (Crum et al., 2013; Jamieson et al., 2012; Jamieson et al., 2013). In one study, Crum et al. (2013) delivered a 2-hour mindset training programme designed to help participants adopt a mindset which perceived stress as enhancing, rather than a stress is debilitating mindset (Crum et al., 2013). As a result of this short intervention, participants adopted more of a stress-is enhancing mindset about stress. This in turn, produced positive significant changes in their health and performance. Other researchers (Ellis, 2001; Neff, 2011) have described the importance of educating individuals to accept that self-worth should not be contingent on performance (Ellis, 2001; Neff, 2003a). Moreover, that striving to be a perfectionist or having irrational beliefs that one must not fail at goals, can be detrimental to mental health wellbeing. This has been the focus of recent research into healthcare professionals attitude to happiness and wellbeing (Benzo, Kirsch, & Nelson, 2017). Neff (2011) has shown that completing reflective writing exercises in a journal workbook, can increase participants' ability to have more self-kindness, common humanity, and mindfulness, which are the three components of self compassion (Neff, 2011).

Accordingly, the aim of this study was to examine whether the delivery of a short duration workshop to educate DHDTS on the meaningful relationship of stress, with a follow-up on-line journal workbook, would alter how DHDTS understood stress.

5.3 Participants and Methods

Ethical approval (Appendix P) was gained from the University of Portsmouth Research Ethics Committee (SFEC 2017 – 019). An anonymous, self-reported online questionnaire was administered to 72 DHDTS (Years 1, 2 & 3) of the BSc (Hons) in Dental Hygiene and Therapy, at the University of Portsmouth Dental Academy (UPDA), in March 2017, one week prior to the delivery of a stress-resilience workshop. The delivery of the workshop was deliberately timed to provide the opportunity for DHDTS to gain benefit from positive shift changes in their understanding of stress, in the weeks immediately prior to undertaking the end of year assessments.

A follow-up of the same questionnaire was then administered three weeks following the workshop. Completion of the survey was taken as consent to participate in the survey. A few days prior to the launch of the first survey, the researcher gave a verbal briefing to the students about the nature of the study, which was to use pre-and post-workshop questionnaires to evaluate the psychological impact of a voluntary-attended stress resilience workshop. It was made explicitly clear that students had the freedom of choice to participate in all parts of the study (e.g. complete pre-and post-workshop surveys, and attend workshop), or only some parts of the study if they wished (e.g. attend workshop only), or not participate in the study at all. However, it was also made clear that only data obtained from students who participated in all parts of the study would be classed as useable data for the aim of the research. To identify participants who had completed all aspects of the study, respondents were asked to provide a unique identity code in the pre-and post-workshop survey, and to have answered 'yes' to the question "did you attend the workshop" on the post-workshop survey.

The purpose of the one-hour workshop was to provide participants with information about the nature of stress and wellbeing, and raise awareness of the meaningful relationship of stress as a coping mechanism to build resiliency. More specifically, the workshop included the following content: rational emotional behavioural theory (information on the nature of unconditional self-acceptance, even

when one under performs); the paradox of stress (information on the debilitating nature of stress, but also emerging evidence of the enhancing nature of stress); sense of coherence (information on orientation toward one's world that sees stimuli as meaningful, comprehensive, and manageable, to guide behaviour that is more likely to resolve the problems posed by stressors); and values and goals (information on understanding how aligning values and goals give a sense of meaning, even under stressful circumstances) (Appendix Q) . At the end of the workshop, participants (n=19) were advised that they would be emailed a link to a brief, on-line workbook on the topic of self-compassion (Appendix R), and a link to the Values in Action Inventory of Strengths (VIA-IS) questionnaire (Appendix S). The VIA-IS is a tool by which people can identify their own positive strengths and learn how to capitalise on them (Peterson, Park, & Seligman, 2005). Completing the on-line workbook and VIA-IS was optional. Email prompts to participate in these on-line activities were sent out at intervals of one, two, and three weeks following the workshop. To fit in with the timetabled curriculum, the same one-hour workshop was delivered separately to Year 1, 2, and 3 students.

Qualtrics™ software used for the survey captured the students' year of study and age. Gender was not captured, as this would identify the very small number of male DHDTS. The survey consisted of five instruments to measure the way individuals see themselves, and included the: Valuing Questionnaire (VQ); Stress Mindset Measure General (SMM-G); Self-Compassion Scale(SC); Sense of Coherence Scale (SOC-29); and the Understanding Self Scale (USS) (Appendix J, T-W).

The VQ (Smout et al., 2014), a self-reporting 10-item scale, was selected to measure the extent to which DHDTS lived out their values across their life. The VQ was used to measure how much participants were living according to their personal values, rather than what their values were per se. This instrument was originally designed to track clients' progress towards living according to their values in Acceptance and Commitment Therapy (ACT) (Dahl et al., 2009) but it is not client specific so can be used with the general population. Participants responded using a six-point format ranging from 0 = not at all true, through to 6 = completely true. The 10-item scale has 2 subscales: 5 items totalled which measures progress towards valued living and 5 items which measure obstruction towards valued living. Subscale scores were calculated by summing the scores of the 5 items in each sub-scale to get a score for the progress domain and a score for the obstruction domain.

The SMM-G (Crum et al., 2013), a self-reporting 8-item scale was used to measure the extent to which the DHDTS adopted one of two mindsets; that the effects of stress were either enhancing or debilitating. Participants responded using a five-point scale ranging from 1 = strongly disagree to 5 = strongly agree. Scores were calculated by summing the scores of the 8 items to get a total SMM score. Higher scores on the SMM represent the mindset that stress is enhancing.

The SC (Neff, 2003a; Neff, 2011) a self-reporting 26-item scale was adopted to measure the extent to which the DHDTS typically acted towards themselves in difficult times. Participants responded using a five-point scale ranging from 1 = almost never to 5 = almost always. Scores were calculated by summing the scores of the 26 items to get a total score for self-compassion.

The SOC-29 (Antonovsky, 1987), a self-reporting 29-item scale was selected to measure how DHDTS understood the overall meaning and coherence of their lives. Participants responded to each individual item using a seven-point scale ranging from 1 to 7, which corresponded to opposite ends of the spectrum for a response to the item statement (e.g. 1 = never have this feeling to 7 = always have this feeling; 1 = full of interest to 7 = completely routine). The 29-item scale has 3 subscales: 11 items which measure comprehensibility (understanding what happens around you), 10 items which measure manageability (the extent that one is able to manage the situation), and 8 items which measures meaning (ability to find meaning in a situation). Subscales were calculated by summing the scores of the items in each sub-scale to get a score for comprehensibility, manageability, and meaning.

The USS, a self-reporting 16-item scale, designed by the authors of this study, was used to measure how DHDTS understood, and reflected on, their sense of self. For example, "my self-worth is affected by how well I do when I am competing with others" and "if people make comments about what I have done, I thank them and do not take it personally", are two of a number of scale items to measure an individual's perception of self-worth. Participants responded using a seven-point scale ranging from 1 = not at all true to 7 = completely true. Scores were calculated by summing the scores of the 16 items to get a total understanding self-score.

Statistical analysis carried out using SPSS v22™ included frequency distributions, reliability analysis, and correlation analysis. The data were checked for normality,

kurtosis and skew. Paired Samples Tests were carried out, and the level for a statistically significant difference was set at $p<0.05$.

5.4 Results

Cronbach's alpha ranged from .7 to .88 for all of the scales. The reliability of all the scales was within the acceptable limits. The response rate for the pre- and post-workshop survey was 72% (n=52) and 43% (n=31) respectively. The response rate for participants who had completed both pre- and post-workshop questionnaires and attended the workshop was 26% (n=19). The mean age for DHDTS was 27 years, with a range of 20 to 48 years. Participants in this group were from Years 1 (n=5), 2 (n=8), and 3 (n=6), and thus a good representative sample of the total UPDA student population.

Table 15 compares DHDTS pre- and post-workshop mean scores for SC, VQ, SMM, and USS. There was a significant difference in the SC pre- and post-workshop scores ($p<0.05$), with participants reporting to have much higher self-compassion after attendance at the workshop than before attending. Scores for progress towards values did not alter after attendance at the workshop; however post-workshop scores for obstruction to values were lower. Participants reported a very low stress (that is debilitating) mindset both pre- and post-workshop, albeit slightly higher (that is moving towards a more enhancing mindset) after attending the workshop, and a noticeable increase in their post-workshop scores of understanding self. There were no statistically significant differences between the pre- and post-workshop scores.

Table 15. Pre-and post-workshop mean scores of SC, VQ, SMM and USS

SC, VQ, SMM and USS (max score within each scale)	Mean (SD) **Pre w'shop** (n = 19)	Mean (SD) **Post w'shop** (n = 19)	***p* value**
Self-Compassion (130)	74.56 (16.64)	83.0 (12.92)	0.006*
VQ Progress (30)	19.88 (6.47)	19.38 (5.96)	0.74
VQ Obstruction (30)	13.68 (7.89)	10.84 (4.56)	0.23
SMM (40)	13.73 (6.29)	14.21 (5.87)	0.77
USS (112)	67.26 (11.88)	70.33 (11.07)	0.16

* $p<0.05$

Table 16 shows DHDTS' reported scores for the SOC-29 subscales of comprehensibility, manageability, and meaning. There was an increase in all post-workshop scores for all 3 subscales, with a significant difference in the subscale of manageability ($p<0.05$).

Table 16. Pre-and post-workshop mean scores of SOC – 29 subscales

SOC-29 subscale (max score within each subscale)	Mean (SD) **Pre w'shop** (n = 19)	Mean (SD) **Post w'shop** (n= 19)	***p* value**
Comprehensibility (77)	39.35 (7.81)	43.92 (9.26)	0.054
Manageability (110)	45.0 (10.22)	49.07 (8.87)	0.046*
Meaning (88)	38.26 (8.38)	39.2 (9.09)	0.583

* $p<0.05$

5.5 Discussion

In all but one of the measures, participants reported a positive (albeit nonsignificant) shift in pre- and post-workshop scores. Specifically, taking part in a one-hour workshop on the meaningful relationship of stress and personal resilience, and completion of an optional follow-on workbook and questionnaire, had a positive effect in the way DHDTS understood stress. This significantly improved their scores for self-compassion and manageability of stressful situations.

As presented in Table 15, the participants showed a positive shift in scores for their understanding of self, and a significant ($p<0.05$) positive shift in scores for self-compassion after attending the workshop. This is an important finding, as competition for grades, and fear of being able to catch up if falling behind, have been reported as high sources of stress for many students in dental undergraduate education (Alzahem et al., 2011; Elani et al., 2014). Moreover, recent qualitative research described how DHDTS felt threatened when others performed better than they did, and that DHDTS were very self-critical about their own performance (Harris et al., 2017b). The data from this study suggested that through educating DHDTS to understand that failure is part of the shared human experience, and to treat themselves kindly in such circumstances, the participants viewed themselves in a more compassionate way. Furthermore, the literature supports the notion that those individuals who have self-compassion, are more

likely to be compassionate towards other people (Dahl et al., 2009; Goldstein, 2003; Neff, 2003a; Neff, 2011) a quality that is of critical importance to a future clinician. Although some components of the workshop introduced theories of unconditional self-acceptance and self-compassion, it is more likely that the participants' additional engagement with the follow-on self-compassion workbook (47%; n=9), may have contributed to the significant difference in pre- and post-workshop scores. This may be because participants were motivated enough to continue to engage in self-compassion activities after the workshop, and therefore understand more about the topic. As such, future interventions with follow-on workbook activities may be the most effective, and requires further research.

The high pre-and post-workshop scores for progress towards values and the low scores for obstruction to values (Table 15), showed that DHDTS were students who reported to be living according to their values (Dahl et al., 2009; Smout et al., 2014) and attending the workshop did not influence the progress towards values scores. However, we are unsure if completing the VIA-IS (which identifies strengths and values) after the workshop (47%; n=9), may have contributed to the reduction in the post-workshop VQ obstruction mean scores.

DHDTS reported very low levels of the stress as enhancing mindset, and high stress as debilitating mindset (Table 15), which is not considered surprising as individuals are typically encouraged to avoid stressful situations whenever possible, or actively control unavoidable or inevitable stress (Crum et al., 2013). Although there was a small positive shift, we did not expect any significant increase in SMM scores after the workshop, as the restriction on time for the workshop meant that participants were only given a brief overview of the theory of stress mindset. This is in contrast to other specific stress mindset interventions which have provided in-depth theory and activities on changing implicit beliefs about stress; reappraisal of stress; and the ability to handle stress (Crum et al., 2013), which have taken at least two hours to deliver.

Timetable constraints restricted the workshop to a one-hour intervention, which is shorter than the researchers would have liked. Nevertheless, the overall content of the workshop appeared to have a positive influence to the way DHDTS reported to manage stressful situations and stay well (Table 16). The hallmark of a strong sense of coherence, is the ability to choose what seems to be the most appropriate strategy from among the variety of potential resources for a given situation. This is usually by

understanding yourself and what you need from that situation (Sagy, Eriksson, Braun-Lewensohn, 2015). Participants in this study reported a noticeable increase in trend for scores which measured their ability to understand what happened around them, and a significant increase ($p<0.05$) in scores that measured the extent to which they were able to manage a challenging situation on their own, or through significant others in their social network. This, according to the literature, is an advantage in preventing tension from being transformed into stress (Antonovsky, 1987).

Although this study supports the potential effectiveness of this intervention, it does need improvement. The number of DHDTS who participated in this study was small. Increasing the availability for students to participate in such opportunities is thus essential if we are to learn more about the positive trends shown in this small study. Likewise, timetabling this type of intervention, as a routine part of all learner programmes, may be an effective way forward, as would, allowing for annual follow-ups to measure the longer-term impact of any effects.

5.6 Conclusions

This is the first study to evaluate the effectiveness of a stress and self-compassion intervention, consisting of a one-hour workshop, with an optional follow-up self-compassion workbook to DHDTS. It showed positive psychological changes in the way the students understood stress. Within the limitations of the study, it shows promising results of the positive impact that such workshops could have on the stress and wellbeing of students in the dental undergraduate training environment. Accordingly, further research to explore the limitations described above, is needed to learn more about the value of these types of positive stress interventions within dental professional training.

6 DISCUSSION

6.1 Studies Findings

This programme of research has achieved all the stated aims which it set out to achieve. The findings in this programme of research, which has used a mixed-method approach, has made a valuable contribution towards filling the gap in our understanding of stress and wellbeing in DHDTS undergraduate education (Harris et al., 2017a; 2017b). The initial exploratory quantitative study described in Chapter 2, showed that DHDTS and DS identified similar sources of stress within their undergraduate education, but perceived themselves as positively-functioning individuals. The comparative quantitative study described in Chapter 3, reported that DHDTS had similar sources of stress to that of the previous literature on dental students. This was important as it linked the current studies to the wider research of stress in undergraduate students. However, unlike the previous literature, the current research also used measures of psychological wellbeing to show the extent that DHDTS reported themselves as positively functioning individuals, whilst also acknowledging the existence of stressors in their learning environment (Harris et al., 2017a).

The results of the two quantitative studies in Chapters 2 and 4 underscored the importance of taking a multi-dimensional approach as proposed by Ryff thirty years ago, to our understanding of psychological wellbeing in DHDTS education (Ryff, 1989a; 1989b). For example, there are three important aspects regarding the findings of the Chapter 2: First, if we had only measured DHDTS (and DS) sources of stress, it would be most likely that, as with the previous literature on dental students, assumptions of DHDTS psychological wellbeing would be interpreted as poor, purely because they reported perceived sources of stress in their undergraduate environment (e.g. Gordon et al., 2016; Gorter et al., 2008; Laurence, 2009). In other words, just looking at sources of stress ignores the fact that psychological wellbeing is not merely the presence or absence of stress, but rather the degree to which individuals are functioning to realise their true potential (Waterman, 1993). Furthermore, removing sources of stress, as advocated in much of the previous literature (Alzahem et al., 2011; Elani et al., 2014), could potentially remove the meaningful aspects of the undergraduate programme - i.e. what students value (Baumeister, 1996; Colley, Harris, Hellyer & Radford (in press); Snyder,

2002; Sommer et al., 2012). In contrast, the present research showed that, alongside reported sources of stress, the DHDTS also reported high levels of positive psychological wellbeing in many areas which could be considered of critical importance to a future clinician. More specifically, the ability to connect with others, to be autonomous, and to learn from mistakes, are requisites for the challenges which clinical decision-making will present throughout one's career in dentistry.

Secondly, although the DS also reported high levels of psychological wellbeing, one important finding of the Chapter 2 study was the significantly higher scores for the DHDTS, compared to the DS, in the dimensions of personal growth, purpose in life, self-acceptance and positive relations with others. This finding could not be fully explained at the time of publication. However, the subsequent qualitative study described in Chapter 3 clearly makes the connection of these dimensions to the DHDTS' motivation (and values) to become a qualified clinician (Harris et al., 2017b), and will be discussed further in this chapter.

Thirdly, the DHDTS reported perceived multiple sources of stress within their undergraduate environment, such as fear of failing the course and concerns about passing academic examinations (as measured by the DES), but simultaneously most reported relatively normal levels of stress, anxiety, or depression as measured by the DASS-21 (Harris et al., 2017a; Lovibond & Lovibond, 1995). These findings align with the literature associated with meaning of high scores on the SPWB (Ryff, 1989a; 1989b). For example, purpose in life and connecting with others, have been shown to predict better emotional recovery from negative stimuli, and increase resiliency to stress, by reducing the levels of wear and tear on the body and brain (i.e. reducing allostatic overload) (Neff, 2003; Schaefer et al., 2013; Zilioli et al., 2015) and are associated with high levels of meaning, as described by Baumeister (1991). Likewise, Snyder et al., (1997; 2002) have shown that students can increase their resiliency to stress by using unsuccessful goal attainment as diagnostic feedback to improve future goal achievement. Perhaps the DHDTS in the current research felt equipped with the ability to seek social support and share their concerns with their peers regarding worries about failing the year; or maybe that accepting one can learn and grow from failing a goal may have allowed the DHDTS to 'get over' a stressor and move forwards, as opposed to experiencing irrational thoughts that would affect their ability to cope (Ainsworth, 2000; Ellis, 2001; Ryff, 1989a; 1989b).

The Chapter 2 quantitative study also aimed to establish base-line data for our planned further research of stress and wellbeing in DHDTS undergraduate education (Harris et al., 2017a). Although UPDA has twenty-four undergraduate DHDTS per year (approx. 15% of total new GDC DHDT registrants per year), it was important to have a clearer understanding of perceived stress and wellbeing among DHDTS in other institutions, and in other countries, to contribute further to our understanding. For example, countries such as New Zealand and Australia where, similar to the UK, the training of DHDTS has been integrated into a three-year curriculum, could in a future study, be compared to a country such as the Netherlands, where the DHDTS programme of training is a four-year programme (Nash et al., 2014). For the current study, the initial intention was to survey DHDTS from two schools in the UK, and one in Australia, and a favourable ethical opinion was given. However, the poor response from the second of the UK schools meant that there was insufficient data, and thus we could only include the one UK school with the Australian school for the comparative quantitative study described in Chapter 4.

The findings of the Chapter 4 comparative study highlighted that there were more similarities than differences between the UK and Australian DHDTS samples. This reflected both the similar length of both country's programmes, and their course content, albeit delivered at different times within the curriculum. Although it was the first survey to be administered to the Australian school, it was the second survey to be administered to the UK students. It was timed for the UK participants to capture data at a different time in the academic year than that of the previous study, to see if timing of the survey influenced the students' perceptions (Harris et al., 2017a). However, the difference in timing of the survey only appeared to affect the DASS-21 anxiety score (increased to moderate), which was to be expected with administering the survey in the weeks leading up to end of year examinations. This would align with the literature offered by Ainsworth (2000) and Dugas et al. (1998), which has described anxiety as being thoughts about a previous experience of a stressor (last year's examinations), or a future stressor (the upcoming examinations), and not the actual current experience of the stressor (sitting the examination). Another slight difference in this study compared to the initial study, was the use of the shorter SPWB 9-item scales to reduce the risk of incomplete responses to the survey, after considering anecdotal feedback from participants in the first study regarding the length of the questionnaire.

The UK and Australian DHDTS reported similar perceptions of stress and psychological wellbeing, which were also similar to the findings reported in Chapter 2. Although there was no statistically significant difference in the positive wellbeing scores between the two samples, the UK students tended to score higher than the Australian DHDTS in all the dimensions, and in all the scales. Furthermore, the UK DHDTS tended to score lower than the Australian DHDTS, though again not statistically significant, in all but one of the items of the DES, and significantly lower in the education domain of the DES. Further research is needed to have a clearer understanding of the role an institution plays in the students' perceptions of stress and wellbeing.

The findings of the Chapter 2 quantitative study were also a key feature for the design of the semi-structured interview schedule of the planned follow-on qualitative study described in Chapter 3 (Harris et al., 2017b). Data from the Chapter 2 study, along with data which was emerging from the Chapter 4 study, showed a trend of reported wellbeing scores which suggested a link to the literature on meaning (Baumeister & Wilson, 1996; Smout et al., 2014; Snyder, 1991). For example, we know from the literature that experiencing stress in the present can be embraced if it serves the purpose of a future desired outcome (Baumeister & Vohs, 2005; Crum et al., 2013; Frankl, 1985; Snyder, 2002; Sommer et al., 2012). Indeed, a study of a national sample of 397 American adults found that higher levels of worry, stress, and anxiety which involved integrating the past, present and future were linked to higher meaningfulness (Baumeister et al., 2013). Therefore, it was possible to explore qualitatively if the DHDTS quantitative high scores for the dimensions of positive wellbeing, could be triangulated to further understand DHDTS psychological wellbeing in their undergraduate education (Baumeister & Wilson, 1996; Feilzer, 2010; Smout et al., 2014).

The Chapter 3 qualitative study suggested a strong alignment to the literature which emphasises the importance of the meaning given to stress as a coping strategy to a stressor. In our quantitative exploratory study 'difference in opinion between clinical staff' was perceived as a high source of stress to the Year 3 DHDTS (Harris et al., 2017a). However, in the Chapter 3 study, some participants described how they used this source of stress as an opportunity to learn and grow, which corresponded with the high scores for perceived personal growth on the SPWB. Triangulation of the DHDTS quantitative scores for purpose in life, perceived goal attainment and valued living was

also attained in the qualitative study. This was achieved through participants descriptions of choosing the career as a DHDT as a goal to serve the purpose and value of wanting to make a difference in the world (Harris et al., 2017b). However, unlike Snyder's hope theory of achieving meaningful goal pursuit by having a repertoire of learning goals as well as performance goals, the participants in this study tended to describe successful goal attainment associated with only performance goals, and not necessarily the intrinsic motivation for learning itself. This finding may be the result of an association with the meaning of high marks within academia as a measure of a 'successful' student (Baumeister & Wilson, 1996; Ellis, 2011). On the other hand, and in line with Snyder's hope theory, some participants did describe how successful goal attainment encouraged them to set 'stretch goals' to enhance their performance in the future (Snyder, 2002).

It was evident and expected that most of the participants in the current study described their experience of a stressor as negatively affecting their performance, even when they performed well. This aligns with most of the historic research into stress which perpetuates the idea that stress is always negative, and must be avoided, even when this is impossible to do. However, it does not align with the new emerging research which suggests that reappraising stress and changing one's mindset about stress can change an individual's perception of stress as a challenge rather than a threat (Crum et al., 2013; Crum & Lyddy, 2014). This in turn creates a healthier physiological response, such as moderating cortisol reactivity to the stress. It also alters behavioural responses, such as students being more open to receiving feedback, and improving academic performance (Crum et al., 2013; Jamieson et al., 2013; Kunz-Ebrachet, Mohamed-Ali, Feldman, Kirschbaum, & Steptoe, 2003; Wemm et al., 2010). However, students were not taught to see such stress as a challenge in the present research and doing it as part of the future curriculum may encourage such an attitude/mindset.

It was both illuminating and a concern however, to discover the lack of self-compassion which some participants described when asked about how they handled instances when they under-performed. For example, they described how they would 'beat themselves up' if they did not get a good grade on clinic, or if they did not do so well in a written examination. These comments suggested an inclination for perfectionism, which research shows is common in dental and allied healthcare students, and can be detrimental to psychological wellbeing (Ellis, 2001; Henning, Ey, & Shaw,

1998; Neff, 2003). These two findings, along with the overall study findings which showed that participants' perceived sources of stress in their undergraduate environment as being strongly linked to meaningfulness, gave rise to the notion that if our follow-on intervention could raise DHDTS awareness of the relationship of meaning to stress, it might possibly increase their ability to cope (Harris et al., 2017b).

The pilot intervention study described in Chapter 5 showed that taking part in a one-hour workshop, and completing a post session workbook, had a positive effect in the way DHDTS understood stress. It showed promising results of the positive impact that such workshops could have on the resiliency and wellbeing of students (not just DHDTS) in the undergraduate training environment (Harris, Wilson, Hughes & Radford, 2018). In particular, educating the DHDTS to accept that failure was part of the shared human experience significantly increased their scores for self-compassion, which is of immense benefit to the individual (Neff, 2003). Moreover, according to the literature, self-compassion is also associated with being more compassionate towards others, and thus is of critical importance for the profession to which the students will be entering (Goldstein, 2003; GDC, 2015; Neff, 2003). The study was a unique approach to the call to provide an effective stress management intervention, which has been reported as a significant issue in the dental undergraduate environment, over the last three decades (Alzahem et al., 2014; Alzahem et al., 2015). Through educating the DHDTS to understand themselves better as a person, and in particular raising awareness of how values, sense of self-worth, and perception of stress affect comprehensibility, manageability, and meaning of stress, could possibly provide the solution.

6.2 Studies Limitations

All the timings of each study went to plan, and they were contingent on each other. However, there will inevitably be limitations for a programme undertaken in the three-year window of a PhD project that involves four individual mixed-method research studies. There are some limitations of the PhD. The current study used surveys as they have many advantages (e.g., ease of administration, anonymous, cost-effective, ease of statistical analysis, and the ability to compare the results with previous studies). However, there are limitations to the survey method, of which three will be briefly

discussed. First, the surveys chosen may have been problematic. Some surveys which made up the questionnaires may have conceptually overlapped with one another (eg hope may be part of psychological wellbeing). This can cause statistical problems with collinearity, particularly if the variables are being used to show separate paths of causation (eg, low hope and low wellbeing separately cause high levels of depression). However, as this was not the case in the present studies, this may be a bigger problem for future research exploring causation. Further, they may not have measured the concepts under investigation. However, only well-used, psychometrically validated (including factor analysed in multiple studies) surveys were used (except for the briefly piloted survey in the last study, which will be validated further in future work). A related issue is that effect sizes for some of the variables may have been very small and would have required large sample sizes to detect them. However, this can only be known after multiple studies have been conducted as effect sizes cannot be known in advance. Second, to compare the DES with previous studies and to develop our hypothesis further, multi-comparison t-tests were conducted (as well as post-hoc tests). This is common in surveys as there is a rich data source to analyse. However, it also raises the risk of obtaining a significant result by chance. Therefore, we used Bonferroni adjustments on the level accepted for significance. Future research will not need to conduct so many comparisons with past research, or could do so using a meta-analytical model which adjusts accordingly. Third, participants may misunderstand or misinterpret the questions differently (or be dishonest or not read the question properly). To try and counteract aspects of this, reliability of responses (Cronbach's alpha) was calculated, and generally this showed responses were consistent (so if there was a misunderstanding, or dishonesty, participants did so consistently). Thus, although the studies were published in reputable journals targeted for the dental professional audience, future research may require more advanced statistical analyses and consideration of these issues.

All four studies had a small number of participants and number of institutions which were included, therefore more research is needed to provide generalisability of the findings and studies presented (Chapters 2-5). There was good collaboration with the Australian school due to the research interests of the school's programme director, and the survey was well-promoted to the Australian students. This was not the case for the other UK school invited to participate, and therefore the survey had too little a response for it to be included in the study, which reduced the overall number of anticipated participants. On the other hand, in relation to the total number of DHDTS

who are educated in the UK each year, it should be recognised that students at UPDA represent approximately 15% of the registration to the GDC in dental hygiene and therapy each year (GDC, 2017). Moreover, the response to the surveys described in Chapters 2 and 4 were both high, so are good representations of those particular cohort's. Furthermore, both of these studies demonstrated consistently high Cronbach's alpha scores, which is one measure of internal consistency which may indicate reliability for the current study instruments as good measures for future study replication.

The Chapter 3 qualitative study initially intended to recruit twelve participants as according to Ando, Cousins, & Young (2014), it is thought that twelve interviews are sufficient to provide themes and codes for data saturation in thematic analysis. Only eight participants volunteered to participate, so the study could possibly lack the diversity of themes which may have been discovered with a higher number of participants. However, due to the repetition of themes among the eight participants, the author is confident that saturation was achieved. As with all research which relies on volunteer participants, it is the case that the study findings only reflect the experiences of those DHDTS who did not find speaking about their own experiences of stress and wellbeing as particularly uncomfortable. Future studies which involve participants writing a reflective journal for example, may be a method to capture qualitative data from DHDTS who were reluctant to be interviewed (Lyubomirsky, Sousa, & Dickerhoof, 2006).

The third limitation was that as the participants were predominantly female (approx. 90%), gender was not reported on the questionnaires as this may have allowed the identification of the male participants and thus not been anonymous. Therefore, the author is unsure if the studies findings about DHDTS psychological wellbeing may also be a reflection of a female-dominated group of participants. Furthermore, our studies did not examine other dimensions, such as personality, which may also have had an influence on DHDTS perceptions of stress and wellbeing. Although the survey captured demographics such as age and ethnicity, there were no analysis on the possibility of the influence of cultural differences of DHDTS perceptions of stress and wellbeing. On reflection, this may have been particularly pertinent to the UK and Australian comparative study. Thus, our research may have missed data which could have further developed our understanding of DHDTS psychological wellbeing.

Finally, one of the main limitations to the intervention study was that it required students to participate in their own free time in an already full academic schedule. This resulted in a relatively small number of participants completing all stages of the intervention study. This time restriction also impacted the amount of contact time to deliver the workshop, which may have affected the quality of the educational delivery of the content of the workshop. The knock-on effect resulted in a high volume of (unfamiliar) information being presented into a one-hour workshop. The given time restriction also did not allow time for a follow-up survey, so it is not possible to determine if the post-workshop positive response to how DHDTS understood stress had been maintained over a longer period of time (e.g. 3-6 months). A further limitation to this study was the confounding factor of response shift bias. The pre and post-workshop survey made the assumption that the DHDTS self-evaluation of the variables measured were stable between the two data collection points. That is, that the underlining concepts being measured do not change over that time. However, often the intervention targets the participants' internal understanding of that concept so it does change. The (often unrecognized) change is called a response shift bias. For example, the present study explored and measured self-compassion. How participants understood their self-compassion at the pre-test survey ('I am quite self-compassionate') may be very different from how they understood their own levels of self-compassion by the post-test survey ('I need to increase my self-compassion). Thus, although the intervention may have improved their understanding they may appear to have lower scores in self-compassion. Similarly, at either the pre-workshop or the post-workshop survey some DHDTS may have under-rated or over-rated their responses to the questions according to how desirable they wished their responses to be. These are limitations of self-report in general when developing interventions and they should be taken seriously. Future research needs to explore how to better measure these shifts in the depth of understanding and changes in the internal frame of reference for participants.

Despite the limitations of the current research discussed here, this is the only known published research which has examined stress and positive psychological wellbeing in DHDTS, and has provided data for future research in this area. Furthermore, the current studies make up the majority of the published studies which have been conducted into the education of Dental Care Professional (DCP) on this topic. As such, these studies should be considered as a positive influence to inspire further research and

subsequent publications by DCPs to make their own valuable contribution to the wider research community, and in particular to the education of their junior colleagues.

6.3 Future Research

The four planned studies conducted in this programme of research have provided valuable data for future research into DHDTS and DS stress and psychological wellbeing. All four studies have been underpinned by sound methodology, which has been scrutinised by the ethics committees of the University of Portsmouth. Moreover, the methodology of each study has been further scrutinised by professionals and academics through the peer review process involved with each study's submission for publication.

In addition to the successful publication of all of the studies in this programme of research, the wide dissemination of both oral and poster presentations indicates that stakeholders are interested in this topic, and it is the author's intention to capitalise on this current interest to move forwards and gain further momentum. The findings from the comparative UK and Australian study are planned to be presented (by the author) at one of the DCP Tutors Group meetings. This would be beneficial as both a learning opportunity for the tutors, and also an opportunity for more research collaboration among the various UK schools to undertake a national study. Likewise, further collaboration with multiple institutions at an international level could, for example, provide a deeper understanding of the influence of cultural identity and its association with power relationships in relation to DHDTS psychological wellbeing. Although this research was directed at DHDTS, Dental Hygienists are a more internationally recognised profession and there maybe merit in investigating stress in dental hygiene programmes.

The qualitative study in this programme of research triangulated much of the data which had been found in the two-previous quantitative studies, and deepened the author's understanding of the topic. The mixed-method approach adopted in the current studies/PhD is advocated so that our future understanding of DHDTS psychological wellbeing will be far richer than our current understanding of the psychological wellbeing of DS from the literature over the past thirty-seven years. In particular, to proactively develop and discuss meaning as part of a programme for dental

professionals may help (as well as discussing stress/self-compassion) to highlight or remind students how meaningful the course is to them and perhaps encourage students to set explicit learning goals.

Research is only of value if either directly or indirectly we use the knowledge gained to help individuals or groups within society. If we want to understand more about the impact of a stress and wellbeing intervention, we cannot rely on the goodwill of students to give up their (precious-little) free time to attend a voluntary educational workshop. Furthermore, by being voluntary, it may send out a message to the students which indicates that the topic is not key to their understanding for their future wellbeing as dental professionals. As the research within this thesis is so important, it is argued, based on the findings of these collective studies, to warrant psychological wellbeing interventions to be embedded within the curriculum, and at regular intervals. This would be beneficial for a number of reasons: First, all DHDTS would have the same opportunity to be educated on the topic of stress and psychological wellbeing, which would eliminate the ethical dilemma that results if only DHDTS who are able to give up their free time receive the information. Second, pre-and post-workshop data could be captured from larger number of participants, so meaningful comparisons can be made. Lastly, follow-up data could be captured at subsequent educational workshops to see if positive (or negative) pre-and post-workshop findings have been maintained. This would further develop the ability for students to be proactive managers of their mental wellbeing not only during their undergraduate training, but also in their future professional careers. With this in mind, forward-thinking curriculum timetable planning which incorporates psychological wellbeing interventions across the academic year has been planned for 2018 at UPDA for both DHDTS and DS from secondment from King's College London. This will provide further valuable data to determine if such an intervention should be rolled out to other dental schools to be embedded within their curriculums (Colley et al., in press). In summary, the baseline data from this programme of research should be used to inform future research not only within the DHDTS and DS undergraduate education, but also research into the psychological wellbeing of the academic staff that teach DHDTS and DS. It should also go beyond undergraduate education and explore the psychological wellbeing of qualified dental hygienists and therapists in the clinical setting. This would thus enable a truly holistic approach to our understanding of psychological wellbeing both within undergraduate training and within the profession itself.

6.4 Conclusion

In conclusion, this programme of research achieved the stated objectives to the aim of starting to understand the psychological wellbeing of DHDTS. More specifically, the programme of research used a carefully selected range of valid and reliable instruments to quantitatively explore DHDTS stress and psychological wellbeing from a national and international perspective. It used a qualitative approach of one-to-one interviews to further develop that understanding of DHDTS psychological wellbeing. Finally, the programme of research made use of the findings from the quantitative and qualitative studies to inform the delivery of an intervention to enhance the wellbeing of DHDTS.

In achieving the aim of the research, stress was seen in a broader context, not merely as something that is 'high' or 'low', but a concept that is embedded in the meaning of the actions of the individual. This research brought into question whether eliminating stress was necessary, or indeed relevant, and concluded that stress needs to be explored further to challenge aspects that need to be challenged, such as the focus on negative reporting of psychological wellbeing in the existing dental literature. It further supports the notion of the important role meaning held, and how exploring meaning in relation to stress may be an excellent introduction to curriculum interventions into increasing psychological wellbeing.

Within the limitations of this research, DHDTS: -

- Perceptions of sources of stress were similar to the existing studies of DS undergraduate education.
- Reported high measures of positive psychological wellbeing.
- Reported normal measures of the negative emotions of stress, anxiety, and depression.
- Perceived their undergraduate training as academically stressful, but also meaningful.
- Improved the way they understood stress after participating in a stress resilience workshop.

DHDTS have a right to the best possible education and training, and that includes psychological wellbeing. Doing so will strengthen their self-understanding and wellbeing to create a strong and robust professional student, and also provide a solid foundation for their future career ahead.

7 PERSONAL REFLECTIONS

7.1 The Novice Researcher

This short final chapter is a reflective discussion of how undertaking this programme of research has facilitated the continual professional development of my competence as a novice researcher. To consolidate my reflections, I have used the Vitae Researcher Development Framework (RDF), which is a tool that describes the knowledge, behaviours and attributes that are required to be a successful researcher. The RDF instantly appealed to me when I was introduced to it three years ago at my PhD induction. The RDF's emphasis on a holistic approach to the qualities of a good researcher, for me, were important components for my research journey, rather than just the completion of a thesis. The RDF's four overarching domains, and twelve smaller sub-domains, have throughout this programme of studies, guided me to recognise the skills I already possessed, and to gain competence in those where I was deficient. This chapter will now use the four RDF overarching aims, which are: Knowledge and intellectual abilities; personal effectiveness; research governance and organisation; and engagement, influence and impact, to reflect on myself as a developing researcher.

7.2 Knowledge and Intellectual Abilities

My growing competence to confidently apply a range of appropriate methods and techniques to make an original contribution to knowledge, was a key aspect of my development within this domain. My background in dental education provided detailed knowledge and understanding of my research population. However, at the start of this PhD, I had limited research experience, and, other than my desire to understand psychological wellbeing, no real knowledge of how it was defined. Throughout the three years of this project, I have taken advantage of my supervisors' expertise, graduate school workshops, peer-review feedback, and virtual learning to develop my ability to understand the theoretical knowledge and practical application to undertake four successful individual studies. More importantly, my developing knowledge of

psychological wellbeing has not only informed the basis of my studies, but has made me understand who I am as a person, and thus is a legacy of this research.

7.3 Personal Effectiveness

My professional background and maturity lead this domain to be one of my key strengths. My self-management skills to effectively time manage the individual studies and respond to changing circumstances, ensured that my commitment and enthusiasm for undertaking this research was never thwarted. The challenge for this programme of studies was to always be thinking ahead. For instance, taking time to travel to UPDA to pop into the students lectures and let them know a study was forthcoming; or realising I needed to move the timing of one of the studies forward a few weeks to maximise potential participation. From day one of this programme of research, the Continental style of this thesis has demanded the self-discipline to write up the studies in time to be published, or accepted for publication, by the time the thesis was submitted. In particular, it has demanded the rigor of electronic submission of a manuscript, the understanding of referees' comments and acting on them in a timely manner, all together with the occasional frustrating time delays.

Another important feature of my development in this domain has been drawing on the expertise of my Supervisor to guide my understanding of psychological wellbeing. My knowledge and self-confidence in this subject area has developed over time. This is evident in the publication of studies, the confidence to present my research at conferences, and being recently selected to peer review on this subject for an international journal.

7.4 Research Governance and Organisation

Ethical practice has been an important aspect of my professional career, and it is important to me as a researcher. I have developed an in-depth understanding of research ethics through my voluntary participation as a post graduate student member of the Science Faculty Ethics Committee, and have now gone on to represent UPDA as a staff member. Through reviewing other researchers' proposals within a forum, I developed an understanding of what does, and does not, constitutes good ethical

research. This process helped me achieve a greater understanding about potential ethical dilemmas of my own research. Thus, I was able to implement this understanding in my own subsequent research proposals and be successful at getting a favourable opinion. My further continual development in this domain is to understand the process of funding sources and grant application procedures which as yet, I have not experienced.

7.5 Engagement, Influence and Impact

Collegiality with the Department of Psychology has underpinned the successful completion of this collaborative research. The ability to be approachable and demonstrate interpersonal sensitivity has enabled me to benefit greatly from feedback given by supervisors and colleagues across the disciplines of psychology, dentistry, and education.

I purposely chose the continental style PhD, because it was very important to me to actively publish my research as it was being discovered. For me, the advantages of submitting the studies for publication was to benefit from feedback from colleagues outside the supervisory team and to put to the test the prediction that my research was of interest to the stakeholders I was aiming it at. Successful publication encouraged me to become a member of my professional society's publications committee, where I now actively support and enable less experienced researchers from my own profession to publish.

7.6 Conclusion

It was a leap of faith to resign from my position at UPDA to undertake a three-year programme of research, in a subject outside of my discipline. On reflection however, it has been the most rewarding experience both personally, and professionally. In completing this research, I have honed my skills as a researcher, gained new colleagues and friends, and developed a measure of expertise in a subject I knew very little about at the start. Undertaking this PhD has always been about the commencement and progression of my research journey. This journey will be continuous.

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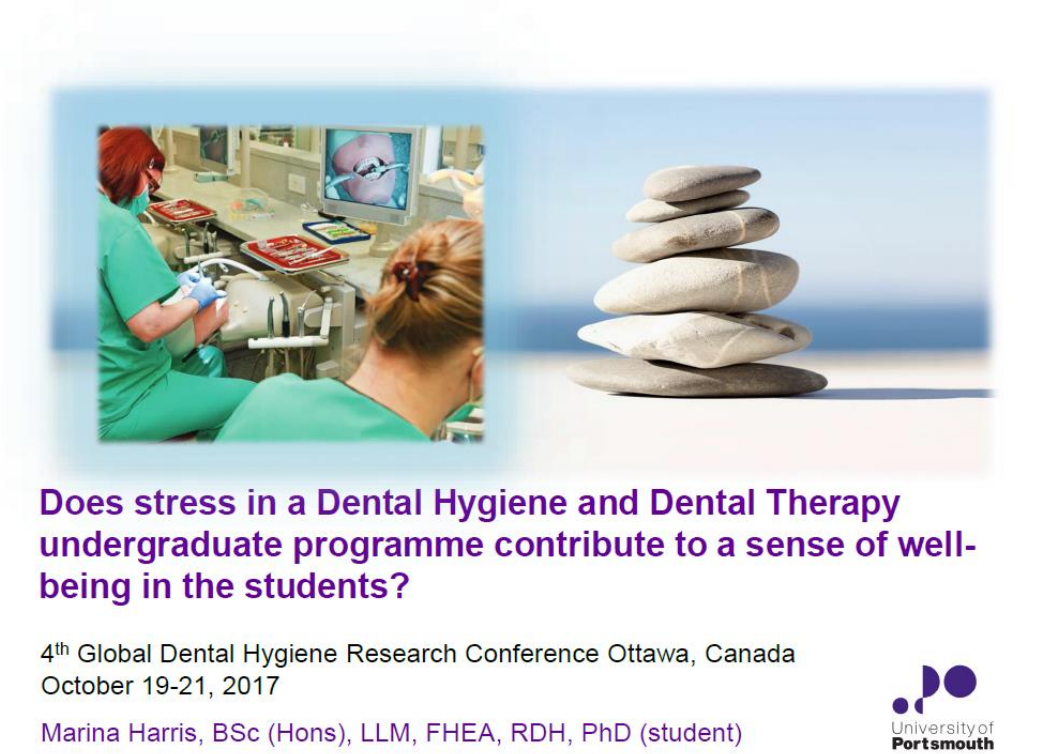
APPENDICES

Appendix A OTTAWA ORAL PRESENTATION

Slide 1



Slide 2

Slide 3

STUDY AIMS

- To use a qualitative approach to further explore the stress and well-being of dental hygiene and dental therapy students (DHDTS) during their undergraduate training
- Conduct semi-structured interviews to explore motivation, goals, and perceived stress
- Undertake thematic analysis of data using Braun and Clarke's (2006) six phases of thematic analysis
- Describe students' own experiences of stress in their undergraduate programmes

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Slide 4

STRESS AND WELL-BEING

A particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being (Lazarus & Folkman, 1984)

A positively-functioning individual who establishes goals, direction, and purpose, which gives the person a sense of meaning in life. The individual is self-determined, and will take advantage of environmental opportunities to continue to develop and grow (Ryff, 1989)

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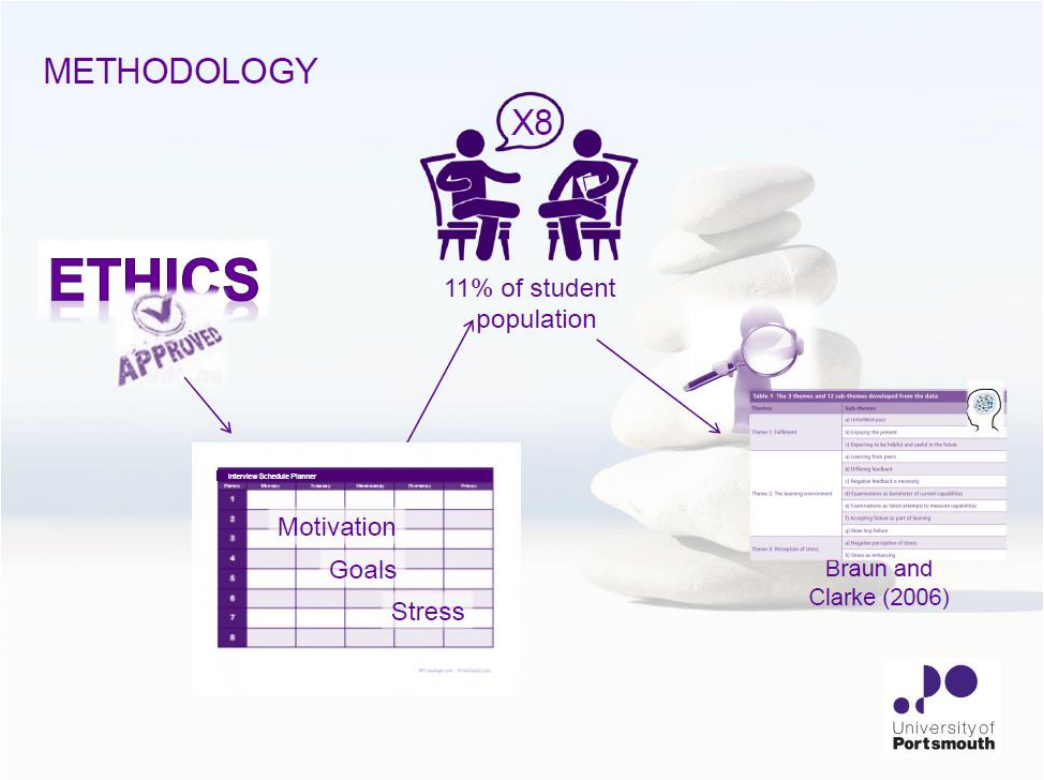
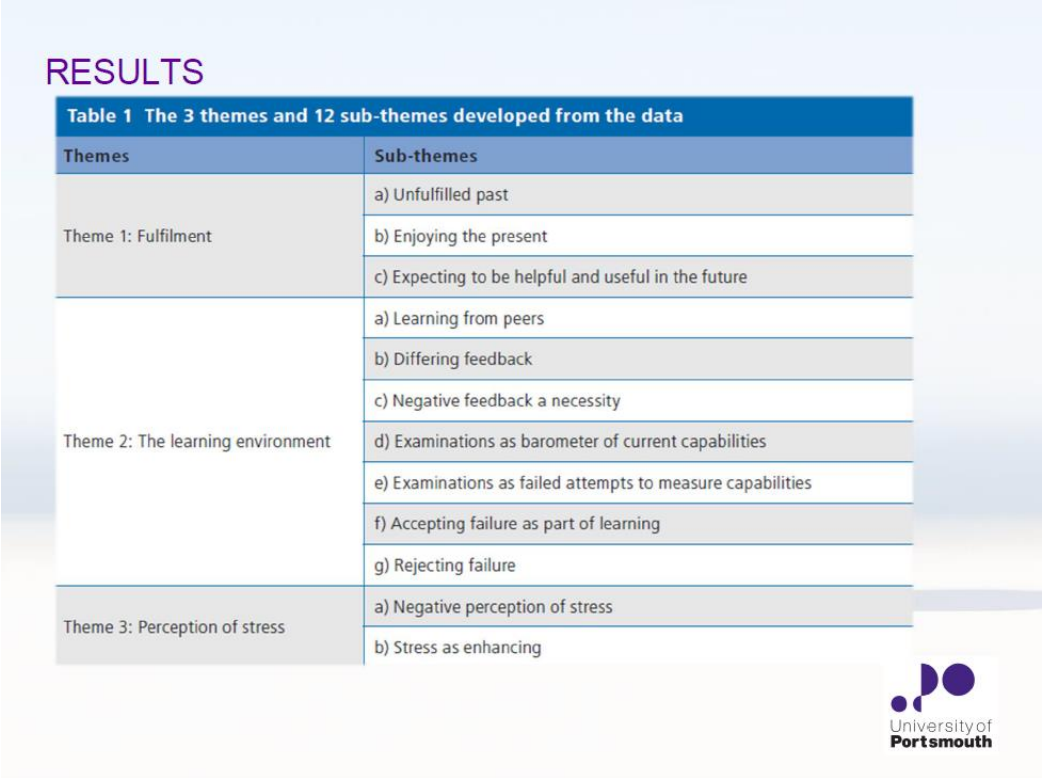
Slide 5



Slide 6



RESULTS

Table 1 The 3 themes and 12 sub-themes developed from the data

Themes	Sub-themes
Theme 1: Fulfilment	a) Unfulfilled past
	b) Enjoying the present
	c) Expecting to be helpful and useful in the future
Theme 2: The learning environment	a) Learning from peers
	b) Differing feedback
	c) Negative feedback a necessity
	d) Examinations as barometer of current capabilities
	e) Examinations as failed attempts to measure capabilities
	f) Accepting failure as part of learning
	g) Rejecting failure
Theme 3: Perception of stress	a) Negative perception of stress
	b) Stress as enhancing

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Slide 7

FULFILMENT (expecting to be helpful and useful in the future)

'Thinking you only get a limited time doing what you're doing and knowing that you have some sort of a contribution to society, someone else's life; it's not just waking up and doing what you're supposed to do'. (SS8)

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Slide 8

THE LEARNING ENVIRONMENT (differing feedback)

'Everyone has different experiences. To be a well-rounded learner you need to have different opinions from different people. If you have only one view all of the time, then you don't learn different ways of looking or approaching things'. (SS1)

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Slide 9

THE LEARNING ENVIRONMENT (accepting failure as part of learning)

'I think there's nothing constructive that ever happens from being negative about something. If something doesn't happen, maybe it wasn't meant to be. If you keep saying no in one field, maybe go another path'.(SS8)

'No-one likes negative feedback, I get quite a bit disappointed, but I think I need that to be able to learn and progress. I beat myself up a first, but come out the other end'. (SS2)

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Slide10

PERCEPTION OF STRESS

'That initial feeling before you go into an exam was just horrible - its not healthy at all and doesn't do anybody any good'. (SS2)

'At first I get nervous and then it kind of makes me write quicker – the adrenaline. I don't think it affects my knowledge – I've never had a mind blank from being nervous'. (SS4)

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Slide 11

CONCLUSION

Analysis suggested that a strong sense of passion to become a clinician mitigated most, but not all, of the stressful experiences of the DHDTS undergraduates learning environment

DHDTS' perceived sources of stress were strongly linked to a sense of meaningfulness

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Slide 12

FUTURE STUDIES

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Slide 13

THANK
YOU
GRACIAS
ARIGATO
SHUKURIA
BÏYAN
SHUKRIA
DANKSCHEEN
TASHAKKUR ATU
SUKSAMA
MEHRBANI
GRAZIE
JUSPAXAR
BOLZÏN
MERCI
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Perceived stress and well-being in UK and Australian Dental Hygiene and Dental Therapy Students

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University of Portsmouth

LA TROBE UNIVERSITY

In brief

Explores UK and Australian students' perception of stress and well-being in their undergraduate education

Compares findings of levels of stress and well-being of dental hygiene and dental therapy students to recent base-line data from a study of this group of dental professionals

UK and Australian students reported high levels of well-being within a stressful academic environment

Background

A recent study used the Scale of Psychological Well Being, the Adult Hope Scale, and the Values Questionnaire, in conjunction with the widely-used Dental Environment Stress questionnaire to explore stress and well-being in a combined programme of Dental Hygiene and Dental Therapy students (DHDTS) in one UK school. The findings of this research showed that students reported high scores of psychological well-being at the same time as high sources of stress, and provided baseline data for this comparative study.

Purpose

To compare findings of sources of stress and well-being among DHDTS studying a combined programme in the UK and in Australia, for a clearer understanding of what role a country's institutional environment and curriculum has on students perceptions.

Methods

A questionnaire was distributed to all DHDTS students in Years 1, 2 and 3 at the University of Portsmouth Dental Academy (UPDA) in the UK, and La Trobe Rural Health School in Australia. Data were collected on students' perception of levels of stress and well-being. Statistical analyses were undertaken using SPSS software. A response rate of 58% (n=42) (UK) and 55% (n=46)(Australia) was achieved.

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Table 4. Domain-specific sources of stress mean DES scores for UK and Australia

Dental Environmental Stress (max score with each domain)	Mean (SD) UK (n=39)	Mean (SD) Aus (n=41)	*p* value
Living accommodation (16)	6.51 (3.60)	8.26 (3.77)	0.019
Personal factors (52)	16.87 (6.55)	17.84 (7.99)	0.27
Education environment (20)	7.41 (2.77)	11.15 (4.14)	0.000*
Academic work (32)	20.41 (5.34)	21.95 (7.13)	0.107
Clinical factors (36)	19.70 (5.86)	19.20 (7.83)	0.823

Table 6. Dimensions of SPWB mean scores for UK and Australia

SPWB dimension (MAX SCORE = 54)	Mean (SD) UK (n=34)	Mean (SD) Aus (n=36)	*p* value
Autonomy	36.97 (7.26)	33.54 (6.29)	0.064
Environmental mastery	37.78 (6.25)	34.30 (7.58)	0.086
Personal growth	44.36 (5.07)	42.39 (5.95)	0.213
Positive relations with others	40.73 (8.45)	39.29 (7.30)	0.317
Purpose in life	43.41 (6.59)	39.25 (5.89)	0.006
Self-acceptance	39.68 (7.72)	35.50 (9.13)	0.057

Mann-Whitney U tests with Bonferroni corrections were used and the level for a statistically significant difference was set at $p < 0.002$.

Table 7. Mean scores of DASS-21, AHS and VQ for UK and Australia

DASS-21, AHS and VQ subscales (max score within each subscale)	Mean (SD) UK (n=42)	Mean (SD) Aus (n=46)	*p* value
Depression Anxiety Stress Scales - 21 (Lovibond and Lovibond)			
Depression (42)	11.57 (9.18)	13.06 (10.18)	0.44
Anxiety (42)	10.76 (8.85)	13.06 (9.56)	0.216
Stress (42)	17.43 (8.07)	17.20 (9.96)	0.85
Adult Hope Scale (Snyder)			
Agency (32)	25.67 (3.67)	22.45 (5.93)	0.01
Pathway (32)	25.30 (3.55)	21.90 (5.97)	0.004
Valuing Questionnaire (Smout et al)			
Progress (30)	19.84 (5.74)	17.74 (6.94)	0.237
Obstruction (30)	10.32 (5.48)	13.25 (6.88)	0.048

Divaris K, Barlow P J, Chendea S A, Cheong W S, Dounis A, Dragan I F, Vrazic D. The academic environment; the students' perspective. Eur J Dent Educ 2008; 12: 120-130.

Ryff C D. Happiness is everything, or is it? Explorations on the meaning of psychological well-being. J Pers Soc Psychol 1989; 57: 1069-1081.

Results

A response rate of 58% (n=42) (UK) and 55% (n=46)(Australia) was achieved. Clinical factors and academic work were perceived as stressful for DHDTS in both the UK and Australia. The Australian DHDTS perceived stress in the educational environment was significantly higher ($p<0.002$) than the UK DHDTS. All students reported high levels of positive well-being, with no significant differences between the two groups.

Conclusions

DHDTS in the UK and Australia identified sources of stress within their undergraduate education, but also perceived themselves as positively-functioning individuals.

Exploring stress and well-being amongst Dental Hygiene and Dental Therapy students

M. Harris, J. C. Wilson, S. Holmes and D. R. Radford

University of Portsmouth
Dental Academy

In brief

- Explores students' perceptions of stress and well-being in their undergraduate education
- Compares levels of stress and well-being of dental hygiene and dental therapy students to that of dental students
- Reports high levels of well-being within a stressful academic environment

Background

Previous research into dental undergraduate stress has been exclusively targeted at Dental Students (DS); has focused on the negative aspects of stress;[1,2] and has ignored measurements of positive well-being.[3]

Aims

A collaborative Department of Psychology and Dental Academy study, to explore dental hygiene and dental therapy students' (DHDTS) perception of stress and well-being during their undergraduate education, and establish base-line data for further studies of this group of dental professionals.

Methods

A questionnaire was distributed to Years 1, 2 and 3 DHDTS and final year outreach DS (as a comparison group), at the University of Portsmouth Dental Academy, during summer 2015. Data were collected on students' perception of levels of stress and well-being. Statistical analyses were undertaken using SPSS software. Mann-Whitney U tests with Bonferroni corrections were used and the level for a statistically significant difference was set at p <0.002.

Table 3 Domain-specific sources of stress mean DES scores for DHDTS and DS

DES Domain (max score within each domain)	Mean (SD) DHDT (n = 58)	Mean (SD) DS (n = 62)	p value
Living accommodation (16)	7.67 (3.93)	6.69 (2.70)	0.108
Personal factors (52)	18.58 (7.77)	17.40 (8.05)	0.499
Education environment (20)	7.32 (2.65)	8.86 (3.40)	0.006
Academic work (32)	21.43 (5.50)	18.68 (5.44)	0.003
Clinical factors (36)	20.70 (6.48)	18.09 (6.46)	0.046

Table 5 Dimensions of SPWB mean scores for DHDTS and DS

SPWB dimension (MAX SCORE = 84)	Mean (SD) DHDT (n = 53)	Mean (SD) DS (n = 55)	p value
Autonomy	55.80 (7.85)	53.83 (5.75)	0.079
Environmental mastery	57.22 (7.24)	54.20 (4.52)	0.007
Personal growth	64.73 (5.89)	55.13 (4.22)	0.000*
Positive relations with others	59.50 (7.87)	55.03 (5.52)	0.000*
Purpose in life	61.62 (8.51)	49.58 (4.85)	0.000*
Self-acceptance	57.01 (9.92)	53.05 (5.23)	0.000*

Survey Instruments

- DES
- DASS-21
- SPWB
- VQ
- AHS

Table 6 Mean scores of DASS-21, AHS and VQ for DHDTS and DS

DASS-21, AHS and VQ subscales (max score within each subscale)	DHDT (n = 58) Mean (SD)	DS (n = 68) Mean (SD)	p value
DASS-21			
Depression (42)	7.26 (8.01)	4.94 (6.50)	0.052
Anxiety (42)	8.0 (7.73)	5.14 (5.53)	0.035
Stress (42)	12.20 (8.99)	7.79 (6.57)	0.004
AHS			
Agency (32)	24.85 (4.97)	24.03 (4.66)	0.291
Pathway (32)	23.22 (94.89)	24.23 (4.58)	0.18
VQ			
Progress (30)	19.51 (6.73)	18.31 (5.7)	0.208
Obstruction (30)	9.96 (7.01)	9.33 (6.28)	0.65

Results

A response rate of 81% (DHDTS) and 85% (DS) was achieved. Clinical factors and academic work were perceived as stressful for both DHDTS and DS, with no significant difference between the groups. The majority of respondents reported levels of depression, anxiety, and stress to be within the normal range. All students reported high levels of positive well-being, with DHDTS scoring significantly higher than DS in the dimensions of personal growth, purpose in life, self-acceptance and positive relations with others (p <0.002).

Conclusions

This is the first study to explore stress and well-being in DHDTS. Both DHDTS and DS students identified sources of stress within their undergraduate education, but also perceived themselves as positively-functioning individuals.[3]

1. Al-Samadani KH, Al-Dharrab A. The perception of stress among clinical dental students. World J Dent 2013; 4: 24-28.

2. Divaris K, Barlow P J, Chendea S A, Cheong W S, Dounis A, Dragan I F, Vrazic D. The academic environment; the students' perspective. Eur J Dent Educ 2008; 12: 120-130.

3. Ryff C D. Happiness is everything, or is it? Explorations on the meaning of psychological well-being. J Pers Soc Psychol 1989; 57: 1069-1081.

Appendix D GIDHT AND BSDHT ORAL PRESENTATION

Slide 1

Does pursuing a career in dental hygiene and therapy contribute to a sense of meaning in life?

GIDHT 2017 – Cheltenham

BSDHT TVRG 2017 - Oxford

Marina Harris

University of Portsmouth Dental Academy

Slide 2

LEARNING OUTCOMES

- To explore the association of meaning to stress
- To capture real-time data of stress and well-being in a group of qualified dental hygienists and therapists
- To present the first empirical data of stress and well-being in dental hygienist and therapist students
- To compare stress and well-being of qualified versus student dental hygienists and therapists

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Slide 3

DENTISTRY IS REGARDED AS A STRESSFUL CAREER

- Dentist-patient relationship
- Difficult physical working environment
- Uncertainty during times of change
- Complaints and litigation
- Practice management issues
- Time and scheduling pressures
- Job dissatisfaction
- Financial worries

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Slide 4

DENTAL UNDERGRADUATE EDUCATION

- Examinations and grades
- Faculty-student relations
- Adequacy of feedback given by staff
- Financial pressures
- Patient-related issues
- Lack of leisure time
- Meeting graduation requirements

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Slide 5

DEFINITION OF STRESS

A particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being
(Lazarus & Folkman, 1984)

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Slide 6

STRESS RESPONSE

- Rapid mobilization of stored energy to the muscles
- Inhibition of further energy storage
- Increase in heart rate, blood pressure and breathing rate to transport nutrients
- Simultaneous inhibition of digestion, growth, reproduction, and immunity
- Increased levels of the hormones adrenaline, noradrenaline and cortisol
- Short-term emergencies: Stress response is vital
- Chronic stress: Constant challenge to the body system is considered detrimental to health

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Slide 7

REPORTED SYMPTOMS OF STRESS

- Nervy or tense
- Headache
- Difficulty in sleeping
- Fatigue
- Low self-esteem
- Hopelessness
- Depression
- Anxiety
- Burnout

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Slide 8

POOR COPING SKILLS

- Dental students drinking more than the DoH recommended weekly limit
- Binge drinking
- Illicit drug use
- Carrying on into first year of qualification

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Slide 9

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Slide 11

THE UPSIDE OF STRESS

- A stressful life is also a meaningful life due to a consequence of the pursuit of goals that feeds our sense of purpose and quite often individuals will accept short-term costs in order to come out better in the long run
- Stress should not be seen as a weakness, but as a sign that something you care about is at stake
- Depending on how the stress is appraised by the individual, it can often be perceived as a challenge (enhancing) rather than a threat (debilitating)

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Slide 12

PSYCHOLOGICAL WELL-BEING

- Positively-functioning individuals establish goals, direction, and purpose, which give them a sense of meaning in life
- They are self-determined, and will take advantage of environmental opportunities to continue to develop and grow

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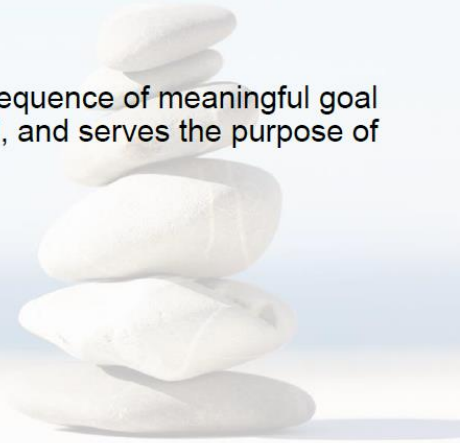
Slide 13

VALUED LIVING

- Valued living is the successful consequence of meaningful goal pursuit that is intrinsically reinforced, and serves the purpose of an individual's core values



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Slide 14

SURVEY

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Slide 15

SURVEY SCORING

- Highlight/put an asterix against your top 2 sources of stress

- Add your total score for A, then divide by 3
- Add your total score for B, then divide by 3
- Add your total score for C, then divide by 3
- Add your total score for D, then divide by 3

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STUDY 1: PERCEIVED STRESS AND WELL BEING AMONG DENTAL HYGIENE AND DENTAL THERAPY STUDENTS

M. Harris, J.C. Wilson, S. Holmes and D.R. Radford

BRITISH DENTAL JOURNAL. VOLUME 222 NO.2

JANUARY 27 2017

University of Portsmouth Dental Academy

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THE RESEARCH PROCESS

- STUDY DESIGN
- METHODOLOGY
- ETHICAL REVIEW
- ANALYSIS OF DATA
- DISSEMINATION

Slide 18

STUDY 1: PERCEIVED STRESS AND WELL BEING AMONG DENTAL HYGIENE AND DENTAL THERAPY STUDENTS

On-Line survey

Response rate: n = 58 (81%) DHDTS
n = 68 (85%) DS

Mean age: 25 years DHDTS (range of 19 to 38 years)
23 years DS (range of 21 to 32 years)

Slide 19

MEASUREMENT INSTRUMENTS

- Dental Environment Stress Questionnaire (DES) measures the sources of stress that are experienced by dental students in their undergraduate training
- Depression, Anxiety and Stress Scale (DASS-21)
- Scales of Psychological Well-Being (SPWB) measures the dimensions of autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance
- Adult Hope Scale (AHS) measures Agency (goal-directed energy) and Pathways (planning to accomplish goals)
- Valuing Questionnaire (VQ) measures valued living

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Domain-specific sources of stress mean DES scores for DHDTs and DS

DES Domain (max score within each domain)	Mean (SD) DHDT (n=58)	Mean (SD) DS (n=62)	*p* value
Living accommodation (16)	7.67 (3.93)	6.69 (2.70)	0.108
Personal factors (52)	18.58 (7.77)	17.40 (8.05)	0.499
Education environment (20)	7.32 (2.65)	8.86 (3.40)	0.006
Academic work (32)	21.43 (5.50)	18.68 (5.44)	0.003
Clinical factors (36)	20.70 (6.48)	18.09 (6.46)	0.046

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The stressors with the highest score (3 or above) for each year of study.

	Stressor (Domain)	Mean (SD)
1 DHDT	Fear of failing course/year (Academic)	3.61 (0.77)
	Examinations (Academic)	3.28 (1.07)
	Fear of being able to catch up if falling behind (Academic)	3.06 (1.21)
2 DHDT	Examinations (Academic)	3.28 (1.07)
3 DHDT	Fear of failing course/year (Academic)	3.50 (0.73)
	Examinations (Academic)	3.38 (0.80)
	Fear of being able to catch up if falling behind (Academic)	3.06 (1.12)
	Difference in opinion between clinical staff (Clinical)	3.06 (0.92)
5 DS	Examinations (Academic)	3.16 (0.83)

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Mean scores of DASS-21, AHS and VQ for DHDTs and DS

DASS-21, AHS and VQ subscales (max score within each subscale)	DHDT (n=58) Mean (SD)	DS (n=68) Mean (SD)	p value
DASS-21			
Depression (42)	7.26 (8.01)	4.94 (6.50)	0.052
Anxiety (42)	8.0 (7.73)	5.14 (5.53)	0.035
Stress (42)	12.20 (8.99)	7.79 (6.57)	0.004
AHS			
Agency (32)	24.85 (4.97)	24.03 (4.66)	0.291
Pathway (32)	23.22 (4.89)	24.23 (4.58)	0.180
VQ			
Progress (30)	19.51 (6.73)	18.31 (5.7)	0.208
Obstruction (30)	9.96 (7.01)	9.33 (6.28)	0.650

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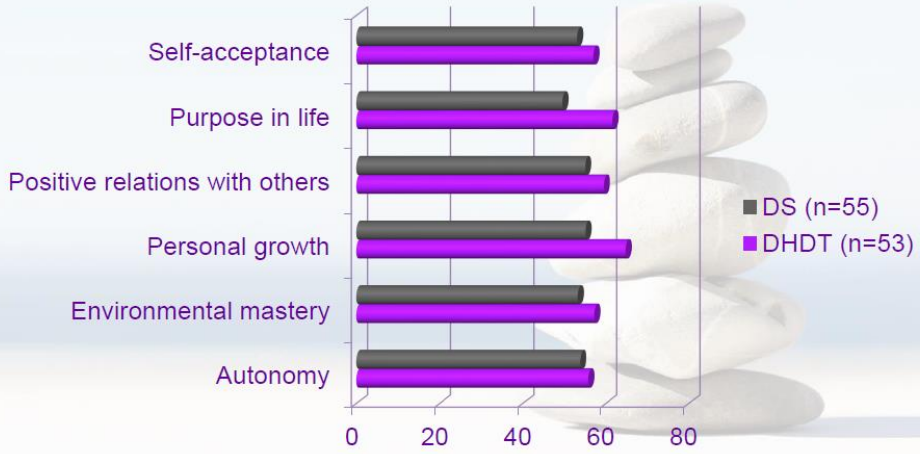
Slide 23

Dimensions of SPWB mean scores for DHDTs and DS



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CONCLUSIONS

- This study showed that DHDT students and DS reported high levels of perceived stress, specifically in the academic domain of the DES. However, at the same time, the majority in both groups reported high levels of positive psychological well-being and normal ranges of stress, anxiety and depression. In contrast to previous studies, which have made the assumption that stress in dental undergraduate training is debilitating, this study showed that DHDT and DS undergraduate training was indeed perceived as academically stressful, however, at the same time, the students also reported to be positively-functioning individuals

Slide 25

STUDY 2 - DOES STRESS IN THE DENTAL HYGIENE AND THERAPY UNDERGRADUATE PROGRAMME CONTRIBUTE TO A SENSE OF WELL-BEING – A QUALITATIVE STUDY

- Semi-structured interviews of up to 45 mins duration
- 8 DHDT students from across all 3 Year groups
- Thematic analysis of transcribed interviews
- Analysis suggested that the strong sense of passion to become a clinician mitigated most, but not all, of the stressful experiences of the learning environment.

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THEME 1: FULFILLMENT

- a) Unfulfilled past
- b) Enjoying the present
- c) Expecting to be helpful and useful in the future

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THEME 2: THE LEARNING ENVIRONMENT

- a) Learning from peers
- b) Differing feedback
- c) Negative feedback a necessity
- d) Examinations as barometer of current capabilities
- e) Examinations as failed attempts to measure capabilities
- f) Accepting failure as part of learning
- g) Rejecting failure

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THEME 3: PERCEPTION OF STRESS

- a) Negative perceptions of stress
- b) Stress as enhancing

Slide 29

UNFULFILLED PAST

- There was an overwhelming desire by all the participants to feel needed and be training for a profession that they felt made a difference to people's lives. Most of the participants had been dental nurses in the past; however, there was a distinct sense of lack of fulfilment, and even frustration at their restricted involvement in patient care in that role:

- '*I did an oral health education course and really liked the patient contact. I liked working at that level, which being an assistant (sic dental nurse) didn't allow.*' (SS1)

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EXPECTING TO BE HELPFUL AND USEFUL IN THE FUTURE

- Responsibility, patient engagement, and making a difference were key motivators to the participants' perceptions of their future roles as DHDTs. The interviewees described their desire to help patients "more directly" and "be in the driving seat", and to make a contribution to society:

- '*Thinking you only get a limited time doing what you're doing and knowing that you have some sort of a contribution to society, someone else's life, it's not just waking up and doing what you're supposed to do.*'(SS8)

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DIFFERING FEEDBACK

- All participants discussed the various ways that they learnt from tutors, however there were mixed opinions in relation to dealing with the differing advice from the clinical teaching staff:
- '*In practice, everyone is different and as a clinician, so you're not stagnant just having one person's opinion, you have lots of different opinions which is good.*' (SS2)
- *'Everyone has different experiences – everyone has a different job and has trained in different areas. Although there are text-book answers, every clinician has a slightly different take on things. To be a well-rounded learner you need to have different opinions from different people. If you have only one view all of the time, then you don't learn different ways of looking or approaching things.*' (SS1)

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NEGATIVE FEEDBACK

- Negative feedback was perceived as a necessary evil to learn and develop. Most interviewees described negative feedback as "not pleasant" or sometimes "disappointing", with some participants discussing how they "beat themselves up", but then viewed it as a challenge:
- '*No-one likes negative feedback, I get quite a bit disappointed, but I think I need that to be able to learn to be able to progress. I beat myself up at first, but come out the other end. I think right, OK, then as a challenge, how am I going to make sure this doesn't happen next time? Or how can I change it to be better.*'(SS2)

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ACCEPTING FAILURE AS PART OF LEARNING

- The majority of participants identified goal failure as something that they accepted as part of being a student:
- '*I think there's nothing constructive that ever happens from just being negative about something – if you keep trying –what doesn't kill you, makes you stronger, more resilient. If something really doesn't happen, maybe it wasn't meant to be. If you keep saying no in one field, maybe go another path; pave your own way.' (SS8)*

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NEGATIVE PERCEPTION OF STRESS

- The majority of students perceived the physiological symptoms of stress to affect their performance in a negative way:
- '*I do feel like it did affect me. Whereas if I didn't have those nerves, because I knew what I was doing, it was all in my mind, it just didn't come out that way because I felt nervous.*' (SS6)
- '*That initial feeling before you go into an exam, especially a practical exam was just horrible – it's not healthy at all, but I think that once you're in the exam, you kind of relax and everything just flows, but that initial horrible feeling before you go in to an exam, I just think is really unhealthy, and doesn't do anybody any good.*' (SS2)

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STRESS AS ENHANCING

- A small minority of students described the physiological symptoms as either enhancing their performance or as a challenge:

- '*At first I get nervous and then it kind of makes me write quicker – the adrenaline. I don't think it affects my knowledge – it's still in my mind – I've never had a mind blank from being nervous, it's just not a nice feeling.*' (SS4)
- '*It's that feeling in your stomach, it's that scared, horrible feeling and I get it with presentations – right before. They're just temporary things, because of something – you know why you're feeling that and in a way, it's good – you just feel human; they're not a bad thing - it's good to be put under stress for a bit to see how you cope with it.*' (SS7)

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CONCLUSIONS

- The findings of this study suggested that the majority of participants derived a sense of flourishment from aspects of their undergraduate programme that they perceived as stressful. The participants described a strong sense of purpose, where their current experiences of the undergraduate programme were understood within the context of their ambition to be future clinicians
- Motivation to become a dental hygienist and therapist served the values which the participants reported as 'wanting to make a difference' and 'being needed'
- The subjective belief that they could actually make a difference, meant that participants in this study demonstrated a sense of efficacy, which in addition to self-worth, purpose, and values, is one of the four levels of meaning described by Baumeister

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Slide 37

LEARNING OUTCOME

To capture real-time data of stress and well-being in a group of qualified dental hygienists and therapists

- To compare stress and well-being of qualified versus student dental hygienists and therapists

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TOP TWO STRESSORS FOR GIDHT MEMBERS

STRESSOR	NUMBER OF 'VOTES'

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Slide 39

The stressors with the highest score (3 or above) for each year of study.

	Stressor (Domain)	Mean (SD)
1 DHDT	Fear of failing course/year (Academic)	3.61 (0.77)
	Examinations (Academic)	3.28 (1.07)
	Fear of being able to catch up if falling behind (Academic)	3.06 (1.21)
2 DHDT	Examinations (Academic)	3.28 (1.07)
3 DHDT	Fear of failing course/year (Academic)	3.50 (0.73)
	Examinations (Academic)	3.38 (0.80)
	Fear of being able to catch up if falling behind (Academic)	3.06 (1.12)
	Difference in opinion between clinical staff (Clinical)	3.06 (0.92)
5 DS	Examinations (Academic)	3.16 (0.83)

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SCALE OF POSITIVE WELL-BEING

SPWB DIMENSION (MAX SCORE = 84)	DHDTS MEAN SCORE	AS A PERCENTAGE OF MAX SCORE OF 84
PERSONAL GROWTH	64.73	77
POSITIVE RELATIONS WITH OTHERS	59.50	70.8
PURPOSE IN LIFE	61.62	73.4
SELF ACCEPTANCE	57.01	67.8

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SCALE OF POSITIVE WELL-BEING

SPWB DIMENSION (MAX SCORE = 18)	GIDHT MEAN SCORE	AS A PERCENTAGE OF MAX SCORE OF 18
PERSONAL GROWTH		
POSITIVE RELATIONS WITH OTHERS		
PURPOSE IN LIFE		
SELF ACCEPTANCE		

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SCALE OF POSITIVE WELL-BEING

SPWB DIMENSION	MEAN SCORE AS PERCENTAGE DHDTS	MEAN SCORE AS PERCENTAGE GIDHT
PERSONAL GROWTH	77	
POSITIVE RELATIONS WITH OTHERS	70.8	
PURPOSE IN LIFE	73.4	
SELF ACCEPTANCE	67.8	

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- Do GIDHT members report to be positively functioning individuals at the same time as reporting high levels of occupational sources of stress?

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Slide 44

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Slide 45

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University of Portsmouth
Dental Academy

Appendix E BSDHT OHC PRESENTATION

Slide 1

Stress and the Dental Hygienist and Therapist:
Is it just all in a day's work?

BSDHT OHC 2016 - Belfast

Marina Harris

University of Portsmouth Dental Academy

Slide 2

Learning Outcomes

- Identify the importance of meaning in relation to stress.
- Present exploratory findings of stress and well-being in Dental Hygiene and Therapy students.
- Gain insight into our own concept of a positive functioning individual

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Slide 3

Dentistry is regarded as a stressful career

- Dentist-patient relationship
- Difficult physical working environment
- Uncertainty during times of change
- Complaints and litigation
- Practice management issues
- Time and scheduling pressures
- Job dissatisfaction
- Financial worries

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Slide 4

Reported symptoms of stress

- Nervy or tense
- Headache
- Difficulty in sleeping
- Fatigue
- Low self-esteem
- Hopelessness
- Depression
- Anxiety
- Burnout

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Slide 5

Dental undergraduate education

- Examinations and grades
- Faculty-student relations
- Adequacy of feedback given by staff
- Financial pressures
- Patient-related issues
- Lack of leisure time
- Meeting graduation requirements

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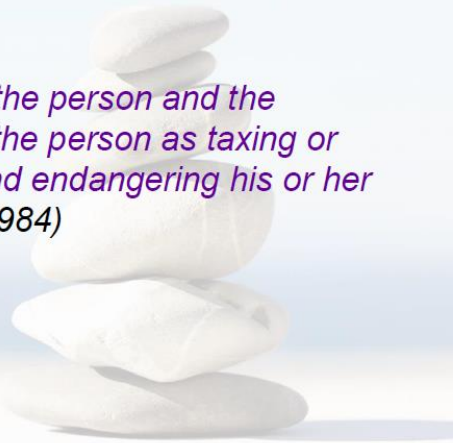
Slide 6

Stress

A particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being (Lazarus & Folkman, 1984)



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Slide 7

Stress response

- Rapid mobilization of stored energy to the muscles
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- Increase in heart rate, blood pressure and breathing rate to transport nutrients
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Slide 8

Psychological well-being

- Positively-functioning individuals establish goals, direction, and purpose, which give them a sense of meaning in life
- They are self-determined, and will take advantage of environmental opportunities to continue to develop and grow

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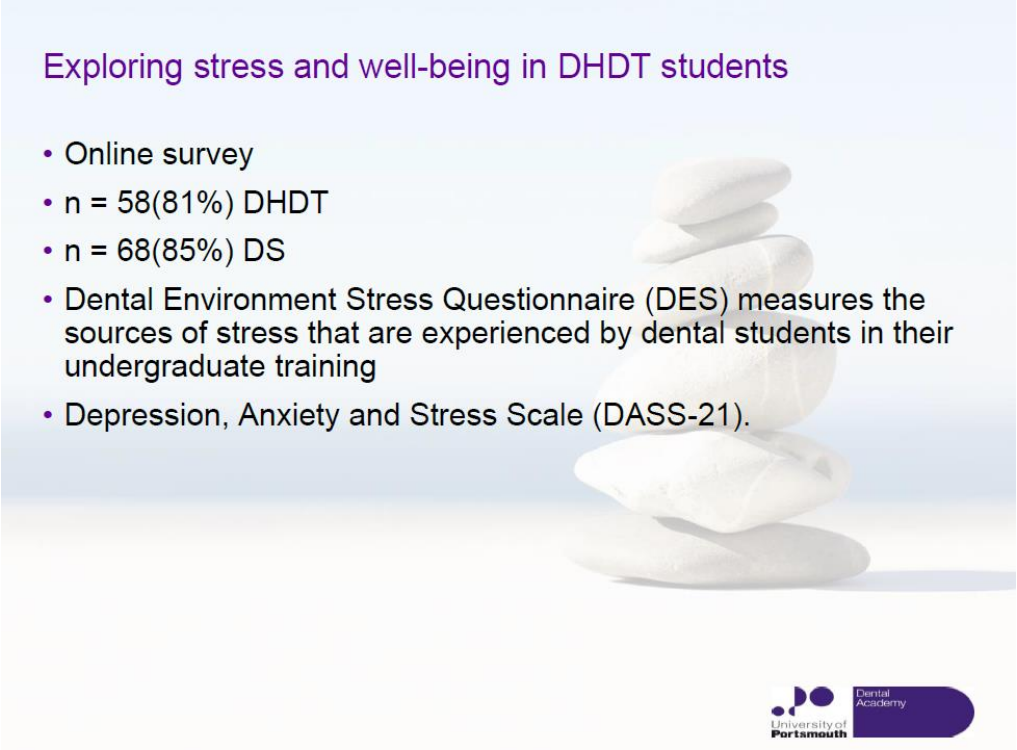
Slide 9

Slide 10



Slide 11

Exploring stress and well-being in DHDT students ….(Contd.)

- Scales of Psychological Well-Being (SPWB) measures the dimensions of autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance.
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Slide 12

Domain-specific sources of stress mean DES scores for DHDTs and DS

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Slide 13

The stressors with the highest score (3 or above) for each year of study.

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	Examinations (Academic)	3.38 (0.80)
	Fear of being able to catch up if falling behind (Academic)	3.06 (1.12)
	Difference in opinion between clinical staff (Clinical)	3.06 (0.92)
5 DS	Examinations (Academic)	3.16 (0.83)

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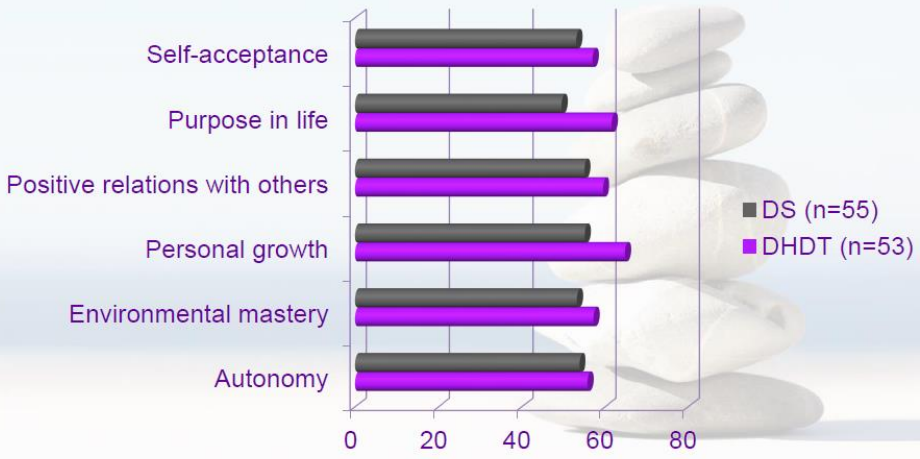
Dimensions of SPWB mean scores for DHDTs and DS



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Mean scores of DASS-21, AHS and VQ for DHDTs and DS

DASS-21, AHS and VQ subscales (max score within each subscale)	DHDT (n=58) Mean (SD)	DS (n=68) Mean (SD)	p value
DASS-21			
Depression (42)	7.26 (8.01)	4.94 (6.50)	0.052
Anxiety (42)	8.0 (7.73)	5.14 (5.53)	0.035
Stress (42)	12.20 (8.99)	7.79 (6.57)	0.004
AHS			
Agency (32)	24.85 (4.97)	24.03 (4.66)	0.291
Pathway (32)	23.22 (4.89)	24.23 (4.58)	0.180
VQ			
Progress (30)	19.51 (6.73)	18.31 (5.7)	0.208
Obstruction (30)	9.96 (7.01)	9.33 (6.28)	0.650

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Now it is your turn – mini questionnaire

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STUDY 2 - Do Dental Hygiene and Therapy students perceive stress as meaningful? – A qualitative study

- Semi-structured interviews of up to 45 mins duration
- 8 DHDT students from across all 3 Year groups
- Thematic analysis of transcribed interviews

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Fulfilment

'Making a difference and making people smile and talking to patients. Like this morning I had a patient and my work really made an impact on their life. They felt like they could smile more and I like that – it made me feel good'. (SS4)

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Personal growth/positive relations with others

'Everyone has different experiences – everyone has a different job and has trained in different areas. Although there are text-book answers, every clinician has a slightly different take on things. To be a well-rounded learner you need to have different opinions from different people. If you have only one view all of the time, then you don't learn different ways of looking or approaching things'. (SS1)

'Positive feedback is always nice to receive – it increases your confidence and you can move on from there. Negative feedback is even more useful, because then you can improve'. (SS5)

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Purpose in life

'I wanted to do DHDT first of all but was unsuccessful, so they recommended the nursing and I did it. I enjoyed it, but I knew I wanted to be in the driving seat; I wanted to be the one to say the things to the patient; I was the one that wanted to get hands-on, so I kept going until they said 'yes". (SS8)

'Thinking you only get a limited time doing what you're doing and knowing that you have some sort of a contribution to society, someone else's life, it's not just waking up and doing what you're supposed to do'. (SS8)

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Your survey results?

- Add your total score for A, then divide by 3
- Add your total score for B, then divide by 3
- Add your total score for C, then divide by 3
- Add your total score for D, then divide by 3

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SPWB Dimensions

- A. Personal growth
  - High scorer: Has a feeling of continual development
  - Low scorer: Has a sense of personal stagnation
- B. Positive relations with others
  - High scorer: Has warm, satisfying, trusting relationships with others
  - Low scorer: Has few close, trusting relationships with others
- C. Purpose in life
  - High scorer: Has goals in life and a sense of directedness
  - Low scorer: Lacks a sense of meaning in life
- D. Self-acceptance
  - High scorer: Possesses a positive attitude toward the self
  - Low scorer: Feels dissatisfied with self

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Appendix F E298 ETHICAL APPROVAL

From: **Sharman Rogers** <sharman.rogers@port.ac.uk>

Date: 23 April 2015 at 11:56

Subject: Re: Ethical Review application ref. E298

To: Caroline Strevens <caroline.strevens@port.ac.uk>, Clare Wilson <clare.wilson@port.ac.uk>, PBS-Ethics <pbs-ethics-group@port.ac.uk>

Dear Caroline

I have received the following response from Ethics Committee:

The FEC is pleased to give a favourable opinion on this application, subject to lodging the final versions of the documentation with Sharman Rogers. The Committee would like to pass on its thanks to Caroline and Claire for such an immediate, clear and comprehensive reply to its concerns.

Best wishes

Sharman

Appendix G DENTAL ENVIRONMENT STRESS (DES)

DES Individual item stressor	Domain
Moving away from home Environment in which to study Lack of home atmosphere Other problems with accommodation	Living accommodation
Making friends Financial responsibilities Personal physical health Intimate Relationships Necessity to postpone marriage Necessity to postpone children Having multiple roles Conflict with spouse/mate over career development Lack of time for relaxation Having children in the home Having reduced holidays compared with other students Fear of going out due to crime Dependencies (e.g. drugs, alcohol)	Personal factors
Expectation versus reality of dental school Approachability of staff Criticism about academic or clinical work Rules and regulations of the dental school Discrimination due to race, nationality, gender or social class	Educational environment

Amount of assigned course work Difficulty of course work Fear of being able to catch up if falling behind Competition for grades Fear of failing course or year Uncertainty about dental career Examinations Lack of input in decision making process in dental school	Academic work
Concerns about manual dexterity Transition from preclinical to clinical Learning precision manual skills Completing clinical requirements Concern about treatment grades awarded Difference in opinion between clinical staff concerning treatment Shortage of allocated clinical time Patient management Confidence in own clinical decision making	Clinical factors

Appendix H DEPRESSION ANXIETY STRESS SCALE (DASS-21)

	Did not apply to me at all (1)	Applied to me to some degree, or some of the time (2)	Applied to me to a considerable degree, or a good part of time (3)	Applied to me very much, or most of the time (4)
1. I found it hard to wind down	❍	❍	❍	❍
2. I was aware of dryness of my mouth	❍	❍	❍	❍
3. I couldn't seem to experience any positive feeling at all	❍	❍	❍	❍
4. I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion	❍	❍	❍	❍
5. I found it difficult to work up the initiative to do things	❍	❍	❍	❍
6. I tended to over-react to situations	❍	❍	❍	❍
7. I experienced trembling (eg, in the hands)	❍	❍	❍	❍
8. I felt that I was using a lot of nervous energy	❍	❍	❍	❍
9. I was worried about situations in which I might panic and make a fool of myself	❍	❍	❍	❍
10. I felt I had nothing to look forward to	❍	❍	❍	❍
11. I found myself getting agitated	❍	❍	❍	❍
12. I found it difficult to relax	❍	❍	❍	❍
13. I felt down-hearted and blue	❍	❍	❍	❍
14. I was intolerant of anything that kept me from	❍	❍	❍	❍

getting on with what I was doing				
15. I felt I was close to panic	❍	❍	❍	❍
16. I was unable to become enthusiastic about anything	❍	❍	❍	❍
17. I felt I wasn't worth much as a person	❍	❍	❍	❍
18. I felt that I was rather touchy	❍	❍	❍	❍
19. I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)	❍	❍	❍	❍
20. I felt scared without any good reason	❍	❍	❍	❍
21. I felt that life was meaningless	❍	❍	❍	❍

Appendix I SCALE OF PSYCHOLOGICAL WELL BEING (SPWB)

Circle the number that best describes your present agreement or disagreement with each statement.	Strongly Disagree	Disagree Somewhat	Disagree Slightly	Agree Slightly	Agree Somewhat	Strongly Agree
1. Most people see me as loving and affectionate.	1	2	3	4	5	6
2. Sometimes I change the way I act or think to be more like those around me.	1	2	3	4	5	6
3. In general, I feel I am in charge of the situation in which I live.	1	2	3	4	5	6
4. I am not interested in activities that will expand my horizons.	1	2	3	4	5	6
5. I feel good when I think of what I've done in the past and what I hope to do in the future.	1	2	3	4	5	6
6. When I look at the story of my life, I am pleased with how things have turned out.	1	2	3	4	5	6
7. Maintaining close relationships has been difficult and frustrating for me.	1	2	3	4	5	6
8. I am not afraid to voice my opinions, even when they are in opposition to the opinions of most people.	1	2	3	4	5	6
9. The demands of everyday life often get me down.	1	2	3	4	5	6
10. In general, I feel that I continue to learn more about myself as time goes by.	1	2	3	4	5	6
11. I live life one day at a time and don't really think about the future.	1	2	3	4	5	6
12. In general, I feel confident and positive about myself.	1	2	3	4	5	6

13. I often feel lonely because I have few close friends with whom to share my concerns.	1	2	3	4	5	6
14. My decisions are not usually influenced by what everyone else is doing.	1	2	3	4	5	6

Circle the number that best describes your present agreement or disagreement with each statement.	Strongly Disagree	Disagree Somewhat	Disagree Slightly	Agree Slightly	Agree Somewhat	Strongly Agree
15. I do not fit very well with the people and the community around me.	1	2	3	4	5	6
16. I am the kind of person who likes to give new things a try.	1	2	3	4	5	6
17. I tend to focus on the present, because the future nearly always brings me problems.	1	2	3	4	5	6
18. I feel like many of the people I know have gotten more out of life than I have.	1	2	3	4	5	6
19. I enjoy personal and mutual conversations with family members or friends.	1	2	3	4	5	6
20. I tend to worry about what other people think of me.	1	2	3	4	5	6
21. I am quite good at managing the many responsibilities of my daily life.	1	2	3	4	5	6
22. I don't want to try new ways of doing things - my life is fine the way it is.	1	2	3	4	5	6
23. I have a sense of direction and purpose in life.	1	2	3	4	5	6
24. Given the opportunity, there are many things about myself that I would change.	1	2	3	4	5	6
25. It is important to me to be a good listener when close friends talk to me about their problems.	1	2	3	4	5	6
26. Being happy with myself is more important to me than having others approve of me.	1	2	3	4	5	6
27. I often feel overwhelmed by my responsibilities.	1	2	3	4	5	6
28. I think it is important to have new experiences that	1	2	3	4	5	6

challenge how you think about yourself and the world.						
29. My daily activities often seem trivial and unimportant to me.	1	2	3	4	5	6
30. I like most aspects of my personality.	1	2	3	4	5	6
31. I don't have many people who want to listen when I need to talk.	1	2	3	4	5	6

Circle the number that best describes your present agreement or disagreement with each statement.	Strongly Disagree	Disagree Somewhat	Disagree Slightly	Agree Slightly	Agree Somewh at	Strongly Agree
32. I tend to be influenced by people with strong opinions.	1	2	3	4	5	6
33. If I were unhappy with my living situation, I would take effective steps to change it.	1	2	3	4	5	6
34. When I think about it, I haven't really improved much as a person over the years.	1	2	3	4	5	6
35. I don't have a good sense of what it is I'm trying to accomplish in life.	1	2	3	4	5	6
36. I made some mistakes in the past, but I feel that all in all everything has worked out for the best.	1	2	3	4	5	6
37. I feel like I get a lot out of my friendships.	1	2	3	4	5	6
38. People rarely talk to me into doing things I don't want to do.	1	2	3	4	5	6
39. I generally do a good job of taking care of my personal finances and affairs.	1	2	3	4	5	6
40. In my view, people of every age are able to continue growing and developing.	1	2	3	4	5	6
41. I used to set goals for myself, but that now seems like a waste of time.	1	2	3	4	5	6
42. In many ways, I feel disappointed about my achievements in life.	1	2	3	4	5	6
43. It seems to me that most other people have more friends than I do.	1	2	3	4	5	6
44. It is more important to me to "fit in" with others than to stand alone on my principles.	1	2	3	4	5	6
45. I find it stressful that I	1	2	3	4	5	6

can't keep up with all of the things I have to do each day.						
46. With time, I have gained a lot of insight about life that has made me a stronger, more capable person.	1	2	3	4	5	6
47. I enjoy making plans for the future and working to make them a reality.	1	2	3	4	5	6
48. For the most part, I am proud of who I am and the life I lead.	1	2	3	4	5	6

Circle the number that best describes your present agreement or disagreement with each statement.	Strongly Disagree	Disagree Somewhat	Disagree Slightly	Agree Slightly	Agree Somewh at	Strongly Agree
49. People would describe me as a giving person, willing to share my time with others.	1	2	3	4	5	6
50. I have confidence in my opinions, even if they are contrary to the general consensus.	1	2	3	4	5	6
51. I am good at juggling my time so that I can fit everything in that needs to be done.	1	2	3	4	5	6
52. I have a sense that I have developed a lot as a person over time.	1	2	3	4	5	6
53. I am an active person in carrying out the plans I set for myself.	1	2	3	4	5	6
54. I envy many people for the lives they lead.	1	2	3	4	5	6
55. I have not experienced many warm and trusting relationships with others.	1	2	3	4	5	6
56. It's difficult for me to voice my own opinions on controversial matters.	1	2	3	4	5	6
57. My daily life is busy, but I derive a sense of satisfaction from keeping up with everything.	1	2	3	4	5	6
58. I do not enjoy being in	1	2	3	4	5	6

new situations that require me to change my old familiar ways of doing things.						
59. Some people wander aimlessly through life, but I am not one of them.	1	2	3	4	5	6
60. My attitude about myself is probably not as positive as most people feel about themselves.	1	2	3	4	5	6
61. I often feel as if I'm on the outside looking in when it comes to friendships.	1	2	3	4	5	6
62. I often change my mind about decisions if my friends or family disagree.	1	2	3	4	5	6
63. I get frustrated when trying to plan my daily activities because I never accomplish the things I set out to do.	1	2	3	4	5	6
64. For me, life has been a continuous process of learning, changing, and growth.	1	2	3	4	5	6

Circle the number that best describes your present agreement or disagreement with each statement.	Strongly Disagree	Disagree Somewhat	Disagree Slightly	Agree Slightly	Agree Somewhat	Strongly Agree
65. I sometimes feel as if I've done all there is to do in life.	1	2	3	4	5	6
66. Many days I wake up feeling discouraged about how I have lived my life.	1	2	3	4	5	6
67. I know that I can trust my friends, and they know they can trust me.	1	2	3	4	5	6
68. I am not the kind of person who gives in to social pressures to think or act in certain ways.	1	2	3	4	5	6
69. My efforts to find the kinds of activities and relationships that I need have been quite successful.	1	2	3	4	5	6
70. I enjoy seeing how my views have changed and matured over the years.	1	2	3	4	5	6
71. My aims in life have been more a source of satisfaction than frustration to me.	1	2	3	4	5	6
72. The past had its ups and downs, but in general, I wouldn't want to change it.	1	2	3	4	5	6
73. I find it difficult to really open up when I talk with others.	1	2	3	4	5	6
74. I am concerned about how other people evaluate the choices I have made in my life.	1	2	3	4	5	6
75. I have difficulty arranging my life in a way that is satisfying to me.	1	2	3	4	5	6
76. I gave up trying to make big improvements or changes in my life a long time ago.	1	2	3	4	5	6
77. I find it satisfying to think about what I have accomplished in life.	1	2	3	4	5	6
78. When I compare myself	1	2	3	4	5	6

to friends and acquaintances, it makes me feel good about who I am.						
79. My friends and I sympathize with each other's problems.	1	2	3	4	5	6
80. I judge myself by what I think is important, not by the values of what others think is important.	1	2	3	4	5	6

Circle the number that best describes your present agreement or disagreement with each statement.	Strongly Disagree	Disagree Somewhat	Disagree Slightly	Agree Slightly	Agree Somewh at	Strongly Agree
81. I have been able to build a home and a lifestyle for myself that is much to my liking.	1	2	3	4	5	6
82. There is truth to the saying that you can't teach an old dog new tricks.	1	2	3	4	5	6
83. In the final analysis, I'm not so sure that my life adds up to much.	1	2	3	4	5	6
84. Everyone has their weaknesses, but I seem to have more than my share.	1	2	3	4	5	6

Appendix J VALUING QUESTIONAIRE (VQ)

	0 Not at all true (1)	1. a very little bit true (2)	2 a little true (3)	3 Partially true (4)	4 Somewhat true (5)	5 Mostly true (6)	6. Completely True (7)
I spent a lot of time thinking about the past or future, rather than being engaged in activities that mattered to me (1)	❍	❍	❍	❍	❍	❍	❍
I was basically on "auto-pilot" most of the time (2)	❍	❍	❍	❍	❍	❍	❍
I worked toward my goals even if I didn't feel motivated to (3)	❍	❍	❍	❍	❍	❍	❍
I was proud about how I lived my life (4)	❍	❍	❍	❍	❍	❍	❍
I made progress in the areas of my life I care most about (5)	❍	❍	❍	❍	❍	❍	❍
Difficult thoughts, feelings or memories got in the way of what I really wanted to do (6)	❍	❍	❍	❍	❍	❍	❍
I continued to get	❍	❍	❍	❍	❍	❍	❍

better at being the kind of person I want to be (7)							
When things didn't go according to plan, I gave up easily (8)	❍	❍	❍	❍	❍	❍	❍
I felt like I had a purpose in life (9)	❍	❍	❍	❍	❍	❍	❍
It seemed like I was just "going through the motions" rather than focusing on what was important to me (10)	❍	❍	❍	❍	❍	❍	❍

Appendix K ADULT HOPE SCALE (AHS)

	Definitely False (1)	Mostly False (2)	Somewhat False (3)	Slightly False (4)	Slightly True (5)	Somewhat True (6)	Mostly True (7)	Definitely True (8)
1. I can think of many ways to get out of a jam.	❍	❍	❍	❍	❍	❍	❍	❍
energetically pursue my goals.	❍	❍	❍	❍	❍	❍	❍	❍
3. I feel tired most of the time.	❍	❍	❍	❍	❍	❍	❍	❍
4. There are lots of ways around any problem.	❍	❍	❍	❍	❍	❍	❍	❍
5. I am easily downed in an argument	❍	❍	❍	❍	❍	❍	❍	❍
6. I can think of many ways to get the things in life that are important to me.	❍	❍	❍	❍	❍	❍	❍	❍
7. I worry about my health.	❍	❍	❍	❍	❍	❍	❍	❍
8. Even when others get discouraged, I know I can find a way to solve the problem.	❍	❍	❍	❍	❍	❍	❍	❍
9. My past experiences have prepared me well for my future.	❍	❍	❍	❍	❍	❍	❍	❍
10. I've been pretty successful in life.	❍	❍	❍	❍	❍	❍	❍	❍

11. I usually find myself worrying about something	❍	❍	❍	❍	❍	❍	❍	❍
12. I meet the goals that I set for myself.	❍	❍	❍	❍	❍	❍	❍	❍

Appendix L SFEC 2016-052 ETHICAL APPROVAL

Science Faculty Ethics Committee
Science Faculty Office
University of Portsmouth
St Michael's Building
White Swan Road
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PO1 2DT

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Marina Harris
Dental Academy
University of Portsmouth

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23 June 2016

FAVOURABLE ETHICAL OPINION – WITH CONDITIONS

Study Title: Do Dental Hygiene and Therapy students perceive stress as meaningful? - A qualitative study

Reference Number: SFEC 2016-052

Date Submitted: 14 June 2016

Thank you for submitting your clear and concise appilication to the Science Faculty Ethics Committee (SEFC) for ethical review in accordance with current procedures[1].

I am pleased to inform you that SFEC was content to grant a favourable ethical opinion of the above research on the basis described in the submitted documents listed at Annex A, and subject to standard general conditions (*See Annex B)*, and the following specific minor conditions.

Conditions

A. If you are visiting students in their homes a risk assessment needs to be carried out and appropriate control measures put in place to ensure your safety. UoP health & safety department can help with this.

B. The consent form, at point 6, for clarity should add (voice recorded) "and transcribed (a written version of the recording" or similar wording for clarity.

C. In the participant information sheet, please add the following to the benefits sections: "There are no direct benefits for yourself."

D. In the participant information sheet please confirm to the potential volunteers where the voucher can be used (*e.g.* Amazon voucher *etc.*)

If you would find it helpful to discuss any of the matters raised above or seek further clarification from a member of the Committee, you are welcome to contact ethics-sci@port.ac.uk who will circulate your queries to SFEC

Please note that the favourable opinion of SFEC does not grant permission or approval to undertake the research. Management permission or approval must be obtained from any

[1] Procedures for Ethical Review, Science Faculty Ethics Committee, University of Portsmouth, October 2012 (to be updated).

host organisation, including the University of Portsmouth or supervisor, prior to the start of the study.

Wishing you every success in your research

Dr Jim House
Vice-Chair Science Faculty Ethics Committee

Annexes

A - Documents reviewed
B - After ethical review - Guidance for researchers

Information:

Dr Clare Wilson - PhD Supervisor
Dr David Radford - PhD Supervisor
Holly Shawyer - Faculty Administrator

Statement of compliance

SFEC is constituted in accordance with the Governance Arrangements set out by the University of Portsmouth

After Ethical Review

If unfamiliar, please consult the advice After Ethical Review[2] which gives detailed guidance on reporting requirements for studies with a favourable opinion, including, notifying substantial amendments, notification of serious breaches of the protocol, progress reports and notifying SFEC of the end of the study.

Feedback

You are invited to give your view of the service that you have received from the Faculty Ethics Committee. If you wish to make your views known please contact the administrator at ethics-sci@port.ac.uk

ANNEX A **Documents reviewed**

The documents ethically reviewed for this application

Document	*Version*	*Date*
A - SFEC PROPOSAL - M. HARRIS - 8 JUNE 2016.docx	1	8 June 2016

ANNEX B - After ethical review - Guidance for researchers

1. This Annex sets out important guidance for researchers with a favourable opinion from a University of Portsmouth Ethics Committee. Please read the guidance carefully. A failure to follow the guidance could lead to the committee reviewing and possibly revoking its opinion on the research.

2. It is assumed that the research will commence within 1 year of the date of the favourable ethical opinion or the start date stated in the application, whichever is the latest.

3. The research must not commence until the researcher has obtained any necessary management permissions or approvals – this is particularly pertinent in cases of research hosted by external organisations. The appropriate head of department should be aware of a member of staff's research plans.

4. If it is proposed to extend the duration of the study beyond that stated in the application, the Ethics Committee must be informed.

5. If the research extends beyond a year then an annual progress report must be submitted to the Ethics Committee.

6. When the study has been completed the Ethics Committee must be notified.

7. Any proposed substantial amendments must be submitted to the Ethics Committee for review. A substantial amendment is any amendment to the terms of the application for ethical review, or to the protocol or other supporting documentation approved by the Committee that is likely to affect to a significant degree:

(a) the safety or physical or mental integrity of participants

(b) the scientific value of the study

(c) the conduct or management of the study.

7.1 A substantial amendment should not be implemented until a favourable ethical opinion has been given by the Committee.

8. Researchers are reminded of the University's commitments as stated in the Concordat to Support Research Integrity viz:

- maintaining the highest standards of rigour and integrity in all aspects of research
- ensuring that research is conducted according to appropriate ethical, legal and professional frameworks, obligations and standards
- supporting a research environment that is underpinned by a culture of integrity and based on good governance, best practice and support for the development of researchers
- using transparent, robust and fair processes to deal with allegations of research misconduct should they arise
- working together to strengthen the integrity of research and to reviewing progress regularly and openly

9. In ensuring that it meets these commitments the University has adopted the UKRIO Code of Practice for Research. Any breach of this code may be considered as misconduct and may be investigated following the University Procedure for the Investigation of Allegations of Misconduct in Research. Researchers are advised to use the UKRIO checklist as a simple guide to integrity.

Date: 8/6/16 **Version**: 1

Do Dental Hygiene and Therapy students perceive stress as meaningful? – A qualitative study

Participant Information Sheet

We would like to invite you to take part in our research study, looking at dental environment stress and psychological well-being in Dental Hygiene and Therapy students from the University of Portsmouth Dental Academy. Before you decide, we would like you to understand why the research is being done and what it would involve for you. Please talk to others about the study if you wish, and ask us if there is anything that is not clear.

Lead Researcher: Marina Harris

marina.harris@myport.ac.uk

What is the purpose of the study?
The purpose of the study is to gain a richer understanding of Dental Hygiene and Therapy students' psychological well-being, and their experience of stress in the dental undergraduate curriculum. This study is a follow-on from 2 previous studies, which have used on-line surveys to explore the same topic.

Why have I been invited?
You have been invited to take part as you provided your email address to be contacted for a follow-up interview after recently completing the on-line survey.

Do I have to take part?
It is up to you to decide to join the study. We will describe the study and go through this information sheet. If you agree to take part, we will then ask you to sign a consent form.
If you decide to take part and later change your mind, you can withdraw at any time. However, we will include the data we would have collected from you up to that point.

What will happen to me if I take part?
You will be asked to take part in a one-to-one interview with the researcher. The Interview will last up to 45 minutes, and will be audio recorded. The researcher will ask you about your experience of sources of stress in your undergraduate training, as well as your subjective experience of aspects of well-being. The researcher will arrange to conduct the interview in a room at the Academy, at a time that is convenient for you. If you no longer attend the Academy, the interview can be conducted at your home, if it is within reasonable travelling distance, or it can be done by telephone.

What are the possible disadvantages and risks of taking part?
You will be required to give up some of your time to be interviewed. There is a slight possibility that you may find the topic of discussing dental environment stress as distressing; whether this is the case or not, the researcher will provide details of UoP well-being services to all participants at the end of their interview.

What are the possible benefits of taking part?
There are no direct benefits for yourself. The aim of the study is to have a deeper understanding of Dental Hygiene and Therapy students' stress and psychological well-being. A clearer understanding of this important topic may help to enhance curriculum development for the benefit of current and future students who study in this discipline.

Will my taking part in the study be kept confidential?
All information discussed in the interview will be made anonymous and kept confidential. A unique code will be assigned to your data, and you will not be identified in any published articles or any other method of dissemination of the study results. You will have the opportunity to check the accuracy of data held about you, and correct any errors if you wish. All data will be stored electronically on a password-protected computer, and will only be looked at by the researcher and academic supervisors, who all have a duty of confidentiality to you as a research participant.

What if there is a problem?
If you have a concern about any aspect of this study, you can speak to, or email, the lead researcher Marina Harris: **marina.harris@myport.ac.uk**

If you remain unhappy and wish to make a formal complaint you can do this by contacting:
Mrs Leanna Wynne
Interim Director of School
University of Portsmouth Dental Academy
Tel:
Email: leanna.wynne@myport.ac.uk

What will happen to the results of the research study?
It is intended for the results of this study to be published in an academic journal and also to be presented at conference. Data from this study will also be retained and possibly used for future research that has been approved by a Research Ethics Committee.

Who is organising and funding the research?
This is an independent research study carried out as part of a PhD studentship sponsored by University of Portsmouth.

Will I be paid?
As an appreciation of their time, all participants will be given a £10 High Street voucher at the end of the interview.

Who has reviewed the study?
Research in the University of Portsmouth is looked at by independent group of people, called a Research Ethics Committee, to protect your interests. This study has been reviewed and given a favourable opinion by the Faculty of Science Research Ethics Committee.

What happens next?
The researcher will email you again to confirm if you still wish to go ahead with the study, and if so, she will arrange a convenient date and time for you, to conduct the interview.

Thank you for providing your contact details and taking the time to read this information sheet.

Appendix N INTERVIEW SCHEDULE

Interview Questions

Date: 8/6/16 **Version**: 1

SEMI STRUCTURED INTERVIEW QUESTIONS

Thank you so much for giving up your time to allow me to interview you; I do appreciate it. First, I just want to reassure you that there are absolutely no questions on the anatomy of the trigeminal nerve or the muscles of mastication!☺ What I am really interested in though, is your subjective account of psychological well-being, and in particular, how it has influenced your experience at the Academy, but also how your experience at the Academy has in turn, influenced your psychological well-being.

Motivation

Why did you choose to study Dental Hygiene and Therapy?

What have you learnt about yourself whilst doing the degree?

What aspects of the course makes you really feel like you want to get out of bed each morning?

Environmental Mastery

Apart from the compulsory timetabled curriculum, what other opportunities have you taken to help you with any aspect of your course?

Prompt: optional skills lab sessions/optional tutorials/part of small study group/used buddy system

Goals

We know that one of your main goals is to qualify as DHDT, what short-term goals have you set to achieve this?

Prompt: are there any specific skills you would like to master? Are there particular subjects that you want to learn more about for your own interest or enjoyment?

What other short-term or long-term goals do you have in any other areas of your life?

What plans do you have in place to help you achieve these goals?

We all fail to get all of our goals sometimes. What do you do when that happens to you?

Prompt: do you try a different strategy to achieve it? Do you just give up? Do you recognise that it was not a realistic goal? Do you replace it with another goal? Do you beat yourself up about it?

When thinking about pursuing your own goals, what are some of the other considerations you think about?

Prompt: would you pursue a goal that went against your own values?

Stressors: Confidence in course

Receiving feedback can be a bit daunting. How do you deal with being observed and graded for your performance with each patient you have treated?

Stressors: Tutor feedback

In what ways do you utilise the tutor feedback that you get after each patient you treat on clinic?

How do you handle the different clinical opinions about patient management from the different tutors?

Prompt: how do you benefit from different people's points of view?

Stressors: Grades

How would you deal with it if you didn't achieve the grade you were expecting – for example in an exam, or a procedure on clinic?

What would be an example of occasions when you have shared a disappointing result of an exam or clinical procedure with somebody else? Or has anybody shared theirs with you?

Prompt: are there people that you know you can trust and they can trust you?

Coping with stress

What physical symptoms of stress have you experienced that affected your performance in a positive way?

Prompt: did you use the stressful situation to enhance your performance?

Meaning

Just thinking back to the exams you have recently taken, what particular meaning did the exams have for you personally?

Prompt: were the exams any of the goals you were pursuing? Were the exams a way to confirm your underpinning knowledge for the benefit of patient safety?

Challenge

What are the ways in which you have used written exams or clinical observations as a challenge to yourself?

End of interview.

Science Faculty Ethics Committee
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ethics-sci@port.ac.uk

Marina Harris
Dental Academy
University of Portsmouth

Marina.harris@myport.ac.uk

9 November 2015

FAVOURABLE ETHICAL OPINION – WITH CONDITION

Study Title: Exploring stress and well-being among dental hygiene-therapy students
Reference Number: SFEC 2015-078
Date Resubmitted: 4 November 2015

Thank you for resubmitting your application to the Science Faculty Ethics Committee (SEFC) for ethical review in accordance with current procedures[1].

I am pleased to inform you that SFEC was content to grant a favourable ethical opinion of the above research on the basis described in the submitted documents listed at Annex A, subject to the minor condition below and subject to standard general conditions (*See Annex B*).

Condition - In the Participant Information Sheet, where you mention that the data will be confidential and anonymous, please remove the reference to "confidential". By definition, data can only be confidential, or have a requirement for confidentiality, if the source (in this case participant) can be identified from the information. As you are collecting the data anonymously, this is not the case. It is a very specific point, which is often confused. Have a look at this link for an explanation: http://gradnyc.com/wp-content/uploads/2012/08/GNYC_Academy_Workshop-3_Confidentiality.pdf

Please note that the favourable opinion of SFEC does not grant permission or approval to undertake the research. Management permission or approval must be obtained from any host organisation, including the University of Portsmouth or supervisor, prior to the start of the study.

Wishing you every success in your research

Dr Jim House
Vice-Chair Science Faculty Ethics Committee

[1] Procedures for Ethical Review, Science Faculty Ethics Committee, University of Portsmouth, October 2012 (to be updated).

Annexes

A - Documents reviewed
B - After ethical review - Guidance for researchers

Information:

Dr Clare Wilson - PhD 1st Supervisor
Dr David Radford - PhD Supervisor
Holly Shawyer - Faculty Administrator

Statement of compliance
SFEC is constituted in accordance with the Governance Arrangements set out by the University of Portsmouth

After Ethical Review
If unfamiliar, please consult the advice After Ethical Review (Annex B) which gives detailed guidance on reporting requirements for studies with a favourable opinion, including, notifying substantial amendments, notification of serious breaches of the protocol, progress reports and notifying SFEC of the end of the study.

Feedback
You are invited to give your view of the service that you have received from the Faculty Ethics Committee. If you wish to make your views known please contact the administrator at ethics-sci@port.ac.uk

ANNEX A **Documents reviewed**

The documents ethically reviewed for this application (SFEC 2015-078)

Document	*Version*	*Date*
C- Responses to Ethical review questions.docx	n/a	4 November 2015
D- SFEC Combined Protocl and Ethical Application Form - version 2 after SFEC recommendations.docx	2	4 November 2015

ANNEX B - After ethical review - Guidance for researchers

1. This Annex sets out important guidance for researchers with a favourable opinion from a University of Portsmouth Ethics Committee. Please read the guidance carefully. A failure to follow the guidance could lead to the committee reviewing and possibly revoking its opinion on the research.

2. It is assumed that the research will commence within 3 months of the date of the favourable ethical opinion or the start date stated in the application, whichever is the latest.

3. The research must not commence until the researcher has obtained any necessary management permissions or approvals – this is particularly pertinent in cases of research hosted by external organisations. The appropriate head of department should be aware of a member of staff's research plans.

4. If it is proposed to extend the duration of the study beyond that stated in the application, the Ethics Committee must be informed.

5. If the research extends beyond a year then an annual progress report must be submitted to the Ethics Committee.

6. When the study has been completed the Ethics Committee must be notified.

7. Any proposed substantial amendments must be submitted to the Ethics Committee for review. A substantial amendment is any amendment to the terms of the application for ethical review, or to the protocol or other supporting documentation approved by the Committee that is likely to affect to a significant degree:

(a) the safety or physical or mental integrity of participants

(b) the scientific value of the study

(c) the conduct or management of the study.

7.1 A substantial amendment should not be implemented until a favourable ethical opinion has been given by the Committee.

8. Researchers are reminded of the University's commitments as stated in the Concordat to Support Research Integrity viz:

- maintaining the highest standards of rigour and integrity in all aspects of research
- ensuring that research is conducted according to appropriate ethical, legal and professional frameworks, obligations and standards
- supporting a research environment that is underpinned by a culture of integrity and based on good governance, best practice and support for the development of researchers
- using transparent, robust and fair processes to deal with allegations of research misconduct should they arise
- working together to strengthen the integrity of research and to reviewing progress regularly and openly

9. In ensuring that it meets these commitments the University has adopted the UKRIO Code of Practice for Research. Any breach of this code may be considered as misconduct and may be investigated following the University Procedure for the Investigation of

Allegations of Misconduct in Research. Researchers are advised to use the UKRIO checklist as a simple guide to integrity.

Appendix P SFEC 2017-019 ETHICAL APPROVAL

Science Faculty Ethics Committee
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Ms Marina Harris
University of Portsmouth Dental Academy
University of Portsmouth

Marina.Harris@port.ac.uk

08 March 2017

FAVOURABLE ETHICAL OPINION – FOLLOWING RESUBMISSION

Study Title: Evaluating a training workshop to raise conscious awareness of the relationship between stress, self-compassion, and meaning.
Reference Number: SFEC 2017-019
Date Resubmitted: 07 March 2017

Thank you for resubmitting your application to the Science Faculty Ethics Committee (SEFC) for ethical review in accordance with current procedures, for making the requested changes following the first SFEC review, and for the clarifications provided.

I am pleased to inform you that SFEC was content to grant a favourable ethical opinion of the above research on the basis described in the submitted documents listed at Annex A, and subject to standard general conditions (*See Annex B*).

Please note that the favourable opinion of SFEC does not grant permission or approval to undertake the research. Management permission or approval must be obtained from any host organisation, including the University of Portsmouth or supervisor, prior to the start of the study.

Wishing you every success in your research

Dr John Crossland
Vice Chair, Science Faculty Ethics Committee

Annexes

A - Documents reviewed
B - After ethical review - Guidance for researchers

Information:

Dr Clare Wilson - PhD Supervisor
Dr David Radford - PhD Supervisor

Holly Shawyer - Faculty Administrator

Statement of compliance

SFEC is constituted in accordance with the Governance Arrangements set out by the University of Portsmouth

After Ethical Review

If unfamiliar, please consult the advice After Ethical Review (Annex B), which gives detailed guidance on reporting requirements for studies with a favourable opinion, including, notifying substantial amendments, notification of serious breaches of the protocol, progress reports and notifying SFEC of the end of the study.

Feedback

You are invited to give your view of the service that you have received from the Science Faculty Ethics Committee. If you wish to make your views known please contact the administrator at ethics-sci@port.ac.uk

ANNEX A **Documents reviewed**

The documents ethically reviewed for this application

Document	*Version*	*Date*
A-2017-019 HARRIS PI Submission Email - STUDY PROPOSAL FOR ETHICAL REVIEW		9 Feb 2017
B-2017-019 HARRIS STUDY 4 PROPOSAL	V1	9 Feb 2017
C-2017-019 HARRIS - Questions Following Ethical Review		24 Feb 2017
D-2017-019 HARRIS PI Re-submission Email - Re# Question's Following Ethical Review		07 Mar 2017
E-2017-019 HARRIS Response letter to SFEC		07 Mar 2017
F-2017-019 HARRIS STUDY 4 PROPOSAL- version 2	V2	07 Mar 2017

ANNEX B - After ethical review - Guidance for researchers

1. This Annex sets out important guidance for researchers with a favourable opinion from a University of Portsmouth Ethics Committee. Please read the guidance carefully. A failure to follow the guidance could lead to the committee reviewing and possibly revoking its opinion on the research.

2. It is assumed that the research will commence within 1 year of the date of the favourable ethical opinion or the start date stated in the application, whichever is the latest.

3. The research must not commence until the researcher has obtained any necessary management permissions or approvals – this is particularly pertinent in cases of research hosted by external organisations. The appropriate head of department should be aware of a member of staff's research plans.

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(b) the scientific value of the study
(c) the conduct or management of the study.

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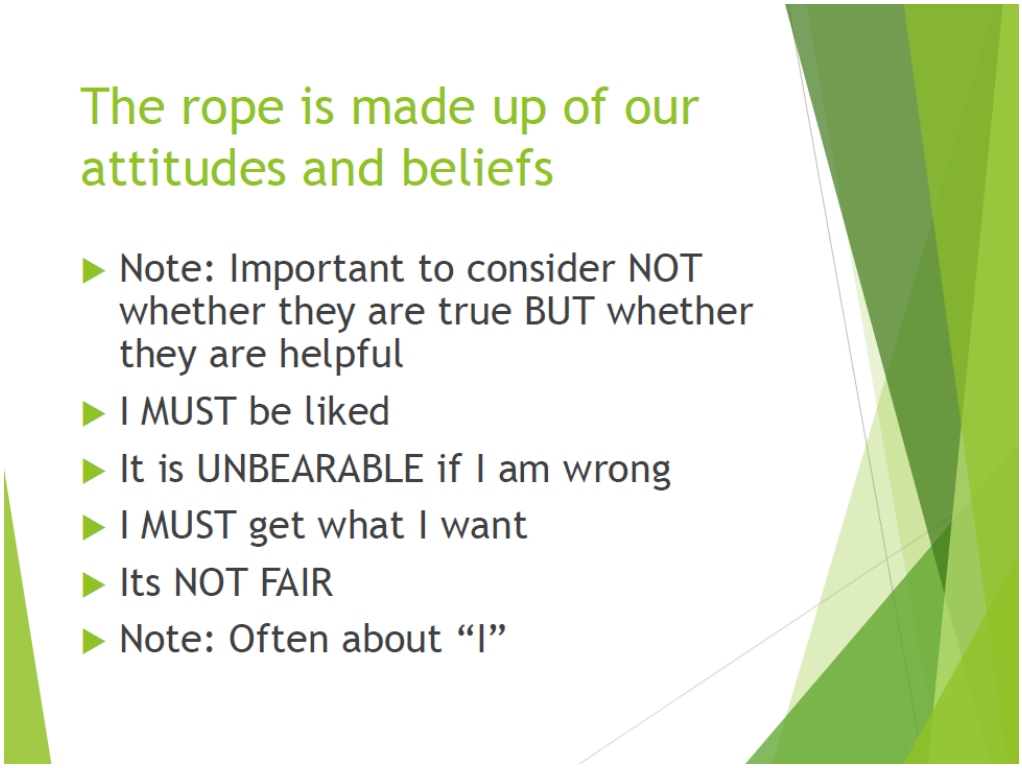
Appendix Q WORKSHOP CONTENT SAMPLES

Slide 1

Slide 2



Slide 3

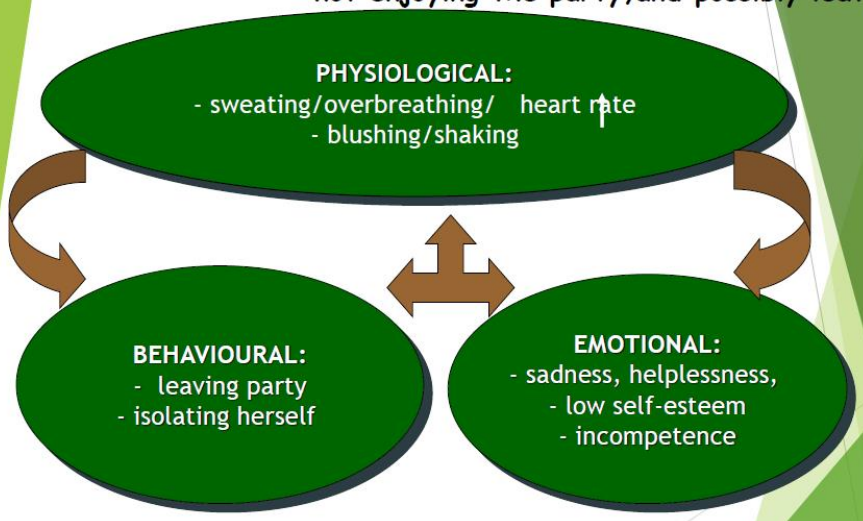
THINKING ERRORS (definitions)

- **Jumping to negative conclusions (e.g. Mind reading)**
  - a tendency to guess what people are thinking & assuming they think negative things about you
- **Catastrophising**
  - guessing how things turn out and assuming the worst outcome
- **Exaggerating/use of absolutes**
  - a tendency to exaggerate how bad/negative things are
- **Overgeneralising**
  - seeing a single negative event as a never ending pattern of defeat
- **Mental filtering**
  - focusing on negative qualities/ events and ignoring positive qualities/events
- **Unrealistic expectations**
  - setting too high standards for yourself whilst not expecting the same standard from others
- **Self-blame**
  - blaming yourself for something that is not really your fault
- **Arguing *Ad hominem***
  - attacking your opponent rather than opponent's argument
- **Black & White thinking**
  - thinking in extremes, forgetting many shades of gray in between
- **Egocentric error**
  - concluding that because you are the centre of your world, you are the centre of everyone else's world.

Slide 4

Possible Outcome following IRRATIONAL thoughts:

not enjoying the party, and possibly leaving



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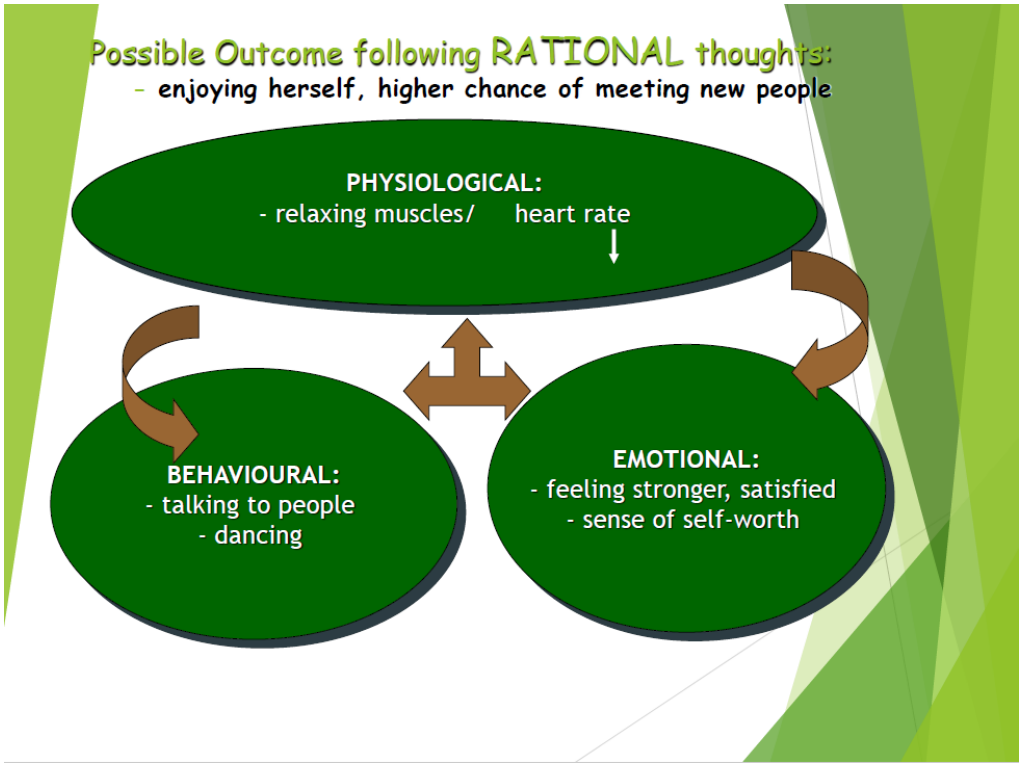


Slide 6

Thus, best to ask: Is this thought enhancing my life, ie, is it helpful?

- Often thoughts/ goals focused on OUTCOMES (I must get a first for my degree) are not as helpful as thoughts/goals focused on PROCESS (I can enjoy learning about this today)
- Often thoughts focused on the SELF (I am worthless, I shouldn't have gotten that wrong) are not as helpful as thoughts focused on my BEHAVIOUR (I made the mistake, I can learn not to do that next time, but the mistake isn't about me)
- Thus, the most toxic mix is thoughts that combine outcomes and are pinned to the self (If I don't get a first, everyone will know I am worthless and I didn't deserve to go to university at all!)
- And this toxic mix often leads to STRESS

Slide 7

Definition of Stress

Stress is experienced when one **appraises** the **stressor** as **exceeding** one's **coping** abilities, ie, the demand is seen as greater than one's personal resources.

Slide 8

Physical Reactions to Stress

- Increased adrenaline interferes with clear judgements results in seeing everything as a THREAT rather than as a challenge to be sorted - narrow focus
- Adrenaline quick
- If stress continues

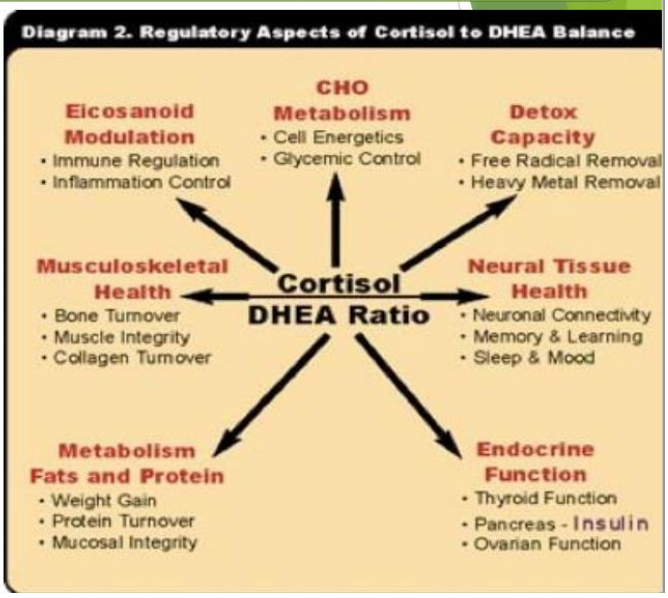
Cortisol is released

- Once released, depress immunity for up to 8 hours

Slide 9

Physical Reactions to Stress

- DHEA and Cortisol have an inverse relationship - as one increases, the other decreases. The ratio (higher DHEA) indicates health or illness



Slide 10

The stress paradox

- A poll of 125,000 people from 121 different countries in 2005 to 2006
- Worldwide 33% of the population said they had felt a great deal of stress the previous day.
- In the US it was 43%, 67% in the Philippines and only 5% in Mauritania.
- The nation's stress index was positively correlated with the nation's well-being, life expectancy and GDP, life satisfaction and happiness scores (Ng, Diener, Aurora, & Harter, 2009).

Slide 11

Stress is related to meaning

- 2013 - US adults, aged 18-78, asked to rate how much they felt their lives were meaningful (Baumeister, Vohs, Aaker, & Garbinsky, 2013).
- Every measure of stress predicted a greater sense of meaning in life - consequence of engaging in roles and pursuing goals that feed our sense of purpose.
- The biggest sources of stress reported are work, parenting, personal relationships, caregiving and health (American Psychological Association, 2014, February 11).
- Feeling stressed can act as gauge for engagement in personally meaningful activities and relationships; people are happier when they are busier (Hsee, Yang, & Wang, 2010).

Slide 12

How we talk about stress matters

(Krasner, Epstein, Beckman, Suchman, Chapman, Mooney, & Quill, 2009)

- The way stress is discussed often does not support well-being;
  - complaining about stress reinforces the fantasy of a stress-free life,
  - venting about stress reduces the ability to reflect on what could be learnt from it, and
  - suffering in silence avoids the vulnerability that comes with honest discussions and seeking social support.

Slide 13

Threat v Challenge Response

- During a **challenge** response blood vessels relaxed, and the heart beat is not only faster to increase blood flow and energy.
- Emotions include anxiety, excitement, energised, enthusiasm and confidence. The primary goal is goal pursuit & so attention is more open and ready to engage with the environment.
- The brain's prefrontal cortex suppresses fear and **increases DHEA** (van Wingen, Geuze, Vermetten, & Fernández, 2011).
- Those who show the CHALLENGE response to stress are less likely to be diagnosed with metabolic syndrome (Yancura, Aldwin, Levenson, & Spiro, 2006) and showed a greater brain volume across the life span (Jefferson, Himali, Beiser, Au, Massaro, Seshadri, & Gona, 2010)

Slide 14

How to get a challenge response:

- Focus on your resources, include:
- acknowledging **personal strengths**,
- thinking about preparations for a particular challenge,
- remembering times **similar challenges were overcome,**
- imagining **loved ones' support.**

(Shnabel, Purdie-Vaughns, Cook, Garcia, & Cohen, 2013).

Slide 15

Meaning and values

Dr Clare Wilson

Slide 16

Levels of Meaning

- Meaning can have multiple levels.
- Low levels of meaning are short-term and immediate whereas high levels of meaning invoke long-term perspectives (Vallacher &. Wegner, 1985).
- High-level meanings are built up by combining low-level meanings, and these integrative meanings are called constructs.

Slide 17

Values

- ‘A value is an enduring belief that some goals are preferable to others’ (Peterson,2006, pg 170)

Slide 18

Values give you life direction

Ideals

- Values are ideals, they often cannot be obtained or completed.
- For example, If you value ‘learning new things’, there will not be a point in the future where you have learnt ALL the new things there are to learn.

Slide 19

Values - Goals - Behavior

- Values give consistency to behavior (unless you have no idea what you value)
- Values help you know what to and not to make time for (how did you spend last week…however you chose to spend you time is an example of what you valued)
- Values establish a relationship between you and the world (because it is relates to what you do in the world)
- Values set the direction for one's life.

Slide 20

Values and Stress

- Keough, & Markus,1998 study of Stanford students' three week winter break journals
- Group 1: wrote about their most important values and how their daily activities related to those values.
- Group 2: wrote about good things that happened to them.
- Group 1 had experienced fewer illnesses and health problems, were more confident in their abilities to handle stress, and **effects were greatest** for those who had **experienced most stress** over the break.
- Writing about values helped the students to see the meaning in their lives; stressful experiences were no longer hassles but an expression of the students' values.
- The power of writing about values is how it transforms the way stressful experiences are thought about and the ability to cope with them (increases the likelihood of believing that situations can be improved through effort and social support, rather than avoidance or denial strategies).

Slide 21

Human Strengths

- A **strength** can be defined as a capacity for feeling, thinking, and behaving in a way that allows optimal functioning in the **pursuit of valued outcomes.**

Slide 22

Human Strengths

- These virtues are thought to emerge across cultures and throughout time
- The VIA-IS was designed to describe individual differences in character strengths on a continuum and is sensitive to change.
- Research has shown that people who actively practice their strengths have significantly higher wellbeing, less mental health problems and are more resilient.
- (it is also now a therapy for prisoners)

Slide 23

Take the Values in Action

- Why not take the Values in Action questionnaire online (it is free but you do need to register), which will tell you what you top 5 values are.
- https://www.viacharacter.org/survey/account/register
- Where they what you expected? Any surprises?
- Think of at least five ways you can consciously increase the use of those values in your life.

Slide 24

Taking More Action

- In the next few days we will email you a link to an online workbook that will allow you to play with some of these ideas and more.
- You do NOT have to do any of them if you don't want to
- BUT we would love you to have a play.
- You can also (hopefully) download the work book if you would prefer.

Slide 25

In Summary,

- How we think about things and the meanings we give things can help us to feel good about our lives, OR very distressed about our lives when experiencing the same events.
- Thus, we can choose wellbeing to some extent by using our values, meanings and rational (functional) thoughts to help turn stressful events into more meaningful challenging events.
- However, this is ONLY the case for irrational-based thinking causing stress.

Which imperfections make you feel inadequate?

Everybody has something about themselves that they don't like; something that causes them to feel shame, to feel insecure, or not "good enough." It is the human condition to be imperfect, and feelings of failure and inadequacy are part of the experience of living a human life. Try writing about an issue you have that tends to make you feel inadequate or bad about yourself (physical appearance, work or relationship issues…) What emotions come up for you when you think about this aspect of yourself? Try to just feel your emotions exactly as they are – no more, no less – and then write about them.

Write a letter to yourself from the perspective of an unconditionally loving imaginary friend:

Now think about an imaginary friend who is unconditionally loving, accepting, kind and compassionate. Imagine that this friend can see all your strengths and all your weaknesses, including the aspect of yourself you have just been writing about. Reflect upon what this friend feels towards you, and how you are loved and accepted exactly as you are, with all your very human imperfections. This friend recognizes the limits of human nature, and is kind and forgiving towards you. In his/her great wisdom this friend understands your life history and the millions of things that have happened in your life to create you as you are in this moment. Your particular inadequacy is connected to so many things you didn't necessarily choose: your genes, your family history, life circumstances – things that were outside of your control.

Write a letter to yourself from the perspective of this imaginary friend – focusing on the perceived inadequacy you tend to judge yourself for. What would this friend say to you about your "flaw" from the perspective of unlimited compassion? How would this friend convey the deep compassion he/she feels for you, especially for the pain you feel when you judge yourself so harshly? What would this friend write in order to remind you that you are only human, that all people have both strengths and weaknesses? And if you think this friend would suggest possible changes you should make, how would these suggestions embody feelings of unconditional understanding and compassion? As you write to yourself from the perspective of this imaginary friend, try to infuse your letter with a strong sense of his/her acceptance, kindness, caring, and desire for your health and happiness.

Feel the compassion as it soothes and comforts you:

After writing the letter, breath out. Then read it again, really letting the words sink in. Feel the compassion as it pours into you, soothing and comforting you like a cool breeze on a hot day. Love, connection and acceptance are your birthright. To claim them you need only look within yourself

Appendix S VIA-IS CLASSIFICATION

The VIA-IS Classification of Character Strengths

1. Wisdom and Knowledge – Cognitive strengths that entail the acquisition and use of knowledge
2. Courage – Emotional strengths that involve the exercise of will to accomplish goals in the face of opposition, external or internal
3. Humanity - Interpersonal strengths that involve tending and befriending others
4. Justice - Civic strengths that underlie healthy community life
5. Temperance – Strengths that protect against excess
6. Transcendence - Strengths that forge connections to the larger universe and provide meaning

For full details see http://www.viacharacter.org

Stress Mindset Measure–General (SMM-G)

Please rate the extent to which you agree or disagree with the following statements. For each question choose from the following alternatives:

0 Strongly Disagree
1 Disagree
2 Neither Agree nor Disagree
3 Agree
4 Strongly Agree

1. The effects of stress are negative and should be avoided.
2. Experiencing stress facilitates my learning and growth.
3. Experiencing stress depletes my health and vitality.
4. Experiencing stress enhances my performance and productivity.
5. Experiencing stress inhibits my learning and growth.
6. Experiencing stress improves my health and vitality.
7. Experiencing stress debilitates my performance and productivity.
8. The effects of stress are positive and should be utilized.

Appendix U SELF COMPASSION SCALE (SC)

HOW I TYPICALLY ACT TOWARDS MYSELF IN DIFFICULT TIMES
Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner, using the following scale:

Almost never				**Almost always**
1	**2**	**3**	**4**	**5**

1. I'm disapproving and judgmental about my own flaws and inadequacies
2. When I'm feeling down I tend to obsess and fixate on everything that's wrong.
3. When things are going badly for me, I see the difficulties as part of life that everyone goes through.
4. When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world.
5. I try to be loving towards myself when I'm feeling emotional pain.
6. When I fail at something important to me I become consumed by feelings of inadequacy
7. When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am.
8. When times are really difficult, I tend to be tough on myself.
9. When something upsets me I try to keep my emotions in balance.
10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.
11. I'm intolerant and impatient towards those aspects of my personality I don't like.
12. When I'm going through a very hard time, I give myself the caring and tenderness I need.
13. When I'm feeling down, I tend to feel like most other people are probably happier than I am.

14. When something painful happens I try to take a balanced view of the situation.
15. I try to see my failings as part of the human condition.
16. When I see aspects of myself that I don’t like, I get down on myself.
17. When I fail at something important to me I try to keep things in perspective.
18. When I’m really struggling, I tend to feel like other people must be having an easier time of it.
19. I’m kind to myself when I’m experiencing suffering.
20. When something upsets me I get carried away with my feelings.
21. I can be a bit cold-hearted towards myself when I'm experiencing suffering.
22. When I'm feeling down I try to approach my feelings with curiosity and openness.
23. I’m tolerant of my own flaws and inadequacies.
24. When something painful happens I tend to blow the incident out of proportion.
25. When I fail at something that's important to me, I tend to feel alone in my failure.
26. I try to be understanding and patient towards those aspects of my personality I don't like.

Appendix V UNDERSTANDING SELF SCALE (USS)

	Not at all true	A very little bit true	A little true	Partially true	Somewhat true	Mostly true	Completely true
1 - I find it difficult to hear criticism of my work, because I feel they are criticising me	1	2	3	4	5	6	7
2 – I tend to be very critical of myself when I make mistakes when learning something new	1	2	3	4	5	6	7
3 – I try to avoid conflict, even when I know I am right, as I am uncomfortable with people being negative towards me	1	2	3	4	5	6	7
4 – I tend to take comments personally, even when they are not meant that way	1	2	3	4	5	6	7
5 – I'm afraid that I will say or do something that will make me look stupid	1	2	3	4	5	6	7
6 – My self-worth is affected by how well I do when I am competing with others	1	2	3	4	5	6	7
7 – I think it reflects badly on me when things I have planned don't turn out the way I expect them to	1	2	3	4	5	6	7
8 – I prefer to keep it to myself when I am unsure what to do, rather than ask for help and have others	1	2	3	4	5	6	7

know I don't understand							
9 – I know when people criticise my work, it is about my work and not about me	1	2	3	4	5	6	7
10 – When I am learning something new, I am fine making errors as that is part of learning	1	2	3	4	5	6	7
11- I can face conflict when I argue with others about ideas, as I know it is about the ideas and not about me	1	2	3	4	5	6	7
12 – If people make comments about what I have done, I thank them and don't take it personally	1	2	3	4	5	6	7
13 – I am happy to ask or do things that may be stupid, as it helps me learn what is stupid and what isn't	1	2	3	4	5	6	7
14 – I am happy to compete with others, but don't really care if I come first or last	1	2	3	4	5	6	7
15 – Often things I have planned do not work out as I expected, but that is to be expected as I can't predict the future	1	2	3	4	5	6	7
16 – I prefer to ask for help when I need it, as then I have more time to learn what needs to be done	1	2	3	4	5	6	7

Appendix W SENSE OF COHERENCE SCALE (SOC-29)

	1	2	3	4	5	6	7
1. When you talk to people, do you have the feeling that they don't understand you?	Never						Always have this feeling
2. In the past, when you had to do something which depended upon cooperation with others, did you have the feeling that it:	Surely wouldn't get done						Surely would get done
3.Think of the people with whom you come into contact daily, aside from the ones to whom you feel closest. How well do you know most of them?	You feel that they are strangers						You know them very well
4. Do you have the feeling that you don't really care about what goes on around you?	Very seldom or never						Very often
5. Has it happened in the past that you were surprised by the behaviour of people whom you thought you knew well?	Never happened						Always happened
6. Has it happened that people whom you counted on disappointed you?	Never happened						Always happened
7. Life is:	Full of interest						Completely routine
8. Until now your life has had:	No clear goals or purpose at all						Very clear goals and purpose
9. Do you have the feeling that you're being treated unfairly?	Very often						Very seldom or never
10. In the past ten years your life has been:	Full of changes without your knowing what will happen next						Completely consistent and clear
11. Most of the things you do in the future will probably be:	Completely fascinating						Deadly boring
12. Do you have the feeling that you are in an unfamiliar situation and don't know what to do?	Very often						Very seldom or never

13. What best describes how you see life:	One can always find a solution to painful things in life						There is no solution to painful things in life
14. When you think about your life, you very often:	Feel how good it is to be alive						Ask yourself why you exist at all
15. When you face a difficult problem, the choice of a solution is:	Always confusing and hard to find						Always completely clear
16. Doing the things you do every day is:	A source of deep pleasure and satisfaction						A source of pain and boredom
17. Your life in the future will probably be:	Full of changes without knowing what will happen next						Completely consistent and clear
18. When something unpleasant happened in the past your tendency was:	"To eat yourself up" about it						To say "ok that's that, I have to live with it" and go on
19. Do you have very mixed-up feelings and ideas?	Very often						Very seldom or never
20. When you do something that gives you a good feeling:	It's certain that you'll go on feeling good						It's certain that something will happen to spoil the feeling
21. Does it happen that you have feelings inside you would rather not feel?	Very often						Very seldom or never
22. You anticipate that your personal life in the future will be:	Totally without meaning or purpose						Full of meaning and purpose
23. Do you think that there will always be people whom you'll be able to count on in the future?	You're certain there will be						You doubt there will be
24. Does it happen that you have the feeling that you don't know exactly what's about to happen?	Very often						Very seldom or never
25. Many people – even those with a strong character – sometimes feel like sad sacks (losers) in certain situations. How	Never						Very often

often have you felt this way in the past?							
26. When something happened, have you generally found that:	You overestimated or underestimated its importance						You saw things in the right proportion
27. When you think of the difficulties you are likely to face in important aspects of your life, do you have the feeling that:	You will always succeed in overcoming the difficulties						You won't succeed in overcoming the difficulties
28. How often do you have the feeling that there's little meaning in the things you do in your daily life?	Very often						Very seldom or never
29. How often do you have feelings that you're not sure you can keep under control?	Very often						Very seldom or never

Appendix X UPR16 FORM

FORM UPR16

Research Ethics Review Checklist

University of Portsmouth

Please include this completed form as an appendix to your thesis (see the Postgraduate Research Student Handbook for more information

Postgraduate Research Student (PGRS) Information				Student ID:	448245
PGRS Name:	Marina Harris				
Department:	UPDA	First Supervisor:	Dr Clare Wilson		
Start Date: (or progression date for Prof Doc students)		1 February 2015			
Study Mode and Route:	Part-time ☐ Full-time ☒	MPhil ☐ PhD ☐	MD ☐ Professional Doctorate ☐		

Title of Thesis:	Dental Hygiene and Therapy students experiences of psychological wellbeing in their undergraduate education
Thesis Word Count: (excluding ancillary data)	34,859

If you are unsure about any of the following, please contact the local representative on your Faculty Ethics Committee for advice. Please note that it is your responsibility to follow the University's Ethics Policy and any relevant University, academic or professional guidelines in the conduct of your study

Although the Ethics Committee may have given your study a favourable opinion, the final responsibility for the ethical conduct of this work lies with the researcher(s).

UKRIO Finished Research Checklist: (If you would like to know more about the checklist, please see your Faculty or Departmental Ethics Committee rep or see the online version of the full checklist at: http://www.ukrio.org/what-we-do/code-of-practice-for-research/)	
a) Have all of your research and findings been reported accurately, honestly and within a reasonable time frame?	YES ☒ NO ☐
b) Have all contributions to knowledge been acknowledged?	YES ☒ NO ☐
c) Have you complied with all agreements relating to intellectual property, publication and authorship?	YES ☒ NO ☐
d) Has your research data been retained in a secure and accessible form and will it remain so for the required duration?	YES ☒ NO ☐
e) Does your research comply with all legal, ethical, and contractual requirements?	YES ☒ NO ☐

Candidate Statement:	
I have considered the ethical dimensions of the above named research project, and have successfully obtained the necessary ethical approval(s)	
Ethical review number(s) from Faculty Ethics Committee (or from NRES/SCREC):	E298 SFEC 2015 - 078 SFEC 2016 - 052 SFEC 2017 - 019
If you have *not* submitted your work for ethical review, and/or you have answered 'No' to one or more of questions a) to e), please explain below why this is so:	

UPR16 – August 2015

Signed *(PGRS)*:	M Harris	**Date:** 25 January 2018