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An Exploration of Early Childhood Education Students' Knowledge and Preparation to Facilitate Physical Activity for Preschoolers

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Graduate Program in Health and Rehabilitation Sciences
A thesis submitted in partial fulfillment of the requirements for the degree in Master of Science
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AN EXPLORATION OF EARLY CHILDHOOD EDUCATION STUDENTS' KNOWLEDGE
AND PREPARATION TO FACILITATE PHYSICAL ACTIVITY FOR PRESCHOOLERS

(Thesis format: Monograph)

by

Olivia J.M. Martyniuk

Graduate Program in Health and Rehabilitation Sciences

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science

The School of Graduate and Postdoctoral Studies
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Abstract and Keywords

Early childhood educators play an important role in influencing preschoolers' physical activity levels. The current study sought to explore Early Childhood Education (ECE) students' physical activity (PA)-related knowledge and educational experience. A total of 1,113 ECE students from 20 Ontario Colleges completed the study survey (online or on paper), which examined students' PA course content; awareness of PA guidelines; understanding of health-related benefits of PA; self-efficacy to facilitate PA for preschoolers; as well as PA resource needs. Survey results identified that 72.1% of ECE students had not completed any PA/physical education specific courses, while only 28.7% were familiar with, and 2.0% accurately reported, the Canadian PA Guidelines for the Early Years. ECE students' mean self-efficacy to facilitate PA ranged from 6.0-7.0 (out of 10.0). The results indicate that the current ECE college curriculum represents an excellent opportunity to provide future childcare providers with enriched PA-related training and support.

Keywords: physical activity, early childhood education, early childhood education students, training, preschool-aged children

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Table of Contents

| | |
|---|-----|
| Abstract and Keywords..... | ii |
| Acknowledgements..... | iii |
| Table of Contents..... | iv |
| List of Tables | vii |
| List of Appendices | vii |
| Chapter 1: Introduction & Literature Review..... | 1 |
| Intervening in the Early Learning Environment..... | 4 |
| The Role of Early Childhood Educators..... | 7 |
| Early Childhood Education Training at the College Level..... | 10 |
| Exploring ECE Students’ Physical Activity Training: Grounded within a Theoretical Health Promotion Model | 13 |
| Purpose of this Study | 14 |
| Chapter 2: Method | 17 |
| Study Design and Procedures | 17 |
| Recruitment and data collection..... | 17 |
| Paper surveys | 18 |
| Online surveys | 18 |
| Participants..... | 19 |
| Inclusion criteria | 19 |
| Sample size | 19 |
| Instruments and Tools..... | 19 |
| Data Analysis | 21 |
| Chapter 3: Results..... | 22 |

| | |
|---|----|
| Descriptive Statistics..... | 22 |
| Participant demographics..... | 22 |
| Participant’s physical activity experiences | 23 |
| Physical activity-related education and training | 23 |
| ECE students’ views on the influences of preschoolers’ physical activity..... | 27 |
| ECE students’ self-efficacy to instruct and facilitate physical activity for preschoolers | 30 |
| Chapter 4: Discussion | 37 |
| Summary and Future Implications..... | 46 |
| References..... | 50 |
| Appendices..... | 72 |
| Curriculum Vitae | 95 |

List of Tables

| Table # | Description | Page |
|---------|---|------|
| 1 | Early Childhood Education Students' Demographic Information and Physical Activity Experience ($n = 1,113$) | 24 |
| 2 | Physical Activity Course Content During Mandatory and/or Elective Early Childhood Education Course Lessons | 26 |
| 3 | Early Childhood Education Students' Familiarity with Physical Activity-Related Documents and Perception of Preschoolers' Meeting Physical Activity Guidelines | 28 |
| 4 | Early Childhood Education Students' Estimate of Physical Activity and Sedentary Behaviour Guidelines for the Early Years | 29 |
| 5 | Means (M) and Standard Deviations (SD) of Early Childhood Education Students' Self-Efficacy to Facilitate and Instruct Physical Activity for Preschoolers | 30 |
| 6 | Comparing Early Childhood Students' Self-Efficacy Based on the Number of Physical Activity/Education Courses Completed | 32 |
| 7 | Comparing Early Childhood Education Students' Self-Efficacy Based on Students' Meeting the Canadian Physical Activity Guidelines | 33 |
| 8 | Early Childhood Education Students' Reports of Additional Knowledge or Resources They Would Find Beneficial to Facilitate Physical Activity in Preschoolers | 35 |

List of Appendices

| Appendix | Title | Page |
|----------|--|------|
| A | The University of Western Ontario Health Sciences Research Ethics Board Approval | 72 |
| B | Invitation Email to Early Childhood Education Program Coordinators and/or Dean/Chair of Program | 73 |
| C | Letter of Information - Paper Version | 74 |
| D | Invitation Email to Early Childhood Education Students | 76 |
| E | Letter of Information - Online Version | 77 |
| F | An Exploration of Early Childhood Education Students' Physical Activity-Related Knowledge and Preparation Survey | 79 |
| G | Reminder Email to Early Childhood Education Students | 84 |
| H | Box Plots | 85 |
| I | Curriculum Vitae | 95 |

Chapter 1: Introduction & Literature Review

Physical activity is a modifiable lifestyle behaviour linked with healthy body weight (Jago, Baranowski, Baranowski, Thompson, & Greaves, 2005), and reduced risk of chronic health conditions (Goldfield, Harvey, Grattan, & Adamo, 2012; Pate, 1995), most notably childhood obesity (Epstein & Goldfield, 1999; Marcus et al., 2000; Rippe, Crossley, & Ringers, 1998; Warburton, Nicol, & Bredin, 2006; Waters et al., 2011). Children obtain many health benefits from engaging in regular physical activity including improvements in their social, cognitive, and psychological development, such as self-esteem (Biddle & Asare, 2011; Canadian Society for Exercise Physiology [CSEP], 2012; Eastman, 1997; Ekeland, Heian, & Hagen, 2005), learning (CSEP, 2012), attention (CSEP, 2012), as well as physiological enhancements including improvements in motor skills (Bürigi et al., 2011; Reilly et al., 2006), bone density (Janz et al., 2001), aerobic fitness (Bürigi et al., 2011; CSEP, 2012), and muscle health (CSEP, 2012; Lobo & Winsler, 2006; Pate, 1995; Williams, Carter, Kibbe, & Dennison, 2009). The Public Health Agency of Canada advocates for children to partake in regular physical activity, due to the positive associations between active movement and development, growth, fitness, concentration, social occasions, reduced stress, as well as improved posture (Public Health Agency of Canada, 2011). According to Alpert, Field, Goldstein, and Perry (1990), preschool-aged children (aged 2.5-5 years) may benefit from structured physical activity (e.g., aerobics), as it can be advantageous for their cardiovascular fitness, agility, and coordination. Moreover, establishing physical activity as a habitual behaviour early in a child's life can foster an active adult lifestyle (Reilly et al., 2004; Stolley et al., 2003; Tucker, 2008) and act as an important piece of the obesity prevention strategy. Such preventative measures are critical as preschool-aged children have not been exempt from the current obesity epidemic; 15.2% and 6.3% of Canadian preschoolers are classified as overweight or obese, respectively (Shields, 2006). This

rate has been echoed internationally, with 16.0 and 5.0%, 15.2 and 5.5%, and 21.2 and 10.4% of preschoolers being classified as overweight or obese in the UK, Australia, and the US, respectively (Griffiths & Hawkins, 2009; Ogden, Carroll, Curtin, Lamb, & Flegal, 2010; Wake, Hardy, Canterford, Sawyer, & Carlin, 2007). Such findings are particularly disconcerting as obese children are more likely to become obese adolescents (Malina, 1996), and are therefore more susceptible to experiencing physical, social, and emotional health complications later in life (Daniels, 2006; Morrison & Chanoine, 2007; Reilly, 2005).

Physical activity for preschool-aged children constitutes a variety of activities that “get kids moving,” including “brisk walking, running, or dancing...climbing stairs and moving around the home...and playing outside and exploring their environment” (CSEP, 2012, p. 3). By the end of the preschool years (when children reach the age of 5), children’s physical activity should comprise 60 minutes of energetic activities including “hopping, jumping, or skipping,” for example (CSEP, 2012, p. 3). The physical activity patterns and behaviours of preschool-aged children are unique; this cohort commonly participates in physical activity in multiple settings, in the form of quick spurts of vigorous activity, followed by less intense periods (Bailey et al., 1995; Benham-Deal, 2005). Despite this knowledge of physical activity patterns, it is a common misconception that young children are endlessly active (Goldfield et al., 2012; Pate, McIver, Dowda, Brown, & Addy, 2008). In fact, sedentary behaviour accounts for the majority of a preschooler’s day (Oliver, Schofield, & Kolt, 2007), while moderate-to-vigorous levels of physical activity are minimal (Reilly, 2010; Vasquez, Salazar, Andrade, Vasquez, & Diaz, 2006). Researchers have reported that sedentary behaviour may account for 73 to 84% of this cohort’s waking hours (Reilly et al., 2004; Vale, Silva, Santos, Soares-Miranda, & Mota, 2010). Likewise, based on 39 studies that objectively examined physical activity in preschoolers, Tucker (2008) reported that only 23% of preschool-aged children were engaging in 120 minutes

of physical activity, as per the National Association for Sports and Physical Education (NASPE) guidelines. Since Tucker's systematic review was published in 2008, a number of additional studies have continued to report low levels of physical activity participation among preschoolers (Gubbels et al., 2011; Temple, Naylor, Rhodes, & Higgins, 2009; van Cauwenberghe, Jones, Hinkley, Crawford, & Okely, 2012; Vanderloo et al., under review). For example, van Cauwenberghe and colleagues (2012) found that on weekdays, preschool-aged boys and girls spent 32 (\pm 21) and 27 (\pm 17) minutes in moderate-to-vigorous physical activity (MVPA), respectively, and on weekend days accrued 36 (\pm 25) and 30 (\pm 21) minutes of MVPA. van Cauwenberghe and colleagues' (2012) findings are comparable to the results of a meta-analysis by Bornstein, Beets, Byun, and McIver (2011) of 26 studies using accelerometers to collect preschool-aged children's physical activity levels: preschoolers obtained 42.8 minutes of MVPA per day (with a 95% confidence interval [28.9, 56.8]).

As an avenue to reach preschoolers, numerous studies have been conducted in the childcare environment (e.g., centre-based or home-based childcares). Regardless of the tool used to measure preschoolers' physical activity levels (e.g., step counts, observation measures, or accelerometers), low participation rates are consistently found in these facilities (Dowda, Pate, Trost, Almeida, & Sirard, 2004; Oliver et al., 2007; Pate, Pfeiffer, Trost, Ziegler, & Dowda, 2004; Pate et al., 2008; Temple et al., 2009; Vanderloo et al., under review). Pate and colleagues (2008) discovered that 25 out of 30 hours of a preschooler's week in childcare was spent sedentary; similarly, Brown et al. (2009) reported that sedentary behaviour accounted for 89% of a preschooler's day. Canadian research has produced similar findings for physical activity behaviours of preschoolers in care: accelerometer data has suggested that preschoolers spend between 1.54 minutes (Vanderloo et al., under review) and 1.76 minutes (Temple et al., 2009) per hour participating in MVPA. Despite the positive correlation between physical activity and

health (Bürge et al., 2011; CSEP, 2012; WHO, 2010), coupled with the threat childhood obesity poses to young children, researchers are concerned that preschoolers remain insufficiently active.

As part of obesity prevention initiatives, physical activity guidelines have emerged from a number of countries, including the UK, Australia, and Canada (Australian Government, 2010; CSEP, 2012; Department of Health, 2011). The Canadian Society for Exercise Physiology recently developed the “Canadian Physical Activity Guidelines for the Early Years,” suggesting preschoolers (aged 3-4 years) should accumulate a *minimum* total of 180 minutes of physical activity each day in order to achieve health benefits and develop fundamental movement skills (CSEP, 2012; Tremblay et al., 2012). It is the responsibility of parents, teachers, childcare providers, policy-makers, and public health professionals, to collaborate their efforts to ensure that young Canadians are provided with ample active opportunities to ensure they meet these physical activity recommendations.

Intervening in the Early Learning Environment

The early learning environment (e.g., centre-based childcare, home-based childcare, preschool, etc.) has been recognized as an ideal venue to promote physical activity for preschool-aged children for several reasons. First, nearly 80% of children with working or studying mothers attend some form of childcare, and typically spend an average of 29 hours per week in care (Bushnik, 2006; Cleveland et al., 2008; Statistics Canada, 2005). Second, this environment has been recognized as having a strong influence on children’s health behaviours, specifically nutrition and physical activity (Bower et al., 2008; Dowda et al., 2004; Finn, Johannsen, Specker, & Falls, 2002), and children enrolled in childcare typically exhibit low levels of physical activity (Brown et al., 2009; Goldfield et al., 2012; Oliver et al., 2007; Pate et al., 2008; Temple et al., 2009, Vanderloo et al., under review). Third, a recent longitudinal study in Quebec, Canada discovered that preschoolers attending childcare were 65% more likely to be

overweight during childhood than those in parental care (Geoffroy et al., 2012). Not only is the childcare environment recognized as an ideal setting to implement children's health interventions (Chow & Humbert, 2011), it also provides access to children during an appropriate period of development (Goldfield et al., 2012). During this phase of life, children are known to be very receptive to change (Goldfield et al., 2012), learning many lessons and acquiring lifelong practices (Benjamin et al., 2007) such as food preferences, eating habits, and motor skills (Gill, King, & Webb, 2005). This period is eminent as children learn to enjoy physical activity, and is optimal for targeting behavioural lifestyle interventions as preschoolers are more likely than school-aged children to make these modifications (Centre for Disease Control and Prevention, 2001). Given the association between the early learning environment and children's physical activity behaviours (Bower et al., 2008; Story, Kaphingst, & French, 2006), health promotion interventions continue to target this environment. For example, educational or community-based programs such as "Romp and Chomp," "SPARK," "Color Me Healthy," or "Animal Trackers," constitute successful research interventions in early learning facilities that improved preschooler's physical activity levels and motor skills, while providing skills and resources to early learning teachers, and/or education for both children and providers (de Silva-Sanigorski et al., 2010; Dunn et al., 2006; McWilliams et al., 2009; SPARK, 2009; Williams et al., 2009). To this end, a recent meta-analysis highlighted the specific components of health promotion interventions that are effective for improving physical activity levels among preschoolers, and interventions that transpired in the childcare setting had a larger effect than those that took place in the home setting (Gordon, Tucker, Burke, & Carron, 2013).

Childcare facilities represent an opportunity to provide adequate active play (McWilliams et al., 2009; Story et al., 2006), contributing to healthier child development and body weight maintenance. Many parents assume that their children are very active in childcare (O'Connor &

Temple, 2005; Pate et al., 2008). On the contrary, several objective assessments—and reviews—of activity levels in childcare suggest that sedentary behaviour is high and physical activity levels are low (McKenzie et al., 1997; Pate et al., 2004; Reilly, 2010; Vanderloo, et al., under review). Vast differences are seen in preschoolers' physical activity levels—variation of close to 50% (Finn et al., 2002; Pate et al., 2004)—depending on the individual childcare facility attended (Boldemann et al., 2006; Dowda et al., 2004; Hinkley, Crawford, Salmon, Okely, & Hesketh, 2008; Worobey, Worobey, & Adler, 2005). Essentially, the individual childcare centre in which a preschooler was enrolled was found to be the greatest predictor of physical activity levels (likely attributed to the differing practices and policies at each centre), above all other factors, such as age, gender, or race (Pate et al., 2004).

Given that there are no nation-wide physical activity-related regulations for childcare in Canada (Statistics Canada, 2006) or the US (Kaphingst & Story, 2009), childcare centers across these countries differ in their programming and policies with regards to physical activity provision (Fees, Trost, Bopp, & Dzewaltowski, 2009; Kaphingst & Story, 2009; Vanderloo, Tucker, Ismail, & van Zandvoort, 2012). Childcare environments that are supportive of physical activity are congruent with higher levels of physical activity (Bower et al., 2008; Tandon, Garrison, & Christakis, 2012). Consequently, there is a clear need for physical activity-related standards and regulations in the childcare environment (Pate et al., 2004). Evidence is building on the important role of programs, policies, and practices in the childcare environment to increase physical activity levels (Bower et al., 2008; Dowda et al., 2004; Finn et al., 2002; Goldfield et al., 2012). Many of these findings are discussed within “The Best Practice Guidelines for Physical Activity at Childcare” (McWilliams et al., 2009), a reference document created using researchers' assessment of the overall physical activity environment of 96 childcare centers in the US (measured using the Environment and Policy Assessment and

Observation [EPAO]; Ward et al., 2008). Consistent with this report, researchers have confirmed the specific components of childcare centres that influence physical activity participation among preschoolers, identifying portable equipment (e.g., slides, balls, and tricycles; Bower et al., 2008; Hannon & Brown, 2008; Vandello et al., under review), reduced sedentary opportunities (e.g., less availability and use of electronic media; Dowda et al., 2009), staff behaviours (e.g., active participation; Vanderloo et al., under review), and increased physical activity training/education as significant (Bower et al., 2008).

The Role of Early Childhood Educators

Early childhood educators, otherwise known as ECEs, childcare providers, or preschool teachers, have a very impactful and challenging role in the childcare setting. In addition to caring for the children at their centre, early childhood educators are commonly responsible for developing and implementing the curriculum for the preschool class (or classes) for which they care (Copeland, Kendeigh, Saelens, Kalkwarf, & Sherman, 2012a; Robinson, Webster, Logan, Lucas, & Barber, 2012). The importance that early childhood educators place on physical activity and other health behaviours may be reflected in their choices for classroom programming (Chow & Humbert, 2011). Tucker and colleagues' (2006) Canadian study found that parents rely on childcare providers to ensure their children obtain sufficient levels of activity during the day (Tucker, Irwin, Sangster Bouck, He, & Pollet, 2006). Similar findings in the US highlight parents' dependence on childcare providers to engage their children in physical activity (Larson, Ward, Neelon, & Story, 2011). In light of this reliance, during focus groups in the US, preschool teachers identified themselves as the primary "gatekeeper to the playground," as they are in control of the decision to visit the playground, types of equipment and areas used, and their willingness to participate in physical activity with the children (Copeland et al., 2012a, p. 98).

Previous research has specifically identified the influence of early childhood educators' behaviours on children's physical activity levels (Bower et al., 2008; Derscheid, Umoren, Kim, Henry, & Zittel, 2010; Story et al., 2006; Temple & O'Connor, 2003; Vanderloo et al., under review), children's play quality, and the extent of outdoor playtime (Copeland et al., 2012a; Dietze & Crossley, 2003). As significant role models to the children in their care (Derscheid et al., 2010; Goldfield et al., 2012; Pate et al., 2008), early childhood educators' behaviours can be predictive of children's health habits, more specifically, physical activity (Vanderloo et al., under review). Higher levels of preschooler's physical activity can be elicited if early childhood educators provide positive prompts (Brown et al., 2009; Gubbels et al., 2011), provide equipment, participate in active play with the preschoolers, and/or create opportunities for structured and unstructured activities (Ammerman et al., 2007; Brown et al., 2006; Pate et al., 2008; Trost, Fees, & Dzewaltowski, 2008). On the other hand, researchers have shared concerns about early childhood educators' enthusiasm towards and efforts in encouraging physical activity (Brown et al., 2009), their awareness of the role they play in preschoolers' physical activity engagement, as well as their access to physical activity-related curricular materials (Temple & O'Connor, 2003).

Other factors such as self-efficacy — defined by Bandura (1997) as an individual's *confidence* to complete a certain task/goal — and lack of co-worker engagement have been raised by early childhood educators as important barriers to facilitating physical activity within the early learning environment (Chow & Humbert, 2011; Copeland et al., 2012a). Humphries and colleagues describe the strong influence of physical education teachers' self-efficacy on their teaching behaviours and how these components affect students' outcomes and learning experiences (Humphries, Hebert, Daigle, & Martin, 2012; Martin & Kulinna, 2005). Given the parallel relationship between physical education teachers of school-aged children to that of early

childhood educators and preschool-aged children, self-efficacy is also likely to powerfully influence preschool teachers' behaviours and abilities to instruct physical activity. Despite the important role that early childhood educators play in encouraging preschoolers to be active (Eastman, 1997), childcare providers have acknowledged their need for additional resources and training to implement physical activity with preschool-aged children (Tucker, van Zandvoort, Burke, & Irwin, 2011; van Zandvoort, Tucker, Irwin, & Burke, 2010).

Bower et al. (2008) compared childcare centres ($n = 20$) by scoring them based on the validated Environment and Policy Assessment and Observation instrument (EPAO; using eight subscales to measure physical activity influences in childcare environments), and detected a moderate correlation ($r = 0.481$) between the Physical Activity Training/Education and Staff Behaviour subscales. Bower et al.'s (2008) findings highlight the impact that physical activity training/education may have on staff behaviours and their physical activity promotion in childcare. Bower et al. (2008) also observed a large effect size ($d = 1.044$) for the Staff Behaviours subscale when comparing centres with a high (total physical activity score above the median) and low (total physical activity score below the median) score on the EPAO. In conjunction, these findings suggest that highly trained/educated providers may engage in behaviours that contribute to a childcare environment being more favourable of preschoolers' physical activity. Using the same EPAO tool to assess childcare environments in a recent Canadian pilot study, Vanderloo et al. (under review) discovered that among these subscales, the Staff Behaviours subscale accounted for almost half of the variability in the amount of time preschoolers spent in MVPA. Consequently, both aforementioned studies illustrate the strong influence that staff behaviours, training, and education can have on preschoolers' activity levels (Bower et al., 2008; Vanderloo et al., under review). Additionally, many studies reference the powerful impact that a childcare provider's "beliefs, creativity, ... level of engagement"

(Copeland et al., 2012a, p. 81), attitude (Chow & Humbert, 2011), and training (Bower et al., 2008; Copeland et al., 2012a; Dowda et al., 2009) can have on the physical activity behaviours of the children in their care. Regardless of any physical activity-regulating policies in place at a childcare centre, it is essential that the childcare workers be invested in children's health, by creating active opportunities and reducing sedentary behaviour. The important role early childhood educators play in encouraging children's health behaviours is eloquently reflected by Breslin, Morton, and Rudisill (2008, p. 430) who state, "it is at the teacher level where policy meets practice. If the teacher does not understand or value the curricular outcomes, or does not have the resources, training, or confidence to implement it, then nothing will change."

Early Childhood Education Training at the College Level

Researchers in the field of early learning have previously identified the limited physical activity-related training and resources provided to early childhood educators (Derscheid et al., 2010; Dunn et al., 2006; Larson et al., 2011; Robinson et al., 2012; Trost, Messner, Fitzgerald, & Roths, 2009). Obeng (2010) elaborates on the issue, questioning the type of formal training in health education provided to childhood educators, and recommends that the curriculum for early childhood education (ECE) students should be altered to fill this gap. In a critical narrative review of various strategies to increase physical activity in preschoolers, Kreichauf and colleagues (2012) concluded that childcare providers' knowledge of physical activity and motor development were important factors in their capacity to facilitate physical activity opportunities. During focus groups in London, Ontario, childcare providers indicated the need for increased physical activity resources (Tucker et al., 2011). Similarly, home childcare providers in Kansas, US, also highlighted physical activity training and programming aid as essential to enrich their abilities to integrate more activity into the day (Fees et al., 2009). Clearly, childcare staff's frequent acknowledgement of a need for increased physical activity-related training or resources

should not go unrecognized (Pagnini, Wilkenfield, King, Booth, & Booth, 2006; Temple, & O'Connor, 2003; Tucker et al., 2011).

Physical activity interventions targeting early childhood educators could produce substantial public health benefits considering the exponential number of children these providers will influence (Goldfield et al., 2012; Ward, Vaughn, McWilliams, & Hales, 2010), especially with an understanding that physical activity interventions appear to be the most successful when executed by childcare staff in the childcare setting (Gordon et al., 2013). Copeland and colleagues (2012a) proposed that increased training and support for childcare providers was key to physical activity interventions, especially if the program helped improve childcare providers' self-efficacy. When these interventions include training, workshops, or curricular material for childcare personnel: (a) early childhood educators can feasibly implement increased physical activity opportunities; and, (b) physical activity levels at the childcare facility improve (Brown et al., 2009; Dunn-Carver et al., 2013; Fitzgibbon et al., 2011; Trost et al., 2008).

In a case study by Vives-Rodriguez (2005) training was revealed as a prominent factor that affected preschool teachers' movement instruction to children in their care: "[t]eacher training seemed to be the most needed and perhaps the most effective way to encourage the integration of movement education into the ... [p]reschool's curriculum." (Vives-Rodriguez, 2005, p. 156). While offering training and resources to practicing early childhood educators are essential, providing comprehensive physical activity training at the ECE student level may be a more effective approach that produces an exponential number of childcare teachers who have the resources, skills, and self-efficacy to incorporate physical activity components into their curriculum. Goldfield and colleagues (2012) suggest that if ECE students' basic training included sufficient focus on physical activity, early childhood educators would be well positioned to effectively improve preschoolers' physical activity behaviours. Likewise,

Derscheid et al. (2010) recommend that college classes or training for early childhood educators could inform them of healthy nutrition and physical activity for preschoolers. In turn, this could increase early childhood educators' confidence to instill that knowledge to preschoolers (Derscheid et al., 2010). In accordance with the Theory of Planned Behaviour and Theory of Reasoned Action, if early childhood educators are taught the value, significance, and importance of physical activity for children's health, they may be more motivated to teach these concepts and more likely to encourage physical activity to the children (Copeland et al., 2012a; Glanz, Rimer, & Lewis, 2002). As a result, early childhood educators would be contributing to the 'subjective norm' by setting the expectations for all teachers and therefore benefiting the children in their care (Copeland et al., 2012a; Glanz et al., 2002). While there are no known interventions that provide physical activity-related training to ECE students, an educational component is central to many of the successful physical activity interventions with practicing early childhood educators in childcare centres (e.g., Bellows, Davies, Anderson, & Kennedy, 2013; Dunn-Carver et al., 2013; Jones et al., 2011). Providing rigorous physical activity-related education to the next generation of childcare providers as a whole could be a more efficient expenditure of future intervention funding.

In light of early childhood educators acknowledging the need for improved physical activity-related resources and training (Fees et al., 2009; Tucker et al., 2011; van Zandvoort et al., 2010), coupled with the importance that the ECE curriculum is altered to include specific physical activity training (Goldfield et al., 2012), research efforts are warranted to investigate if and what additional learning and support may be beneficial in ECE students' educational programming. Exploring the current state of ECE students' physical activity-related knowledge and identifying any relative gaps within their college curriculum can help to determine if this is

an appropriate venue to intervene as one mechanism to support improved physical activity among preschool-aged children.

Exploring ECE Students' Physical Activity Training: Grounded within a Theoretical Health Promotion Model

To contribute to the development of future physical activity interventions that support preschoolers' activity participation, collecting information on ECE students' knowledge and educational experience is a component of program planning that is well positioned within the Multilevel Approach to Community Health (MATCH) model (Simons-Morton, Simons-Morton, Parcel, & Bunker, 1988). MATCH is a health promotion program-planning model acknowledging that health behaviours exist with an ecological framework and are influenced by multiple levels including intrapersonal, interpersonal, and community level factors (McKenzie, Neiger, & Thackeray, 2009). Thus, there can be multiple objectives and targets for an intervention approach (McKenzie et al., 2009). The MATCH model is appropriately used when the risk factors for disease are already identified and priorities have been determined (Simons-Morton et al., 1988). The five phases involved in the MATCH model include: goal selection (i.e., selection of health behaviour goals for the target population and identifying environmental factors and goals), intervention planning (i.e., intervention objectives are matched with the intervention targets [i.e., ECE students] and intervention actions [i.e., teaching or training]), program development (i.e., development of the intervention), implementation preparations (i.e., adoption, implementation, and maintenance), and evaluation (i.e., measure impact, and conduct process and outcome evaluations; McKenzie et al., 2009). Pertaining to this study, Phase I is complete, as it is well established that preschoolers' physical activity levels are low while in childcare, which may place their health at risk, and increasing physical activity opportunities in this environment is a public health priority (Active Healthy Kids Canada, 2012). During Phase II

(the intervention planning phase) the following agenda items are identified: (a) the level of society at which to intervene (e.g., individual level, interpersonal level, organizational level, etc.); (b) the associated mediator factors (e.g., knowledge, attitudes, skills, or experience); and, (c) the intervention objectives and approach. Specific to phase II, section (a), early childhood educators would be considered important interpersonal influences (e.g., family members or teachers) that act as potential targets of intervention actions (TIAs) as they are “individuals who exert influence or control over the personal or environmental conditions that are related to the target health and behaviour goals,” and this significant role has been identified by a variety of researchers, as discussed above (McKenzie et al., 2009, p. 25). Thus, before developing an intervention, the mediating factors such as early childhood educators’ knowledge, attitudes, skills, and experience, which are related to the target behaviour (i.e., preschoolers’ physical activity participation; Simons-Morton, Greene, & Gottlieb, 1995) must be considered. Reaching out to ECE students before they are practicing in the workforce will help us to depict a more vivid picture of Ontario’s future childcare providers’ physical activity-related course content, knowledge, and self-efficacy. Subsequently, this will help to determine if early childhood educators are provided with adequate physical activity-related training or if additional support is sought for this population. Such knowledge is necessary before progressing to the next step (e.g., developing phase I, part (c) the intervention objectives and approach) of designing a health promotion intervention with the overall goal of increased physical activity participation in the childcare environment.

Purpose of this Study

Targeting early childhood educators, and specifically ECE students, may be an appropriate way to encourage physical activity among preschoolers in childcare; however, no Canadian or international research has investigated the physical activity-related training,

knowledge, and education of ECE students within their formal education. As such, the primary purpose of the present study was to explore the physical activity-related knowledge and educational experience of ECE students currently studying at Ontario colleges. As a secondary objective, ECE students' self-efficacy, own physical activity behaviours, and their perspectives regarding resources that would aid in encouraging physical activity participation among preschoolers in childcare was explored. While variation exists across educational institutions, based on a preliminary review of ECE diploma programs at Ontario colleges (i.e., a researcher reviewed the course names and descriptions as per each college's ECE curriculum posted on their website) it was hypothesized that the majority of ECE students would not have completed any courses specifically devoted to physical activity or physical education during their college training. However, it was anticipated that physical activity-related content may be embedded within courses devoted to child development or health behaviour. In addition, it was hypothesized that ECE students' self-efficacy levels would be higher if they had completed one or more physical activity/physical education courses during their training, and that their self-efficacy would also be higher if they personally engaged in increased levels of physical activity each week. Although an observation of the ECE curriculum could provide an overview on the courses covered with ECE students, we would not be able to gauge the specific course content devoted to physical activity topics; students' awareness of physical activity guidelines for preschoolers; students' understanding of health-related benefits of physical activity; students' awareness of environmental influences on physical activity engagement; students' perceived self-efficacy to lead active opportunities, create environments supportive of active play, and instruct physical activity content; as well as their perceptions of physical activity-related resource needs. In addition, it is important to gather information on students' confidence to lead activities and instruct concepts, as opposed to just noting that concepts are covered in course content. In an

effort to support future early childhood educators to confidently and effectively implement physical activity opportunities in the childcare environment, it is important to examine their current knowledge, learning experiences, and self-efficacy to identify if additional physical activity training at the college level is warranted.

Chapter 2: Method

Study Design and Procedures

Using a cross-sectional design, this study explored the physical activity-related knowledge and educational experience of ECE students studying at Ontario colleges. ECE students' self-efficacy was assessed as a secondary objective. Eligible colleges were determined by cross-referencing the Ontario Colleges website (<http://www.ontariocolleges.ca>) with the Child Care Human Resources Sector Council website (<http://www.ccsc-cssge.ca>). English-speaking Ontario colleges that offer an ECE diploma program ($n = 23$) were identified, and invited to participate in the study. Given that variation likely exists between the ECE students' curricula at each college, it was important to invite as many colleges as possible. Ethical approval was provided by the Health Sciences Research Ethics Board at The University of Western Ontario (Appendix A). If requested by any of the colleges ($n = 9$), the study protocol was also submitted to their respective Research Ethics Board for approval.

Recruitment and data collection. In order to contact as many ECE students as possible, convenience sampling was used to recruit participants. The appropriate college contact (e.g., ECE program coordinator and/or the Dean/Chair of the program) at each college was contacted during the last week of February 2013, to inquire if they would be interested in participating in the study (Appendix B). Initial contact was in the form of email, followed by a reminder email, circulated 2 weeks later. For those schools who did not respond by email, the researchers made one follow-up phone call to invite participation. Of the colleges that chose to partake ($n = 20$), all ECE students enrolled in their diploma program were invited to participate in the survey. For each participating college, the program contact or college Research Ethics Board was asked to indicate their preferred method of data collection. Depending on the college's preference, the survey was disseminated through one of the following methods: 1) researchers distributed the

survey (in person) to the class during the beginning, break, or end of a classroom session(s); 2) a professor/ECE coordinator disseminated the survey during class time; or, 3) the program coordinator sent out an email to all students enrolled inviting them to participate in the survey online by following a link to SurveyMonkey® (SurveyMonkey Inc.). Voluntary completion of either the online- or paper-version of the survey indicated consent to participate. All participants who emailed the researcher directly with the subject “ECE Student Gift Card” became eligible to enter the draw to win a \$25 Chapters gift card.

Paper surveys. For any colleges that opted for paper surveys, (option 1 or 2 of the survey dissemination methods), a date was arranged for a researcher to enter the classrooms to administer the paper-version of the survey or surveys were mailed to schools that were outside of driving distance with a return envelope and postage. Mailed surveys were distributed by an ECE program coordinator (or program assistant) or a classroom professor, as deemed appropriate by the individual college. A Letter of Information (Appendix C) was attached to the front of the survey for students to keep, which included instructions for how to email the researcher to enter the gift card draw or to request survey results.

Online surveys. Of the colleges that chose to use the online survey, (option 3 of the survey dissemination methods) the ECE program coordinator was asked to send an email invitation to the study to students (Appendix D). If the college did not have an email distribution list, Blackboard (an online course curriculum website or equivalent) was used to post the invitation for ECE students. The researchers were copied on this email or provided with the date the invitation was sent or posted. The online invitation was sent to all accessible ECE students to request their participation in this study. This email was designed to draw the participants’ attention to the Letter of Information (LOI; Appendix E) that was included as the first page of the survey, as well as a link to the survey (<https://www.surveymonkey.com/s/6ZDYSZD>;

Appendix F). The final page of the online survey included instructions on how to email the researcher to enter the gift card draw or to request survey results. Only students who pressed the “submit” button on the last page of the survey had their data sent to the researchers. The coordinator was asked to send out a reminder email (Appendix G) to all ECE students 2 weeks after the initial email invitation, to thank those who had already participated, and to remind those who had not completed the survey to do so if interested by the survey close date. The online survey link remained accessible to ECE students from February 2013 to June 2013.

Participants

Inclusion criteria. All students, who were enrolled in the ECE diploma program (during the winter semester of 2013 and a few programs from the summer semester of 2013) at one of the agreeing Ontario-based colleges, were invited to complete the survey. Students were invited to participate regardless of which type of ECE diploma program they were attending (e.g., full-time, part-time, accelerated, or fast-track) and which year of study they were in (e.g., year 1, year 2, or other).

Sample size. All English-speaking Ontario Colleges that offered an ECE diploma program for the winter semester of 2013 were contacted and invited to participate. If data collection was not feasible at a college before the end of the winter semester, students from the summer semester of 2013 were recruited instead. Class size for each college was documented so a response rate could be calculated.

Instruments and Tools

Individuals who participated in the study completed the survey entitled “An Exploration of Early Childhood Education Students’ Physical Activity-Related Knowledge and Preparation” (see Appendix F), created specifically for this project by the researchers. The survey was designed to examine: (a) what physical activity-related knowledge ECE students’ acquire during

their college education; (b) which physical activity-related concepts are covered in their courses; (c) the extent to which the relationship between physical activity and health concepts are discussed; (d) whether ECE students are familiar with important physical activity-related documents and guidelines; (e) ECE students' level of self-efficacy in creating active opportunities and teaching physical activity curriculum; (f) ECE students' awareness of environmental influences on children's physical activity levels and their comprehension of their roles surrounding physical activity; (g) ECE students' values regarding physical activity; and (h) ECE students' perception of helpful physical activity-related resources and training. A variety of physical activity-related documents and tools were used to develop the survey including: The Canadian Society of Exercise Physiology's Physical Activity and Sedentary Behaviour Guidelines (2012); The Day Nurseries Act (1990); Active Healthy Kids Canada Report Card (2012); the Environment and Policy Assessment and Observation tool (Ward et al., 2008); the NAPSE Position Statement-Appropriate Practices in Movement Programs For Children Ages 3-5 (2009b); Guide for Constructing Self-Efficacy Scales (Bandura, 2006), as well as various academic research articles. Once created, the survey was reviewed by researchers with expertise in preschoolers' physical activity behaviours and a variety of ECE trained professionals to ensure the language and questions seemed appropriate (i.e., to ensure the survey had face validity [i.e., the test appears to subjectively measure what it purports to measure]), prior to ethics submission.

The survey was created in two formats: online and on paper. The survey content was identical in both versions of the survey. Both formats of the survey allowed students the option to skip questions and still submit the survey. The survey took approximately 10 minutes to complete, and individuals were only contacted again if they specifically requested a copy of the results.

Data Analysis

Descriptive statistics were used to explore participants' demographic characteristics, in addition to current physical activity-related knowledge and training of ECE students. Moreover, frequencies were run to examine the number of students who received physical activity-related training during course content, as well as how many were familiar with particular physical activity documents (e.g., the Canadian Physical Activity Guidelines for the Early Years). Two Mann-Whitney *U* tests were performed to compare ECE students' self-efficacy (i.e., confidence) ratings to instruct and facilitate physical activity when segregated into two groups. The first Mann-Whitney *U* test compared ECE students' confidence dependent on the completion of any physical activity/education courses during their college training. A second Mann-Whitney *U* test was run to evaluate the difference (if any) between ECE students' confidence ratings based on their own physical activity behaviour (i.e., meeting the Canadian adult physical activity guideline or not meeting the guideline). Using the four criteria (credibility [i.e., performing *peer debriefing* by having an additional researcher review the research process and results to test for biases and assumptions and analyze the participants' quotations to verify that they drew the same themes and conclusions from the data], transferability [i.e., providing a *rich description* of the participants to allow future researchers to evaluate the appropriateness of transferring the results from our study to their research], dependability and confirmability [i.e., through the *peer debriefing* process]) described by Lincoln and Guba (1985) as a framework when applicable, qualitative content analysis was used to uncover any common themes that emerged from the one open-ended question in the survey. Data analysis involved inductive content analysis to identify qualitative findings (Patton, 2002). To achieve this, the researchers relied on Miller and Crabtree (1999) to review the quotations and identify emerging themes, which were consistently mentioned by the ECE students.

Chapter 3: Results

Of the colleges that chose to partake in the present study ($n = 20$), nine opted for the online method of data collection (individual student responses per school ranged from five to 53 participants), nine selected the paper version (individual student responses per school ranged from six to 262 participants), and two used both options. For the colleges that used both survey options, one school operated the ECE diploma program at multiple campuses and each coordinator chose a different method of data collection, while the other school used different methods of data collection for their winter and summer semesters (i.e., students in their second year were surveyed online during the winter, while students in the first year program were surveyed on paper in the summer). A total of 109 surveys were completed during the summer semester as data collection was not feasible at two schools during the winter semester. Overall, 229 ECE students completed the survey online, and 884 completed a paper survey, for a total sample size of 1,113. Given that 2,448 ECE students were invited to complete the survey online, and 1,037 ECE students were invited to participate in the paper-version of the survey, our response rate was 9.35% and 85.25%¹ for online and paper, respectively.

Descriptive Statistics

Participant demographics. A total of 1,113 ECE students participated. Response rates per individual college varied from 2.2% ($n = 5$) to 26.2% ($n = 53$) of students participating online, while the response rate for paper completions ranged from 50.0% ($n = 11$) to 89.6% (of the total program; $n = 60$) with a maximum of 100.0% (of the students we had access to¹; $n = 16$). The mean age of participating students was 23.92 ± 7.43 years (range: <19-59 years); 96.9% were

¹ Response rates for paper surveys are based on the number of ECE students that the college granted access to and not representative of the total amount of ECE students in the program.

female and 76.4% were Caucasian. The majority of students were enrolled in the diploma program full-time ($n = 1,055$), with a fairly even split of first-year and second-year students. A small number of students were enrolled in the fast-track/accelerated version of their program, or in another type of educational format (“other”; $n = 41$). Eighty-seven percent of students had some placement experience at a childcare centre. Please see Table 1 for complete participant demographic information.

Participant’s physical activity experiences. The majority (91.6%) of ECE students indicated that physical activity was either ‘somewhat important’ or ‘very important’ in their own lives. Based on ECE students’ self-reported physical activity behaviours (Table 1), only 10.5% met the Canadian Physical Activity Guidelines for Adults of at least 150 minutes of MVPA per week (CSEP, 2012), with nearly half of students obtaining less than 60 minutes of MVPA per week (Table 1). However, 19.0% of students reported having a personal fitness trainer (at one time) and 74.0% had played on a sports team. In addition, many students mentioned that they had experience as a sports coach or instructor of some sort (e.g., basketball coach, baseball coach, soccer coach, or dance instructor).

Physical activity-related education and training. During their college education, 802 ECE students (72.1%) reported having completed no physical activity/physical education specific courses, with 174 ECE students (15.6%; Table 1) having completed one course, such as “Children’s Health and Wellness” or “Music and Movement.” Of the mandatory course lessons in their college education, just over half of ECE students (66.5%; Table 2) reported that physical activity was discussed. When asked about the physical activity-related content of these course lessons, most students reported discussions on gross motor skills (83.5%), and some on physical education (37.8%; Table 2). Also, 15.0% of students recalled some physical activity discussions

Table 1

*Early Childhood Education Students' Demographic Information and Physical Activity**Experience (n = 1,113)*

| Participant Characteristic | N | % |
|----------------------------|-------|-------|
| Sex | | |
| Male | 32 | 2.90 |
| Female | 1,079 | 96.90 |
| Age | | |
| 19 years or less | 312 | 28.10 |
| 20-29 years | 605 | 54.30 |
| 30-39 years | 94 | 8.40 |
| 40-49 years | 62 | 5.60 |
| 50-59 years | 14 | 1.40 |
| Ethnicity | | |
| Caucasian | 850 | 76.40 |
| African Canadian | 24 | 2.20 |
| Aboriginal | 32 | 2.90 |
| Hispanic | 25 | 2.20 |
| Asian | 90 | 8.10 |
| Arab | 18 | 1.60 |
| Other | 50 | 4.50 |
| Prefer not to answer | 14 | 1.30 |

Enrollment Status

| | | |
|-----------|-------|-------|
| Full-time | 1,055 | 94.80 |
| Part-time | 55 | 4.90 |

Year of Study

| | | |
|--|-----|-------|
| 1 | 580 | 52.10 |
| 2 | 490 | 44.00 |
| Other (e.g., accelerated or intensive) | 41 | 3.70 |

Accumulated Minutes of MVPA During a Typical Week

| | | |
|---------|-----|-------|
| <30 | 222 | 19.90 |
| 30-59 | 286 | 25.70 |
| 60-89 | 232 | 20.80 |
| 90-119 | 149 | 13.40 |
| 120-149 | 100 | 9.00 |
| 150+ | 117 | 10.50 |

Number of Physical Activity or Physical Education Courses Completed

| | | |
|----------------------|-----|-------|
| No courses completed | 802 | 72.10 |
| 1 course | 174 | 15.60 |
| 2 courses | 49 | 4.40 |
| 3 or more courses | 27 | 2.40 |

Note. Column total per section may not always match the total number of participants due to skipped questions; MVPA = moderate-to-vigorous physical activity.

Table 2

Physical Activity Course Content During Mandatory and/or Elective Early Childhood Education Course Lessons

| Topic | Mandatory | | Elective* | |
|-----------------------------------|-----------|-------|-----------|-------|
| | <i>N</i> | % | <i>N</i> | % |
| Physical education | 421 | 37.80 | 131 | 11.80 |
| Physical activity | 740 | 66.50 | 167 | 15.00 |
| Gross motor skills | 929 | 83.50 | 164 | 14.70 |
| Locomotor & non-locomotor skills | 520 | 46.70 | 82 | 7.40 |
| The F.I.T.T. Principle | 101 | 9.10 | 57 | 5.10 |
| No courses discussed these topics | 91 | 8.20 | 367 | 33.00 |

Note. Column total per section may not match the total number of participants due to skipped questions; F.I.T.T. = Frequency, Intensity, Time, and Type; * 45.6% of students skipped the elective course question.

during their elective course lessons; however, almost half of ECE students opted to not answer this half of the question, having taken no elective courses. Many ECE students recognized several health benefits associated with children participating in physical activity, such as increased coordination, enhanced brain function, strong bones and healthy muscles, and social awareness. While 82.0% of ECE students had studied the relationship between physical activity and childhood obesity during their ECE training, only 16.2%, 44.0%, and 45.9% reported having discussed the relationship between physical activity and cancer, heart disease, and type II diabetes, respectively.

With regard to childcare and physical activity guidance documents, over the course of their ECE educational training or placement experience, most ECE students (92.7%) had been introduced to Ontario's "Day Nurseries Act" (1990; Table 3). However, very few were familiar with the Canadian Physical Activity Guidelines for the Early Years (28.7%), the Active Healthy Kids Canada Report Card (16.3%), or the Canadian Sedentary Behaviour Guidelines for the Early Years (8.4%; Table 3). This is interesting, given that approximately one-quarter (23.4%) of ECE students believe that "most" Canadian preschoolers engage in sufficient levels of physical activity per day (as per the guidelines), while 30% of students believe that only "half" of preschoolers do (Table 3). However, only 2.0% of ECE students accurately reported the number of minutes preschoolers should be physically active per day (as per the Canadian guidelines), while only 6.8% correctly estimated the Sedentary Behaviour Guidelines for this cohort (Table 4).

ECE students' views on the influences of preschoolers' physical activity. A total of 94.7% of ECE students in the current study felt that physical activity was 'very important' for preschoolers. Most of these participants (ranging from 70.4% to 90.8%) concurred that early childhood educators themselves play a role in engaging preschoolers in physical activity by way

Table 3

Early Childhood Education Students' Familiarity with Physical Activity-Related Documents and Perception of Preschoolers' Meeting Physical Activity Guidelines

| Guidance Document | <i>N</i> | % |
|---|----------|-------|
| The Day Nurseries Act | 1,032 | 92.70 |
| Active Healthy Kids Canada Report Card | 181 | 16.30 |
| Canadian Physical Activity Guidelines for the Early Years | 319 | 28.70 |
| Canadian Sedentary Behaviour Guidelines for the Early Years | 93 | 8.40 |
| I have never heard of any of these documents | 31 | 2.80 |
| Number of Preschoolers Meeting PA Guidelines | | |
| Most do not | 342 | 30.70 |
| Half do | 338 | 30.40 |
| Most do | 260 | 23.40 |
| I don't know | 133 | 12.00 |

Note. Column total may not match the total amount of participants due to skipped questions; PA = physical activity.

Table 4

Early Childhood Education Students' Estimate of Physical Activity and Sedentary Behaviour Guidelines for the Early Years

| Number of Minutes Per Day | Physical Activity | | Sedentary Behaviour | |
|------------------------------------|-------------------|-------|---------------------|-------|
| | Guidelines | | Guidelines | |
| | <i>N</i> | % | <i>N</i> | % |
| 30 minutes | 75 | 6.70 | 236 | 21.20 |
| 60 minutes | 347 | 31.20 | 76 | 6.80 |
| 90 minutes | 92 | 8.30 | 18 | 1.60 |
| 120 minutes | 173 | 15.50 | 26 | 2.30 |
| 180 minutes | 22 | 2.00 | 5 | 0.40 |
| I don't know how many minutes | 52 | 4.70 | 112 | 10.10 |
| I'm not familiar with the document | 308 | 27.70 | 575 | 51.70 |

Note. Column totals may not always match the total number of participants due to skipped questions.

of role modeling, providing equipment, creating structured and unstructured activities, and providing verbal prompts. While these students were cognizant of their role in facilitating physical activity at childcare, they seemed less informed about the environmental influences on physical activity. Only 53.5% of students indicated that teacher prompts are influential on physical activity, and only 62.0% and 63.0% recognized the impact of fixed and portable equipment, respectively.

ECE students' self-efficacy to instruct and facilitate physical activity for preschoolers.

When asked to rate their confidence to instruct and facilitate physical activity on a 10-point self-efficacy scale, ECE students' answers ranged from "1" to "10". Of the five items to rate, the average score was highest for ECE students' self-efficacy to create a childcare environment that encourages active play ($M = 7.98$, $SD = 1.77$; Table 5). Teaching about the relationship between physical activity and health was a task that ECE students had the lowest confidence to do ($M = 6.79$; $SD = 2.07$). A Mann-Whitney U test (Table 6) indicated that in comparison to students with no physical activity/education training (mean rank = 493.29), ECE students who had completed one or more physical activity/education course were more confident (mean rank = 565.24) in their ability to instruct physical activity content and knowledge ($U = 81,316.00$, $z = -3.37$, $r = -0.11$, $p < 0.05$). The group of students with increased physical activity/education training also reported more confidence (mean rank = 558.12) to teach physical activity and health ($U = 82,591.50$, $z = -2.95$, $r = -0.09$, $p < 0.05$) than their less educated peers (mean rank = 494.93). A second Mann-Whitney U test (Table 7) indicated that students who were sufficiently active (i.e., met the Canadian Physical Activity Guidelines for Adults [CSEP, 2012]) were more confident (mean rank = 650.87) to instruct physical activity content and knowledge than their less active peers (mean rank = 511.96), $U = 39,401.50$, $z = -4.67$, $r = -0.14$, $p < 0.05$. Interestingly, this test also indicated that the more active ECE students (mean rank = 641.83) were also more confident

Table 5

Means (M) and Standard Deviations (SD) of Early Childhood Education Students' Self-Efficacy to Facilitate and Instruct Physical Activity for Preschoolers

| Task | <i>M</i> | <i>SD</i> |
|--|----------|-----------|
| Instruct PA content and knowledge | 6.86 | 2.05 |
| Teach about the relationship between PA and health | 6.79 | 2.07 |
| Lead activities to improve children's fitness development | 7.35 | 2.06 |
| Create a childcare environment that encourages active play | 7.98 | 1.77 |
| Use a variety of methods to encourage PA | 7.88 | 1.76 |

Note. *M* = average answer reported using a self-efficacy rating scale of 1-10; PA = physical activity.

Table 6

Comparing Early Childhood Education Students' Self-Efficacy Based on the Number of Physical Activity/Education Courses Completed

| Task | Mean Rank | | Mann-Whitney <i>U</i> | <i>z</i> | <i>p</i> | Effect Size (<i>r</i>) |
|---|---------------|--------------|-----------------------|----------|----------|--------------------------|
| | No PA Courses | 1+ PA Course | | | | |
| Instruct PA content and knowledge | 493.29 | 565.24 | 81, 316.00 | -3.37 | .001* | -0.11 |
| Teach about the relationship between PA and health | 494.93 | 558.12 | 82, 591.50 | -2.95 | .003* | -0.09 |
| Lead activities to improve children's fitness development | 491.41 | 558.56 | 81, 270.00 | -3.16 | .002* | -0.10 |
| Create a childcare environment that encourages active play | 499.65 | 545.02 | 86, 249.50 | -2.14 | .032* | -0.07 |
| Use a variety of methods to encourage PA | 496.81 | 549.97 | 84, 327.50 | -2.50 | .012* | -0.08 |

Note. PA = physical activity. No PA Courses = Students with No Physical Activity/Education Courses Completed; 1+ PA Course = Students with One or More Physical Activity/Education Course Completed. * $p < 0.05$.

Table 7

Comparing Early Childhood Education Students' Self-Efficacy Based on Students' Meeting the Canadian Physical Activity Guidelines

| Task | Mean Rank | | Mann-Whitney <i>U</i> | <i>z</i> | <i>p</i> | Effect Size (<i>r</i>) |
|--|-----------------------|---------------------|-----------------------|----------|----------|--------------------------|
| | Insufficiently Active | Sufficiently Active | | | | |
| Instruct PA content and knowledge | 511.96 | 650.87 | 39,401.50 | -4.67 | .000* | -0.14 |
| Teach about the relationship between PA and health | 516.76 | 606.61 | 44,333.50 | -3.01 | .003* | -0.09 |
| Lead activities to improve children's fitness development | 509.03 | 641.83 | 39,634.50 | -4.49 | .000* | -0.14 |
| Create a childcare environment that encourages active play | 520.35 | 581.77 | 47,279.50 | -2.08 | .038* | -0.06 |
| Use a variety of methods to encourage PA | 512.33 | 638.38 | 40,597.50 | -4.26 | .000* | -0.13 |

Note. PA = physical activity. Insufficiently active indicates <150 minutes of moderate-to-vigorous physical activity per week, while sufficiently active indicates \geq 150 minutes of MVPA per week. * $p < 0.05$.

to lead activities that improve children's fitness development (e.g., cardiovascular endurance or muscular strength) than their less active peers (mean rank = 509.03), $U = 39,634.50$, $z = -4.49$, $r = -0.14$, $p < 0.05$. Appendix H provides box plots that display the median values and the distribution of responses for each individual self-efficacy rating scenario compared in the two Mann-Whitney U tests. Only 5.0% of ECE students' felt that no extra resources would be helpful to increase physical activity participation in the childcare environment, but many (range: 56.7% to 84.5%) identified the following as beneficial (from most to least popular): age/developmentally appropriate ideas for games/activities/exercises; active opportunity ideas in various weather climates; physical activity workshops or professional development programs; and, guest physical activity instructors. ECE students' were provided with an open-ended question to declare any beneficial resources or knowledge that would help them to facilitate physical activity for preschoolers. As discussed in Table 8, a few common themes emerged from their responses, including: the creation of a course devoted to physical activity; physical activity-related workshops and/or professional development opportunities; as well as specific physical activity resources or guidelines.

Table 8

Early Childhood Education Students' Reports of Additional Knowledge or Resources They Would Find Beneficial to Facilitate Physical Activity in Preschoolers

| Theme | Example Reflections |
|---|---|
| New PA Course | <p data-bbox="506 472 1461 505">“Instating a mandatory ECE class that is solely based on physical activity.”</p> <p data-bbox="506 557 1719 589">“There should be one class based on physical activity for children because it is very important.”</p> <p data-bbox="506 641 1929 673">“Include a course within the ECE curriculum that strictly focuses on physical activities, health, and well-being.”</p> <p data-bbox="506 725 1961 839">“I definitely think that a course would be beneficial to ECEs in training regarding how to teach physical education to young students.”</p> |
| Workshops/ Professional Development | <p data-bbox="506 894 1877 1008">“Continued professional development on ways to promote physical activity within our children and ways to communicate healthy lifestyle to our families that we deal with.”</p> <p data-bbox="506 1060 1969 1174">“I think it’s important to have specific guidelines on training for gross motor activities and more workshops on it. I think that if we can inspire adults (teachers and parents alike) to be more active it will help in the classroom.”</p> <p data-bbox="506 1226 1020 1258">“Time built into courses for workshops.”</p> |

Resources and
Guidelines

“An online webpage that is specific with activities to develop certain areas of physical development such as cardio, muscular, flexibility, coordination. With a list of activities as well of how it’s helping that particular area of development.”

“A physical activity website.”

“List of websites that offer additional resources and videos to see children in action and more ways to help explain fitness to children so they will understand.”

Note. PA = physical activity. ECE = Early Childhood Education. ECEs = Early Childhood Educators.

Chapter 4: Discussion

The purpose of the current study was to examine ECE students' physical activity-related knowledge and educational experience during their college training. As a secondary objective, ECE students' self-efficacy and physical activity behaviours were also explored. A total of 1,113 ECE students from various colleges across Ontario participated in the present study. This work adds a novel, important contribution to the literature as no known Canadian or international study has explored ECE students' knowledge (e.g., awareness of physical activity guidelines) and preparation (e.g., physical activity curriculum courses) to facilitate physical activity for preschoolers. A number of findings warrant discussion.

The current ECE college curriculum represents an untapped opportunity to provide future childcare providers with enriched physical activity-related training (i.e., only 37.8% and 66.5% of ECE students received compulsory course content on physical education and physical activity, respectively). Although physical activity/education content appears within their curriculum, additional training could be afforded in the preparation of early childhood educators by instating a mandatory course, or more enhanced course content. Subsequently, compulsory courses/course content may be ideal to empower future childcare providers with increased knowledge and skills to promote physical activity, while also satisfying their reported desire for additional resources. ECE students have indicated that there is room for improvement in the following areas of their physical activity-related educational experience: knowledge of important health-related guidelines pertaining to preschoolers; understanding of the relationship between physical activity and various health outcomes; self-efficacy levels to facilitate physical activity for preschoolers; and increased exposure to materials and resources to orchestrate physical activities during childcare. These findings are especially important in light of the low rates of physical activity participation evident among preschoolers in childcare (Vanderloo et al., under review), in

addition to practicing childcare providers that reported the need for additional physical activity-related training and resources (Fees et al., 2009; Tucker et al., 2011; van Zandvoort et al., 2010). Clearly, efforts are warranted to support improved physical activity participation among preschool-aged children, and targeting ECE students prior to graduation and embarking on their careers in childcare represents one appropriate way to do so.

As hypothesized, the present study confirmed that the majority of participating ECE students had not completed any specific physical activity/education courses (both mandatory and elective) during their college training. While it is possible that these students could go on to participate in training of this nature during their professional development sessions once they are working in the field, past research has indicated that this may not actually be the case. A recent study of 182 childcare providers in Illinois reported that only 66.7% of home-care providers and 43.0% of centre-based childcare providers had participated in physical activity training in the year prior (Kim, Shim, Wiley, Kim & McBride, 2012). This finding was echoed in the study by Trost et al. (2009) with providers operating family childcare homes in Kansas, as less than half had attended annual physical activity training. Similarly in Australia, of 112 preschools and 149 daycare centres, only 49.0% of preschool staff and 50.0% of childcare centre staff had completed any physical activity training within the past year (Wolfenden et al., 2011). If physical activity-related training is this sparse and inconsistent for ECE students and practicing early childhood educators alike, implementing a mandatory physical activity course as part of their college training may present an excellent opportunity to improve the physical activity-related knowledge and education of all future childcare providers. ECE students have personally endorsed the need for a mandatory course dedicated to preschooler physical activity needs, as suggested by the qualitative data collected in the present study.

Although a number of students in the current study declared that physical activity is marginally covered during their mandatory course lessons, it is evident that further enhancements could be made to the type and extent of physical activity-related material instructed. While it seems important that ECE students be taught the national Physical Activity Guidelines for the Early Years (0-4 years), only 28.7% reported receiving this course content, and only 2.0% accurately reported the appropriate minutes of physical activity per day (CSEP, 2012). This translates into 61.7% of the students underestimating the duration of time that preschoolers should be active each day—which is a majority of the sample, considering 27.7% of students were not familiar with the document to answer this question. This is disturbing given that almost two-thirds of the participants believed that most Canadian preschoolers do obtain sufficient daily physical activity. In addition, only 6.8% of students correctly estimated the Sedentary Behaviour Guidelines for this cohort, and one-half of them were not familiar enough with the document to answer the question. This knowledge gap highlights that students in ECE lack awareness and understanding of some valuable documents regarding preschoolers' health behaviours that could be guiding their prospective practices and positively influencing their programming decisions in childcare. It is concerning to think that the individuals who are in a powerful position over many preschoolers during childcare hours are uninformed about the amount of time these children should spend being active each day for healthy growth and development. The underuse of physical activity guidelines has been formerly revealed by practicing childcare staff: during focus groups with staff from Head Start and preschool programs in Colorado, one participant mentioned that they did not know the guidelines for preschool-aged children, nor the respective age-appropriate activities, and that their education lacked attention to physical activity guidelines for preschoolers (Bellows, Anderson, Gould, & Auld, 2008). Likewise, a childcare provider in Chow and Humbert's (2011) focus groups

questioned the presence of existing guidelines for all of the other daily tasks in childcare, yet none devoted to physical activity. In a study by Derscheid and colleagues (2010) of people working in the early childhood field (e.g., teachers, teacher assistants, staff), the individuals with less field experience relied more on the government guidelines than those with more field experience, suggesting that it may be appropriate to introduce such guidelines to students during an early, impressionable stage of their career.

Almost all of the ECE students in the present study were familiar with Ontario's Day Nurseries Act (1990); however, this well-known document does not provide comprehensive legislation or policies on preschoolers' daily physical activity during childcare hours (it mandates outdoor play time, not physical activity; Vanderloo et al., 2012). Therefore, introducing ECE students to the Canadian Physical Activity and Sedentary Behaviour Guidelines (CSEP, 2012) could serve as excellent supplements to the Day Nurseries Act (1990), which is evidently included in the current ECE curriculum. The Canadian guidelines are important supplementation for educating ECE students, given that the Ontario Day Nurseries Act has not been updated in 23 years, despite increases in childhood obesity, and consistent reports of low physical activity participation among preschoolers in childcare.

A large number of ECE students in the present study indicated that their abilities to encourage physical activity would benefit from additional resources, workshops, and exposure to new activities/ideas. This is a particularly important finding as it suggests that students recognize that increased support would be advantageous to their training, and also that these students share an interest in such materials. This finding is not a novel one; childcare providers have commonly admitted that they would appreciate new ideas for physical activities (De Craemer et al., 2013; Temple & Naylor, 2010; Tucker et al., 2011). In both a review by Goldfield et al. (2012) review as well as the Physical Activity Guidelines for Americans Midcourse Report (2012), increased

staff training is highlighted among the leading strategies that could help increase physical activity levels in preschool-aged children.

The present study explored self-efficacy to facilitate and instruct physical activity for preschool children based on their ECE training to date. Mean confidence of the ECE students ranged from 6.0 to 7.0 across the five items measured. This finding suggests that the physical activity-related content that exists in the current curriculum may be providing ECE students with a reasonable amount of knowledge and skills to contribute to their self-efficacy. While it is difficult to interpret if student perceived confidence in survey-based situations would translate to their actual confidence when placed in real-life situations, room for improvement exists nevertheless. Interestingly, the aspects where students felt they had the least confidence to teach preschoolers may coincide with insufficient learning about this content during their training. For example, ECE students had the lowest self-efficacy to teach about the relationship between physical activity and health, and less than half of ECE students reported having discussed the relationships between physical activity and various health outcomes during their ECE training. Based on our Mann-Whitney *U* test results, ECE students with increased physical activity/education training (i.e., had completed one or more courses) appeared to have higher confidence in certain teaching domains pertaining to physical activity (e.g., to instruct about physical activity content and knowledge). While the effect sizes were all relatively small (r ranged from -0.07 to -0.11) when comparing the self-efficacy between the two groups, other research suggests that this connection between training and confidence would be likely. Simpson, Tucker, and van Zandvoort (2011) found a similar relationship in their study of 58 physical education teachers: although not statistically significant, increased training may impact teachers' confidence when teaching physical education. Given that childcare providers have previously reported feeling they have less knowledge and self-efficacy in physical activity

provisioning (Copeland et al., 2012a; O'Connor & Temple, 2005), perhaps additional training could help to overcome this barrier (Derscheid et al., 2010). For an applicable example, Naylor and Temple (2013) recently found that their workshops (partially designed to improve the confidence of practicing childcare providers) successfully increased the percentage of participants who perceived their knowledge as sufficient to select activities suitable for different stages of development (increased from 64.7% to 86.0%) or to enrich the environment with objects/equipment/structures that facilitate movement experiences (increased from 66.4% to 91.2%). However it is important to note that there was no comparison group involved (Naylor & Temple, 2013), diminishing the ability to evaluate the true effectiveness of the intervention. As Derscheid et al. (2010) found that childcare providers in their focus groups lacked full awareness of how to incorporate developmentally appropriate practices into their daily teachings, they too acknowledged the potential implications that physical activity college classes or training could have on the confidence of early childhood educators to facilitate physical activity for children in their care.

Most ECE students in this sample believed that early childhood educators play an important role in engaging preschoolers in physical activity by way of role modeling, providing equipment, creating structured and unstructured activities, and providing verbal prompts. ECE students' recognition of this responsibility is promising with respect to preschooler's health behaviours, and consistent with several childcare providers' perceptions of their roles in creating physical activity opportunities (Cashmore & Jones, 2008; Pagnini et al., 2006; Kim et al., 2012). However, these findings are unlike those revealed in other literature on childcare providers' view of their roles with respect to preschoolers physical activity (e.g., Kim et al., 2012; Temple & O'Connor, 2003; Wilke, Opdenakker, Kremers, & Gubbels, 2013). For example, Wilke et al. (2013) identified that childcare workers do not perceive themselves to be a key promoter of

physical activity for children, and that the responsibility was shifted to the child's parents instead. Clearly, it is important that early childhood educators are cognizant of their role as physical activity promoters as this may increase their motivation to structure sufficient time for physical activities into the childcare curriculum each day.

Another finding worthy of discussion is that only 10.5% of ECE students from the present study reported participation in weekly MVPA at a level that meets the Canadian Physical Activity Guidelines for Adults (≥ 150 minutes of MVPA per week; CSEP, 2012). While childcare staff member's personal health habits would not necessarily impact their health-related practices with children at work (Gosliner et al., 2010), it could be of concern to have insufficiently active childcare workers, especially since 87.10% of participants had reported placement experience at a childcare centre. A childcare provider in focus groups exemplified this concern by stating: "I think if you are an active person yourself it will rub off on the children you look after" (O'Connor & Temple, 2005, p. 6). More physically active early childhood educators may have a positive influence in the childcare environment given the importance of modeling physical activity to children and the value they place on this behaviour (Fees et al., 2009); a strong interest in physical activity could influence providers' motivation to prioritize and model physical activity during preschool hours. While self-reported physical activity behaviours are not the most reliable measures as they can be falsely inflated due to social desirability bias (van de Mortel, 2008), this suggests that even fewer of the respondents of the survey from the current study may actually be sufficiently active. The results of the present study support the notion that ECE students' physical activity behaviours may influence their confidence to deliver physical activity in the workplace: ECE students were slightly more confident in their abilities to teach certain tasks related to physical activity when they were more active themselves. These findings align with Simpson et al (2011) indicating that a correlation exists between physical education

teachers' confidence to instruct and their personal physical activity behaviours. While the effect size was relatively small for each individual confidence item measured in this study (range of $r = -0.06$ to -0.14), this finding still indicates that training should emphasize the value and importance of leading a physically active lifestyle, for both children and adults.

The successful research program, HENRY (Health Exercise Nutrition for the Really Young), implemented with staff across 12 childcare centres in England, demonstrated a favourable outcome that can occur in the personal lifestyle behaviours of participating staff (Willis, Potrata, Hunt, & Rudolf, 2012). While the program was created to empower childcare staff with increased knowledge and skills to work with families to combat childhood obesity issues, the training program unexpectedly induced some changes in the physical activity and nutrition habits of participating staff and their families. In a qualitative study by Chow and Humbert (2011) with childcare centre staff, participants reported that a barrier to engaging preschoolers in physical activity was when co-workers' attitudes and behaviours toward physical activity were negative, which impacted their participation in physical activity with the children. A clear recommendation emerges from these studies: physical activity interventions or training for childcare providers would be wise to teach the importance of engaging preschoolers in physical activity as well as to promote the benefits of engaging in positive health behaviours for the staff themselves. If this occurred during the initial education of all childcare workers, as more of these individuals accept positions in childcare facilities, their new knowledge, skills, and values could help to set the subjective norm (i.e., the physical activity culture within the childcare centre), which has been shown to be a relevant factor in childcare workers' intention to engage preschoolers in physical activities (Gagné & Harnois, 2013).

While the present study offers a unique contribution to the literature, it is not without limitations. Although the total sample size was large, it would have been ideal if all of the

participants had answered the survey at the end of their graduating year (to ensure that they could accurately reflect on all ECE curriculum received). However, the results of the present study would not have dramatically changed given the very small portion of our total sample that had completed one or more courses specifically devoted to physical activity/education. As such, it is not likely that the amount of physical activity-related material covered in their curriculum would have drastically increased if all of the participants were in their second year of study. Had we decided to selectively target students in their final year, it could have greatly reduced participation. Instead, targeting all ECE students (i.e., first year or second year, full-time or part-time) at any stage of their college education allowed us to retrieve information from as many students as possible, and in turn greatly improved the generalizability of our results. Far more students completed the survey on paper than online, which potentially skews the data and threatens our external validity, as the number of responses received was disproportionate to the number of students attending each school (e.g., one school had 6 students participate, while another school had 363 students participate). Despite this, there was an excellent overall scope (i.e., participation from 20 colleges) and sample size to garner an understanding of the ECE student current learning experiences across Ontario. Thus, even if the responses were disproportionate from certain schools, they still represent a substantial number of future childcare providers who have justified that formal training of the early childhood educators may be an ideal opportunity to provide increased physical activity-related knowledge and resources. In addition, some of our smaller response rates may be explained by the fact that we were unable to arrange data collection at some colleges until the final few weeks of the semester, a busy time for students (e.g., classes ending, exams, summer jobs, etc.). The possibilities for volunteer bias and social desirability bias from the participants was not absent; many of the students who chose to fill out the survey may be those who place higher value or interest on children's physical

activity, and some could have answered the questions to select answers they believed researchers wanted to hear. While it was made clear that the survey was voluntary and anonymous, students completing the paper survey may have felt obliged to participate when the researcher, professor and/or college staff member was present in the room during survey distribution.

Given that no validated, reliable instrument was found to investigate the ECE students physical activity-related knowledge and learning experience, the measurement method used for the present study was created by the researchers and had not been formally validated or tested for reliability. While this may affect the internal validity of the current study, both researchers and experts in the field reviewed the survey to ensure face validity, and there was no explicit confusion about the survey expressed from participating students or ECE classroom professors. Due to the nature of collecting data using a survey format, there were several occasions where students would answer with inconsistent logic (e.g., would check off that they have heard of the CSEP guidelines in one question, but check off that they are not familiar with the guidelines in the subsequent questions; or would answer a question by checking off all of the items that they had discussed in class, but then check off that they had not discussed any) suggesting that students may not have always given their full attention to each question. Providing students with close-ended questions also meant no interpretation issues could be resolved for either the participant or the researcher.

Summary and Future Implications

This study makes an important contribution to the literature on preschoolers' physical activity in the childcare environment as it was the first one to gather a basic understanding of the physical activity-related training of ECE students with a provincial scope. Moving forward, the current study could heighten awareness of certain physical activity-related gaps in ECE students' knowledge and curriculum that might be considered in future revisions to the ECE curriculum.

Given that early childhood educators are employed at a variety of facilities (i.e., centre-based childcares, home-based daycares, early learning programs, or before and school programs) without enforced regulations for physical activity-related practices and policies, it is crucial that all ECE students will graduate from their studies and enter the workforce with sufficient physical activity-related knowledge, skills, and training to confidently structure physical activity within their childcare programming. The ECE curriculum presents a unique opportunity to support these individuals with such comprehensive physical activity knowledge and training.

In terms of research implications, this study serves as an important platform for future physical activity research investigations or interventions with early childhood educators. Seeing as only a small portion of the current sample provided qualitative feedback ($n = 32$), future researchers could conduct a qualitative study (e.g., focus groups) to gather more in-depth details and perspectives on the desire for, and types of physical activity-related courses or content that could be added to the ECE curriculum. Important opinions to include could be ECE students, ECE course instructors, ECE program faculty, research experts in the field, and practicing childcare staff to ensure that the coursework covered will maintain real-life application for jobs in the field. More specifically, it would be beneficial to obtain ECE students' opinions and description of their current physical activity training, as well as classroom professor's perspectives on the attention to physical activity within the current ECE curriculum. The latter could be a valuable, informative perspective to collect, given that it is possible this course content was taught, but the ECE students in the current study had missed the class or forgot about that material when answering the survey. In addition, by reviewing some of the common barriers to facilitating physical activity for preschoolers as cited by early childhood educators (e.g., lack of space [van Zandvoort et al., 2010], clothing [Copeland et al., 2009; Wilke et al., 2013], or preschool policies [Copeland et al., 2012b; Wilke et al., 2013]), ECE instructors or

program faculty may reveal ways these future providers can combat these challenges, which would be advantageous for students to learn in advance of working. As such, a longitudinal study could assess the degree to which increased ECE training impacts ECE students' self-efficacy as well as physical activity levels of preschoolers. Finally, the current study could be broadened to a national level to see if any differences exist between institutions across the country regarding the ECE curriculum and/or ECE students' physical activity-related knowledge.

Physical activity among the preschool cohort demands increased attention from childhood researchers across the globe (Active Healthy Kids Canada, 2010; Birch, Parker, & Burns, 2011; Goldfield et al., 2012; Skouteris et al., 2012; Timmons et al., 2012). Our recognition of the opportunity within childcare providers' educational programming to offer increased training and resources to support preschooler's physical activity should not be overlooked. More specifically, the current study builds on the rationale by Goldfield et al. (2012) to intervene with childcare providers to influence physical activity levels of preschoolers in care. Based on the specific findings from the current study, ECE students require more supportive training on the relationship between physical activity and health outcomes; on accessing activity guidelines for the early years; as well as resources that are desired by ECE students, such as age/developmentally-appropriate physical activities and active opportunities ideas in various weather climates. Considering the powerful role of early childhood educators in the childcare environment (Derscheid et al., 2010; Goldfield et al., 2012; Pate et al., 2008), coupled with the relationship between increased teacher training and higher childcare centre physical activity levels (Bower et al., 2008; Dowda et al., 2004) it is crucial to provide early childhood educators with substantial knowledge, resources, and practical experience in order to create valuable physical activity opportunities for preschool-aged children. Moreover, by providing this knowledge proactively during early childhood educators' formal training, it is possible that, once

they enter the workforce, these childcare providers will be champions for physical activity-related curriculum being provided to the preschoolers in their care. It is imperative that early childhood educators be targeted as students to ensure that all future childcare providers are educated and prepared to support physical activity within the childcare curriculum. Relying solely on the creation of physical activity-related provincial policies, or physical activity workshops/interventions to support current early childhood educators with increased skills and resources significantly reduces the overall reach and impact of these initiatives. A greater number of children would benefit if providers were equipped with physical activity-related knowledge and skills prior to entering the workforce. Ultimately, increasing support for ECE students may help to build their respective self-efficacy when working as childcare providers, and lends further strength to the importance of intervening prior to graduation. It may prove beneficial for all early childhood educators to receive comprehensive training on physical activity during their formal training.

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Appendix A: The University of Western Ontario Health Sciences Research Ethics Board Approval



Research Ethics

Use of Human Participants - Ethics Approval Notice

Principal Investigator: Dr. Patricia Tucker
 File Number: 103426
 Review Level: Delegated
 Approved Local Adult Participants: 430
 Approved Local Minor Participants: 0
 Protocol Title: An Exploration of Early Childhood Education Students' Physical Activity-Related Knowledge and Preparation
 Department & Institution: Health Sciences/Occupational Therapy, Western University
 Sponsor:
 Ethics Approval Date: April 05, 2013 Expiry Date: December 31, 2013
 Documents Reviewed & Approved & Documents Received for Information:

| Document Name | Comments | Version Date |
|-----------------------|--|--------------|
| Letter of Information | Revised. Clarification of implied consent. | |

This is to notify you that The University of Western Ontario Research Ethics Board for Health Sciences Research Involving Human Subjects (HSREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the Health Canada/CH Good Clinical Practice Practices: Consolidated Guidelines; and the applicable laws and regulations of Ontario has reviewed and granted approval to the above referenced revision(s) or amendment(s) on the approval date noted above. The membership of this REB also complies with the membership requirements for REB's as defined in Division 5 of the Food and Drug Regulations.

The ethics approval for this study shall remain valid until the expiry date noted above assuming timely and acceptable responses to the HSREB's periodic requests for surveillance and monitoring information. If you require an updated approval notice prior to that time you must request it using the University of Western Ontario Updated Approval Request Form.

Members of the HSREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussion related to, nor vote on, such studies when they are presented to the HSREB.

The Chair of the HSREB is Dr. Joseph Gilbert. The HSREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000940.

Signature

Ethics Officer to Contact for Further Information

| | | |
|-------------------|-------------|-----------------|
| Janice Sutherland | Grace Kelly | Shantel Walcott |
|-------------------|-------------|-----------------|

This is an official document. Please retain the original in your files.

Appendix B: Invitation Email to Early Childhood Education Program Coordinators
and/or Dean/Chair of the Program

Subject Line: Possible Research Study

Hello,

My name is Trish Tucker and I am a faculty member in Health Sciences at Western University. My research efforts are focused on physical activity levels among preschool-aged children. We are quickly discovering the significant role that Early Childhood Educators play in encouraging and supporting preschoolers' physical activity levels within early childhood settings. We have previously conducted focus groups with childcare providers from around the city. As a next phase, we are hoping to administer a survey to Early Childhood Education (ECE) students to gain an understanding of their knowledge and resource needs related to physical activity engagement with young children. With the high rates of childhood obesity, and the low levels of physical activity often seen in young children, we are trying to identify ways in which we can support childcare providers in engaging preschoolers in physical activity, and in order to do this, having an understanding of the knowledge and training ECE students have, will be a first step.

We are contacting you today to see if (*insert college name*) would be one of the Ontario colleges interested in participating in our study. If you are willing to participate, we would be looking to circulate an anonymous survey with all of the students enrolled in your ECE diploma program (e.g., full-time or part-time, year 1 or year 2), using a method you deem to be most convenient (online via Survey Monkey or on paper in the classroom). The survey will take approximately 10 minutes to complete and will gather information relating to ECE students' knowledge and training to facilitate physical activity with young children.

Thank you very much for considering this request and if there is someone else we should contact, could you please direct me accordingly. We would be more than happy to share the survey with you beforehand, as well as share the results with you after the data has been collected. Please let me know if you have any questions or require any more information. We would be happy to address any of your inquiries, and we look forward to hearing from you.

Warm regards,

Trish Tucker

Trish Tucker, PhD
Assistant Professor - School of Occupational Therapy
Western University
London, Ontario CANADA N6G 1H1





Appendix C: Letter of Information – Paper Version

AN EXPLORATION OF EARLY CHILDHOOD EDUCATION STUDENTS' PHYSICAL ACTIVITY-RELATED KNOWLEDGE AND PREPARATION

Investigators

Trish Tucker, PhD, Faculty of Health Sciences, Western University
Olivia Martyniuk, BHSc, Faculty of Health Sciences, Western University

Background

Research has previously indicated that preschool-aged children are insufficiently active. Childcare centers have been identified as an appropriate venue to support and encourage physical activity participation among young children. However, childcare providers have previously expressed the need for increased training and resources to help them engage children in physical activity.

Purpose of the Study

Students enrolled in an Early Childhood Education (ECE) diploma program at various Ontario colleges will be recruited for this study. The aim of this study is to gain an understanding of Early Childhood Education students' knowledge, training, and resource needs related to physical activity engagement with preschool-aged children.

If You Agree to Participate

If you agree to participate in this study you will be asked to complete a survey (attached) that will be distributed during your class time. The survey will take approximately 10 minutes to complete. Your voluntary completion of this anonymous survey implies your consent.

Confidentiality

The information collected will be used for research purposes only, and neither your name nor any personally identifiable information will be collected. All data will be grouped with other participants for publishing or presentation purposes. All information collected for the study will be kept confidential. Only the investigators of this study will have access to any data collected. All electronic files will be saved on password-protected computers. Data will be saved for 5 years before it is properly destroyed.

Risks & Benefits

There are no known risks or benefits to you for participating in this study. However, by participating, you will provide researchers with valuable information about the education and training that Early Childhood Education students receive with regard to physical activity facilitation.

Voluntary Participation

Participation in this study is voluntary. You may refuse to participate, skip any survey questions, or withdraw from the study at any time with no effect on your grades or academic status.

Compensation

Upon completion of the survey, you will be provided with instructions on how to enter a draw to win a \$25 Chapters gift card, as appreciation for your time.

Questions

If you have any questions about the conduct of this study or your rights as a research participant you may contact the Office of Research Ethics, Western University. If you have any questions about this study, please contact Dr. Trish Tucker.

If you would like to receive a copy of the overall results of the study, please email researcher after completing the survey. This letter is yours to keep for future reference.

Participant Initials ____

Appendix D: Invitation Email to Early Childhood Education Students

Subject Line: Participation in Research Study

Dear student:

Researchers at Western University are conducting a study to explore Early Childhood Education (ECE) students' physical activity-related knowledge and training at the college level.

We are looking for students who are enrolled in ECE diploma programs at Ontario colleges, regardless of enrollment status (e.g., full-time or part-time, year 1 or year 2). We are asking you to complete an online survey through Survey Monkey. Participation in this anonymous survey is completely voluntary, and will take approximately 10 minutes to complete. If you are interested in participating, please begin by reviewing the additional details in the Letter of Information attached to the survey. The survey can be accessed at the following link:

<https://www.surveymonkey.com/s/6ZDYSZD> . We would very much appreciate your completion of this survey, as it will provide valuable ideas for ways in which we can support childcare providers to engage preschoolers in physical activity. The survey link will stay open until June 1st, 2013.

No personal information will be collected, and all data will be grouped with other participants for publishing purposes. Your decision to participate (or not) will have no bearing on your schooling or grades.

We appreciate your willingness to participate. Please note that in two weeks I will send a reminder email about the online survey.

Warm regards,

Trish Tucker

Trish Tucker, PhD
Assistant Professor - School of Occupational Therapy
Western University
London, Ontario CANADA N6G 1H1





Appendix E: Letter of Information – Online Version

AN EXPLORATION OF EARLY CHILDHOOD EDUCATION STUDENTS' PHYSICAL ACTIVITY-RELATED KNOWLEDGE AND PREPARATION

Investigators

Trish Tucker, PhD, Faculty of Health Sciences, University of Western Ontario

Olivia Martyniuk, BHSc, Faculty of Health Sciences, University of Western Ontario

Background

Research has previously indicated that preschool-aged children are insufficiently active. Childcare centers have been identified as an appropriate venue to support and encourage physical activity participation among young children. However, childcare providers have previously expressed the need for increased training and resources to help them engage children in physical activity.

Purpose of the Study

Students enrolled in an Early Childhood Education (ECE) diploma program at various Ontario colleges will be recruited for this study. The aim of this study is to gain an understanding of Early Childhood Education students' knowledge, training, and resource needs related to physical activity engagement with preschool-aged children.

If You Agree to Participate

If you agree to participate in this study you will be asked to complete a 10-minute survey online through Survey Monkey.

Confidentiality

“Survey Monkey,” is located in the USA and is the host of this online survey. The survey data is subject to access by American Regulatory bodies, with no obligation to inform the participants. The information collected will be used for research purposes only, and neither your name nor any personally identifiable information will be collected. All data will be grouped with other participants for publishing or presentation purposes. All information collected for the study will be kept confidential. Only the investigators of this study will have access to any data collected. All electronic files will be saved on password-protected computers. Data will be saved for 5 years before it is properly destroyed.

Risks & Benefits

There are no known risks or benefits to you for participating in this study. However, by participating, you will provide researchers with valuable information about the education and training that ECE students receive with regard to physical activity facilitation.

Voluntary Participation

Participation in this study is voluntary. You may refuse to participate, skip any survey questions or withdraw from the study at any time with no effect on your grades or academic status.

Compensation

Upon completion of the survey, you will be provided with instructions on how to enter a draw to win a \$25 Chapters gift card, as appreciation for your time.

Questions

If you have any questions about the conduct of this study or your rights as a research participant you may contact the Office of Research Ethics, Western University. If you have any questions about this study, please contact Dr. Trish Tucker.

If you would like to receive a copy of the overall results of the study, please email researcher after completing the survey. This letter is yours to keep for future reference.

Appendix F: An Exploration of Early Childhood Education Students' Physical Activity-Related Knowledge and Preparation

Objective: Researchers from Western University are inviting Early Childhood Education (ECE) students enrolled in an Ontario college to complete the following survey. We are seeking information regarding ECE students' knowledge and training with regards to promoting physical activity among *preschool-aged children (2.5-5 years)*.

Instructions: Please respond to all questions by choosing the most appropriate response option. You may skip any questions or choose to withdraw from the study at any time. Please note that voluntary completion of this anonymous survey implies your consent, which will allow researchers to use these data for analysis and publication. No personal information will be linked with any of your answers, and all data will be grouped with other participants for publishing purposes. Your decision to participate (or not) will have no bearing on your schooling or grades. The survey will take approximately 10 minutes to complete. We appreciate your willingness to participate and thank you for your time.

Section A: Participant Information

1. Please select your sex: Male Female

2. Please state your age (in years): _____

3. Please indicate your ethnicity:

| | |
|---|---|
| <input type="checkbox"/> Caucasian | <input type="checkbox"/> Asian |
| <input type="checkbox"/> African Canadian | <input type="checkbox"/> Arab |
| <input type="checkbox"/> Aboriginal | <input type="checkbox"/> Other, please specify: _____ |
| <input type="checkbox"/> Hispanic | <input type="checkbox"/> I prefer not to answer |

4. At which Ontario College are you currently enrolled? _____

5. In which year of your ECE College Program are you currently enrolled?

| |
|---|
| <input type="checkbox"/> Year 1 |
| <input type="checkbox"/> Year 2 |
| <input type="checkbox"/> Other, please specify: _____ |

6. What is your current enrollment status in your ECE program?

| |
|------------------------------------|
| <input type="checkbox"/> Full-Time |
| <input type="checkbox"/> Part-Time |

7. Please indicate if you have any work, volunteer, or placement experience at a childcare centre:

- Work experience Placement experience
 Volunteer experience None

Section B: Physical Activity Experiences

For the purpose of this study, we have adopted the Canadian Society of Exercise Physiology (CSEP) definition of **physical activity** as: *any bodily movement that results in increased breathing, heart rate, and energy expenditure*. Examples include: active recreation and exercise (e.g., hiking, running, playground activities, playing sports, etc.), leisure activities (e.g., yoga, gardening, etc.), and/or active transportation (e.g., bicycle riding, brisk walking, etc.)

8. How important is physical activity in your life?

- Not at all important
 Neither important or unimportant
 Somewhat important
 Very important

9. How many minutes of **moderate-to-vigorous** physical activity (e.g., cycling, jogging, swimming, playing sports, etc.) do you obtain during a typical week?

- Less than 30 minutes 90-119 minutes
 30-59 minutes 120-149 minutes
 60-89 minutes 150 minutes or more

10. Please circle YES or NO to indicate your sports/fitness-related experience:

- Have you ever had a personal fitness trainer? YES NO
 Have you ever played on a sports team? YES NO

Please state if you have any other fitness-related qualifications/experiences (e.g., *soccer coach*): _____

Section C: Physical Activity-Related Education & Training During the College Years

11. What physical activity or physical education training have you completed during your ECE college education?

- No formal physical activity/education training completed
 1 course – Course name: _____
 2 courses – Course names: _____
 3+ courses – Course names: _____

12. Have any of the following concepts been covered during your: (please check all that apply)

A. **Mandatory** ECE course lessons:

- Physical education
- Physical activity
- Gross motor skills
- Locomotor & non-locomotor skills
- The FITT Principle
- No mandatory courses discussed these topics

B. **Elective** ECE course lessons:

- Physical education
- Physical activity
- Gross motor skills
- Locomotor & non-locomotor skills
- The FITT Principle
- No elective course discussed these topics

13. How important do you believe it is for **preschoolers** to participate in physical activity during childcare hours?

- Not at all important
- Neither important or unimportant
- Somewhat important
- Very important

14. To your knowledge, which of the following health benefits (if any) can children obtain from regular physical activity (please check all that apply):

- increased coordination
- reduced stress
- improved sleep
- enhanced brain function
- strong bones and healthy muscles
- develop social awareness
- motor proficiency
- I don't know

15. During your ECE training thus far, have you studied or discussed the relationships between physical activity and any of the following health concepts (please check all that apply):

- rates of childhood obesity
- prevalence of type II diabetes (*diabetes mellitus*)
- heart disease
- mental health
- cancer rates
- I don't remember

16. Have you been introduced to any of the following **documents** during your coursework or work placement (please check all that apply):

- The Day Nurseries Act
- Active Healthy Kids Canada Report Card
- Canadian Physical Activity Guidelines for the Early Years
- Canadian Sedentary Behaviour Guidelines for the Early Years
- I have never heard of any of these documents

17. If you are familiar with the Canadian **Physical Activity** Guidelines for the Early Years, do you recall the **minimum amount** of time that preschool-aged children should be **physically active** each day?

- | | |
|--------------------------------------|---|
| <input type="checkbox"/> 30 minutes | <input type="checkbox"/> 180 minutes |
| <input type="checkbox"/> 60 minutes | <input type="checkbox"/> I don't know how many minutes |
| <input type="checkbox"/> 90 minutes | <input type="checkbox"/> I'm not familiar with these guidelines |
| <input type="checkbox"/> 120 minutes | |

18. If you are familiar with the Canadian **Sedentary Behaviour** Guidelines for the Early Years, do you recall the amount of **screen time** preschool-aged children should be **limited to** per day?

- | | |
|--------------------------------------|---|
| <input type="checkbox"/> 30 minutes | <input type="checkbox"/> 180 minutes |
| <input type="checkbox"/> 60 minutes | <input type="checkbox"/> I don't know how many minutes |
| <input type="checkbox"/> 90 minutes | <input type="checkbox"/> I'm not familiar with these guidelines |
| <input type="checkbox"/> 120 minutes | |

19. Based on your learning experiences so far, do you believe **Canadian preschoolers** engage in sufficient levels of physical activity per day (as per the Canadian guidelines)?

- | | |
|---|---------------------------------------|
| <input type="checkbox"/> Most do <u>not</u> | <input type="checkbox"/> Most do |
| <input type="checkbox"/> About half do | <input type="checkbox"/> I don't know |

20. Within the childcare environment, what role do you see ECE's playing with regards to preschoolers' physical activity levels (please check all that apply):

- Act as a role model by engaging in activity with the children
- Verbally prompt children to engage in physical activity
- Provide equipment that supports active play
- Introduce structured and unstructured activities to encourage active movement
- I don't think ECEs have an effect on preschooler's physical activity levels

21. The following aspects of the childcare environment have been identified as influencing children's physical activity levels while in childcare. Have you discussed any of the following during your coursework or work placement (please check all that apply):

- | | |
|--|---|
| <input type="checkbox"/> Amount of fixed equipment (e.g., see-saws, play structure) | <input type="checkbox"/> Adult/teacher prompts |
| <input type="checkbox"/> Amount of portable equipment (e.g., balls, push/pull toys) | <input type="checkbox"/> Adult/teacher participation in activities |
| <input type="checkbox"/> Amount of free space | <input type="checkbox"/> Behaviour modeling by adults/teachers |
| | <input type="checkbox"/> We have not discussed any of these in relation to physical activity |

Section D: Facilitation & Instruction of Physical Activity for Preschool Children

For question #22, please record a number from 1 to 10 for each of the concepts, using the following efficacy rating scale:

| | | | | | | | | | |
|------------------|---|---|---|-------------------|---|---|---|---|-----------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Cannot do at all | | | | Moderately can do | | | | | Highly certain can do |

22. Based on your training to date, how would you rate your **confidence** to (please refer to the scale above):

- Instruct physical activity content and knowledge _____
- Teach about the relationship between physical activity and health _____
- Lead activities to improve children’s fitness development (e.g., cardiovascular endurance, muscular strength, flexibility & coordination) _____
- Create a childcare environment that encourages active play _____
- Use a variety of methods in encourage physical activity _____

23. In an effort to increase physical activity participation among preschoolers attending childcare, what would be a helpful resource for you as an ECE?

- Instructional strategies to promote physical activity
- Active opportunity ideas in various weather climates
- Age/developmentally-appropriate ideas for games/activities/exercises (e.g., types of ball games, moving to music, dances, structured activities)
- Physical activity workshops or professional development programs
- Guest physical activity instructor

Please let us know if there is any other knowledge or resources that would help you to facilitate physical activity in the childcare environment:

Thank you for completing this survey.

Paper-version of the survey - please return to a researcher or professor in your classroom.
 Online survey - please submit through Survey Monkey.
 Please email researcher with the subject: *ECE SURVEY RESULTS* if you would like us to send you a copy of the survey’s results.
 As appreciation for your time, if you would like to enter the draw to win a \$25 Chapters gift card, please email researcher with the subject: *ECE STUDENT GIFT CARD*

Appendix G: Reminder Email to Early Childhood Education Students

Subject Line: Research study reminder

Dear student:

We would like to thank you for your time and effort to complete our survey regarding ECE students' physical activity-related knowledge and preparation. We very much appreciate your contribution to our research.

If you haven't already, and are still interested in completing the survey, please visit the following link: <https://www.surveymonkey.com/s/6ZDYSZD>. The survey will close in __ days, so we request that you complete this by June 1st, 2013. As a reminder, the survey only takes 10 minutes to complete.

Thank you again for your willingness to participate.

Warm regards,

Trish Tucker, PhD

Trish Tucker, PhD
Assistant Professor - School of Occupational Therapy
Western University
London, Ontario CANADA N6G 1H1



Appendix H: Box Plots

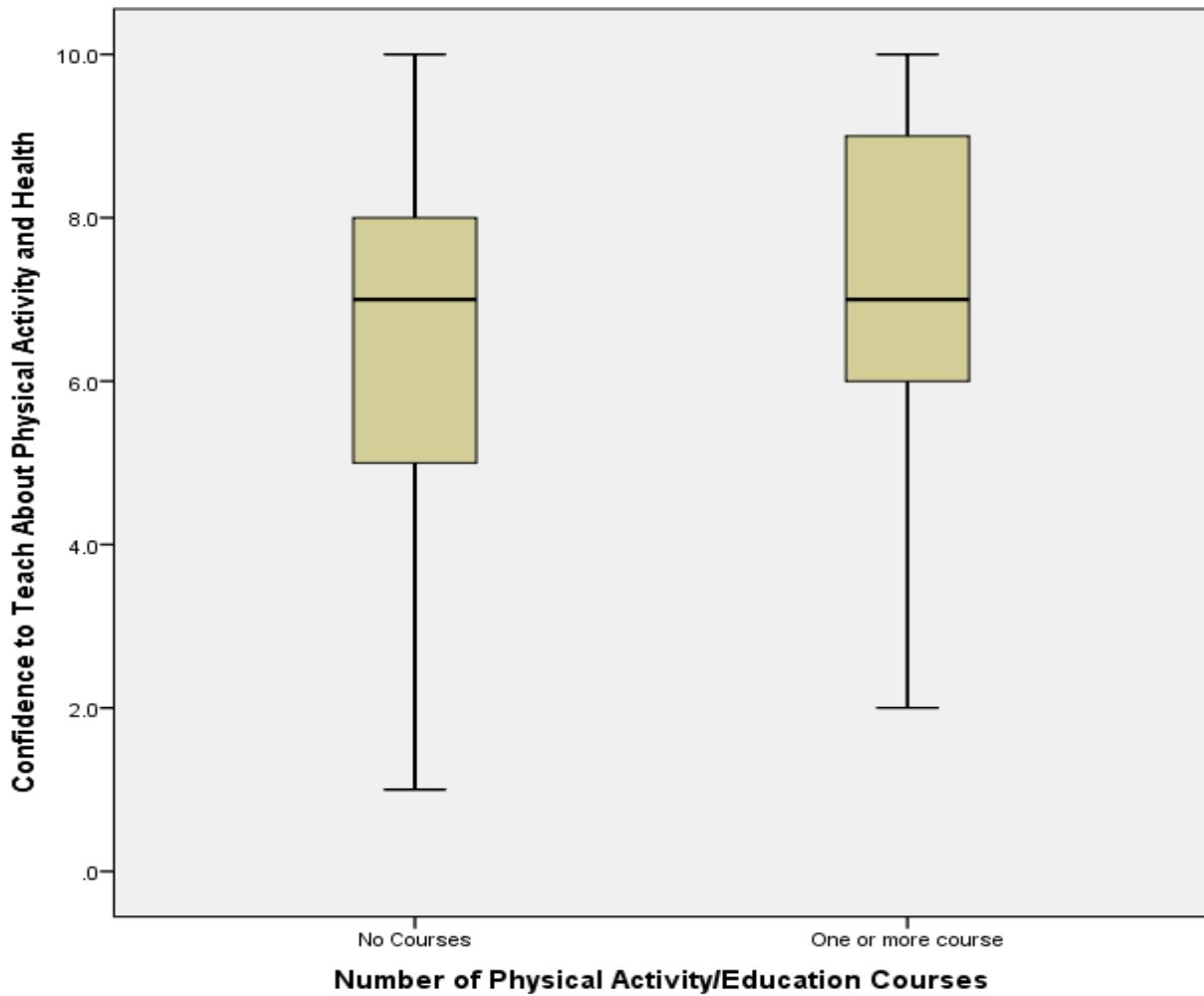


Figure 1. ECE Students' Confidence to Teach About the Relationship Between Physical Activity and Health Based on the Number of Physical Activity/Education Courses Completed.

Confidence was reported on a self-efficacy rating scale from 1-10.

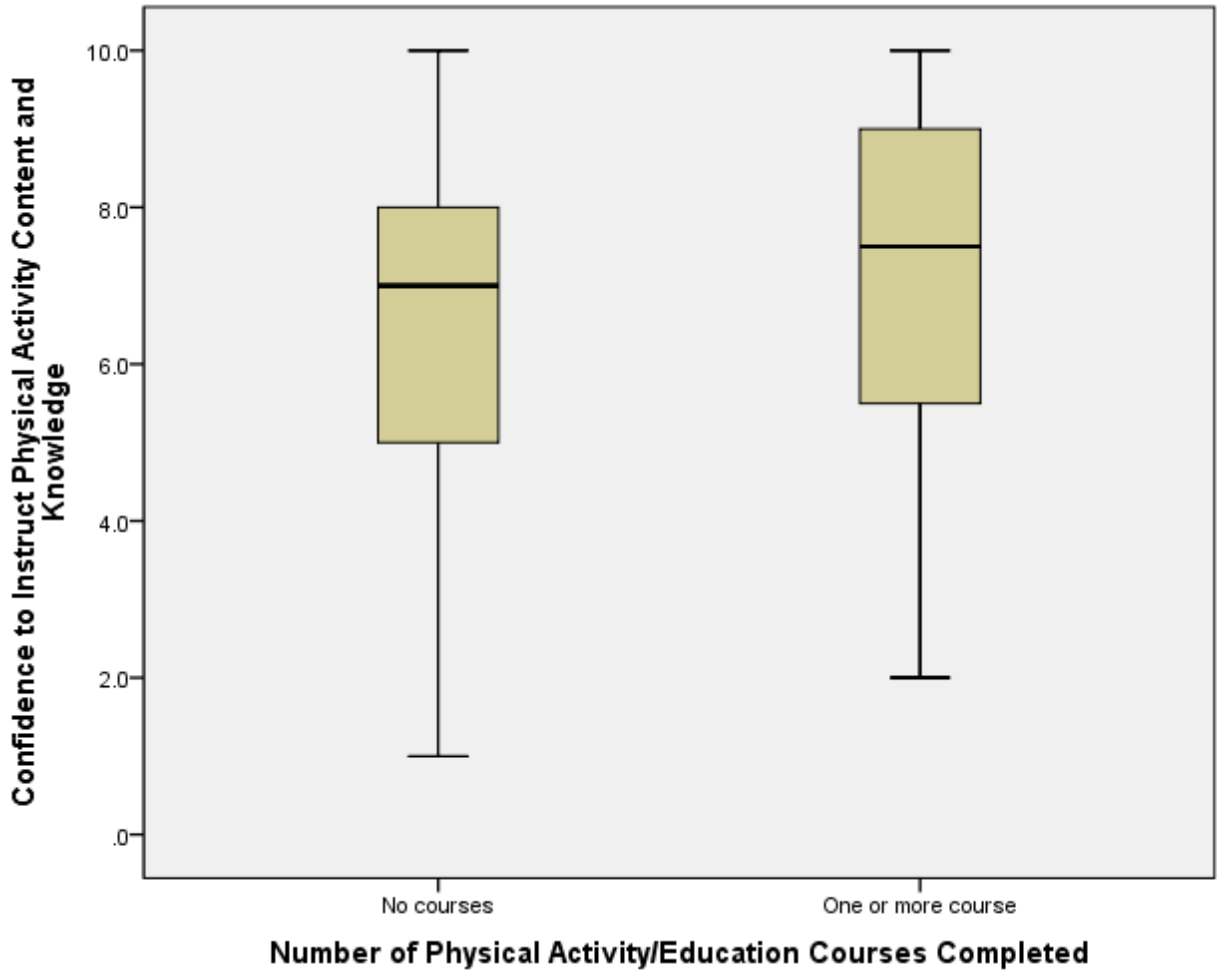


Figure 2. ECE Students' Confidence to Instruct Physical Activity Content and Knowledge Based on the Number of Physical Activity/Education Courses Completed. Confidence was reported on a self-efficacy rating scale from 1-10.

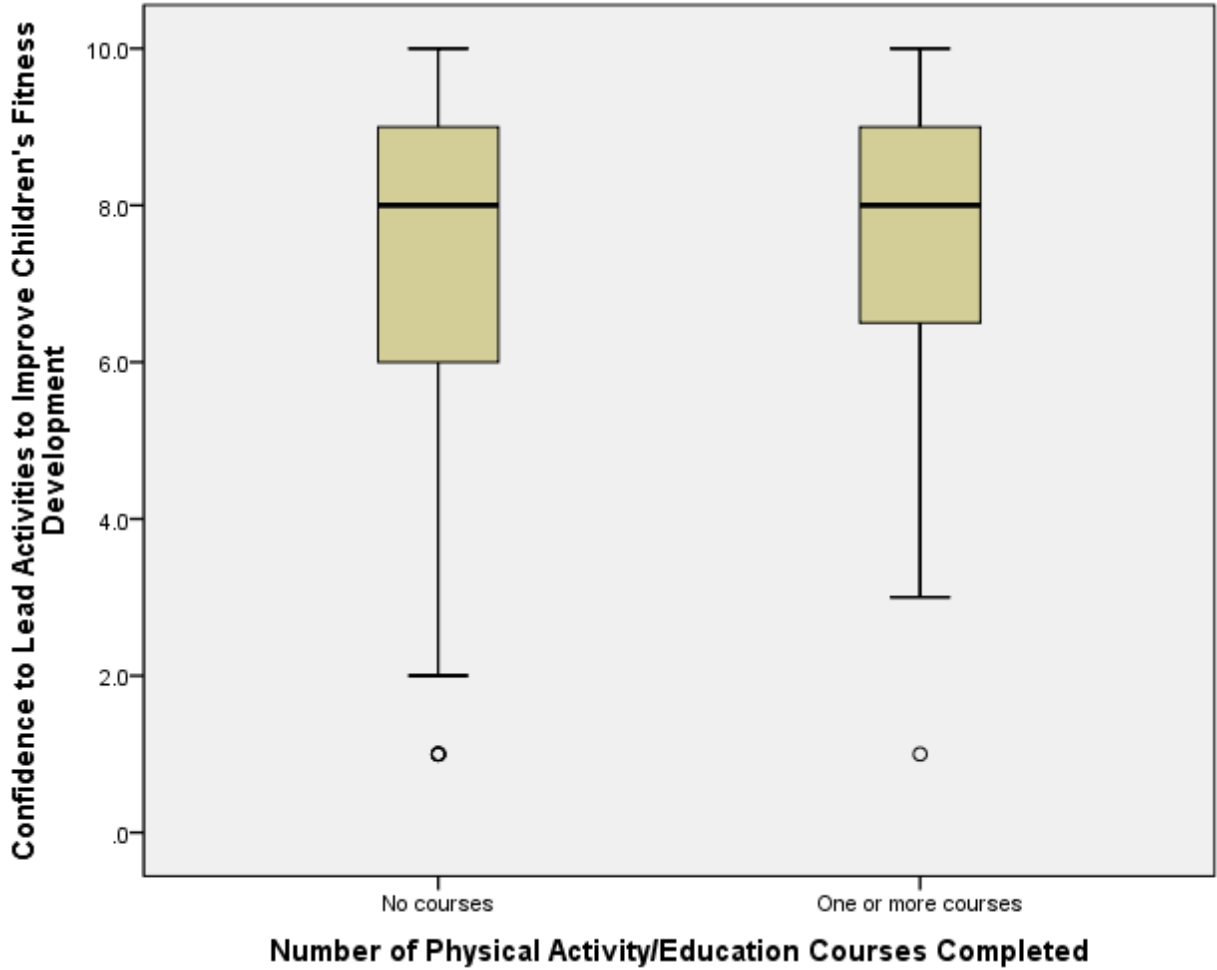


Figure 3. ECE Students' Confidence to Lead Activities to Improve Children's Fitness Development Based on the Number of Physical Activity/Education Courses Completed. Confidence was reported on a self-efficacy rating scale from 1-10.

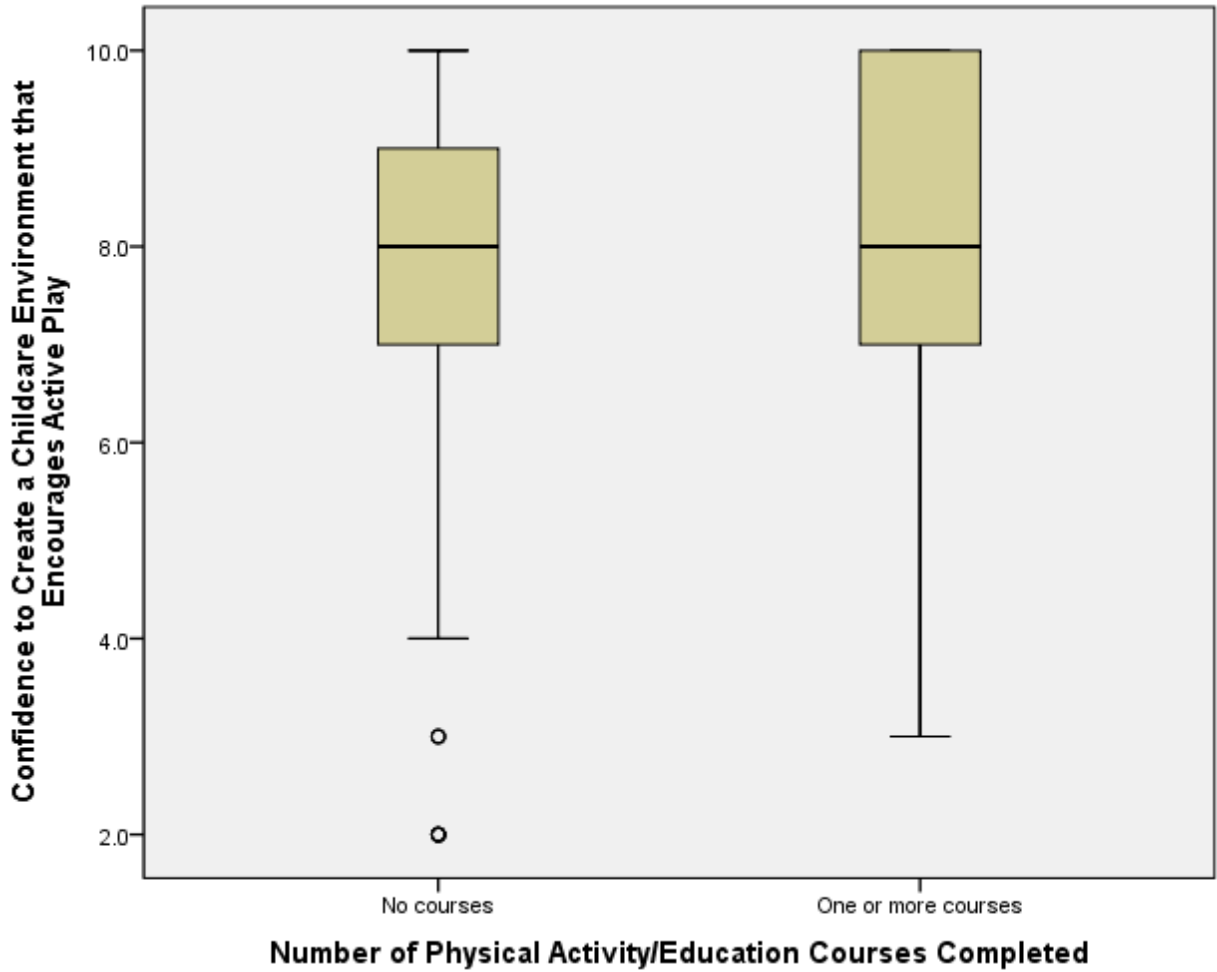


Figure 4. ECE Students' Confidence to Create a Childcare Environment that Encourages Active Play Based on the Number of Physical Activity/Education Courses Completed. Confidence was reported on a self-efficacy rating scale from 1-10.

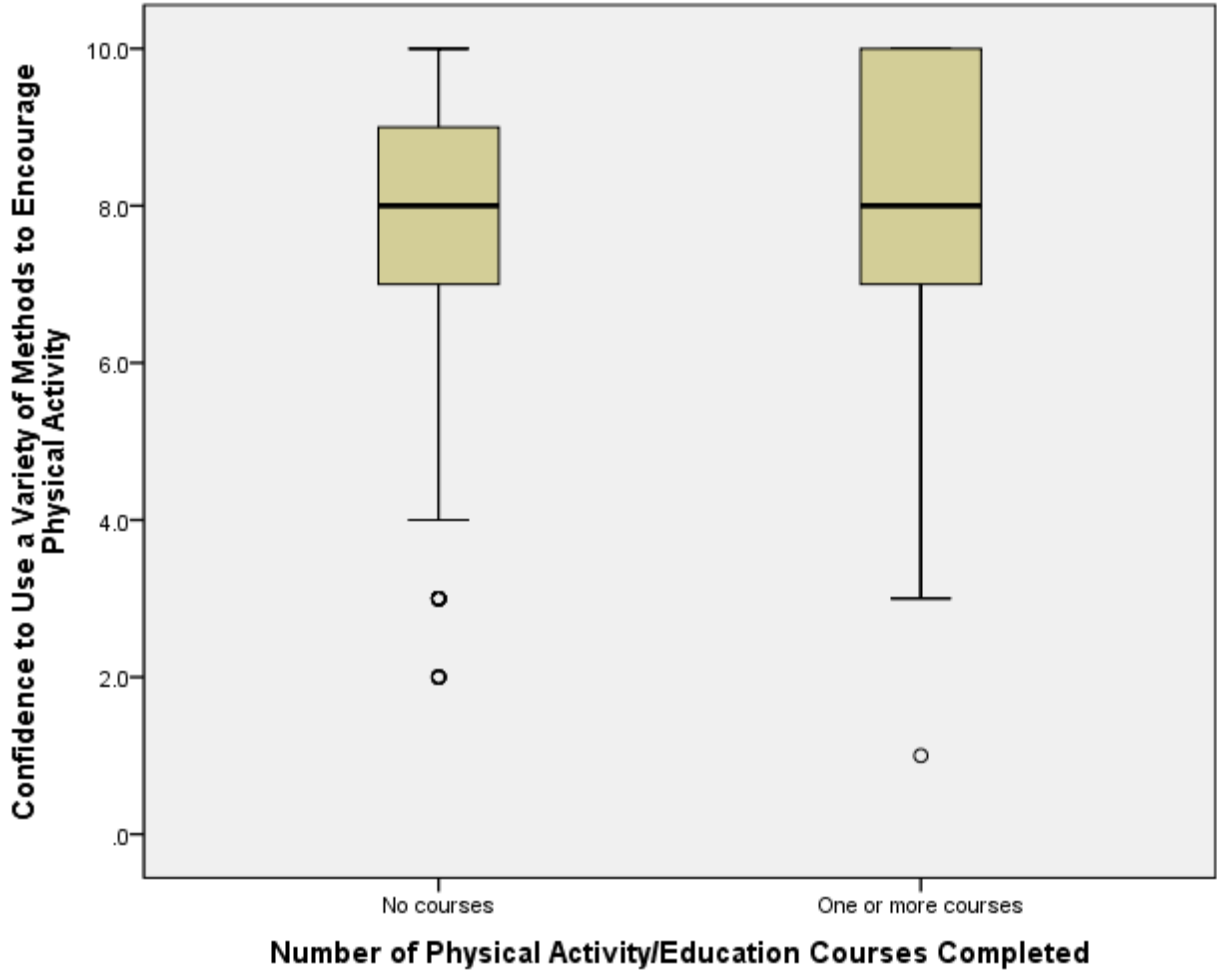


Figure 5. ECE Students' Confidence to Use a Variety of Methods to Encourage Physical Activity Based on the Number of Physical Activity/Education Courses Completed. Confidence was reported on a self-efficacy rating scale from 1-10.

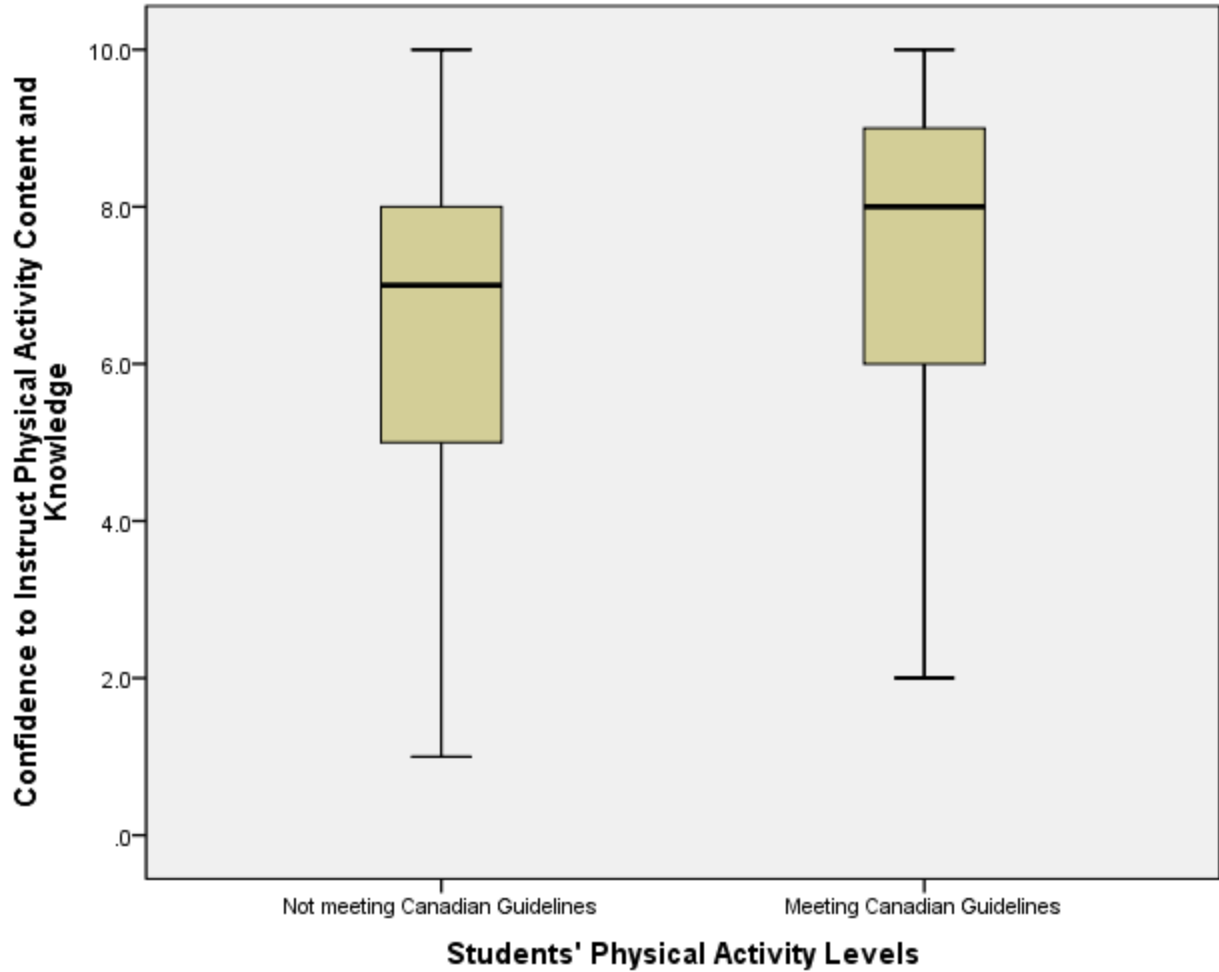


Figure 6. ECE Students' Confidence to Instruct Physical Activity Content and Knowledge Based On the Amount of Students' Moderate-to-Vigorous Physical Activity Minutes Accumulated Per Week. Confidence was reported on a self-efficacy rating scale from 1-10.

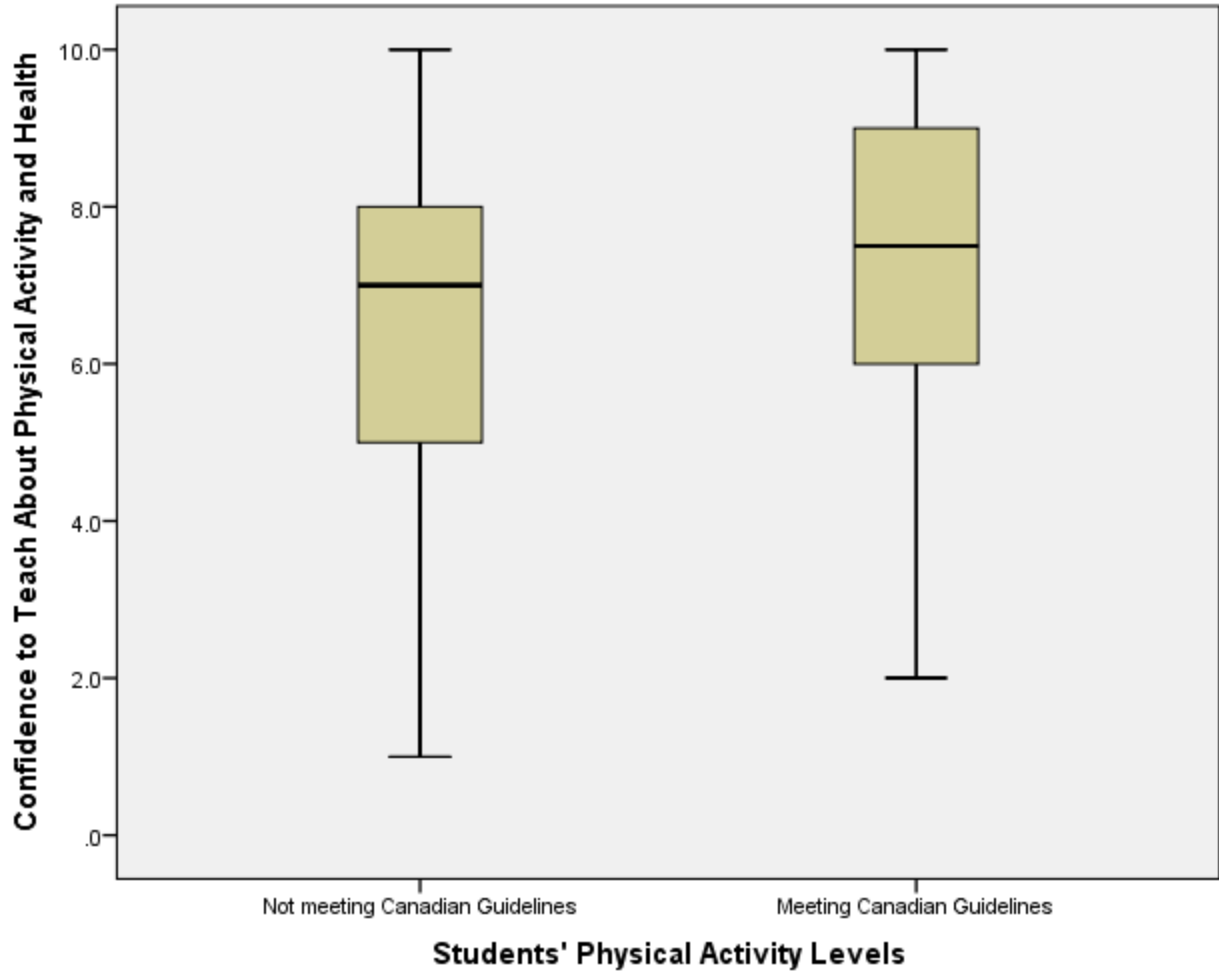


Figure 7. ECE Students' Confidence to Teach about the Relationship Between Physical Activity and Health Based On the Amount of Students' Moderate-to-Vigorous Physical Activity Minutes Accumulated Per Week. Confidence was reported on a self-efficacy rating scale from 1-10.

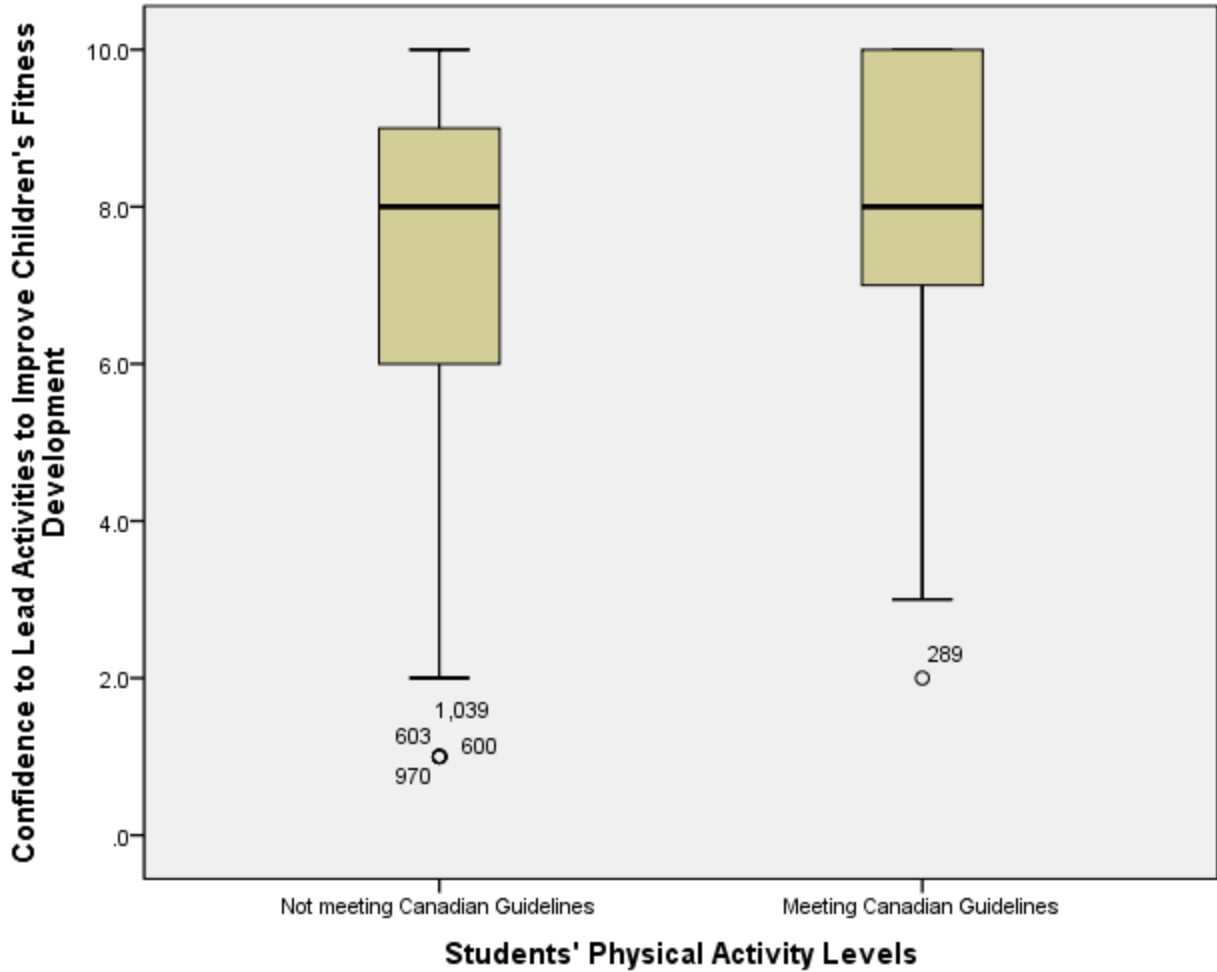


Figure 8. ECE Students' Confidence to Lead Various Activities to Improve Children's Fitness Development Based On the Amount of Students' Moderate-to-Vigorous Physical Activity Minutes Accumulated Per Week. Confidence was reported on a self-efficacy rating scale from 1-10.

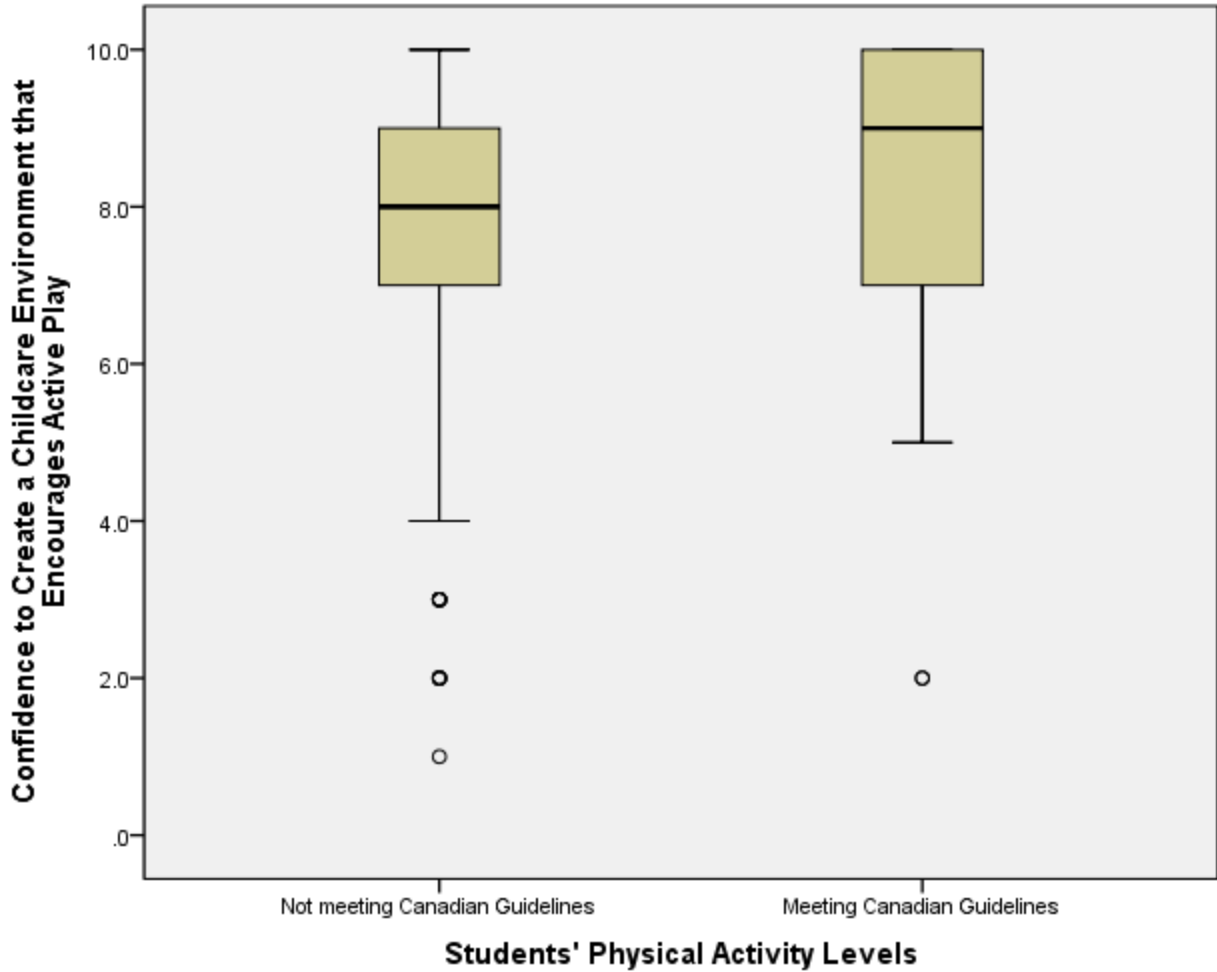


Figure 9. ECE Students' Confidence to Create a Childcare Environment that Encourages Active Play Based On the Amount of Students' Moderate-to-Vigorous Physical Activity Minutes Accumulated Per Week. Confidence was reported on a self-efficacy rating scale from 1-10.

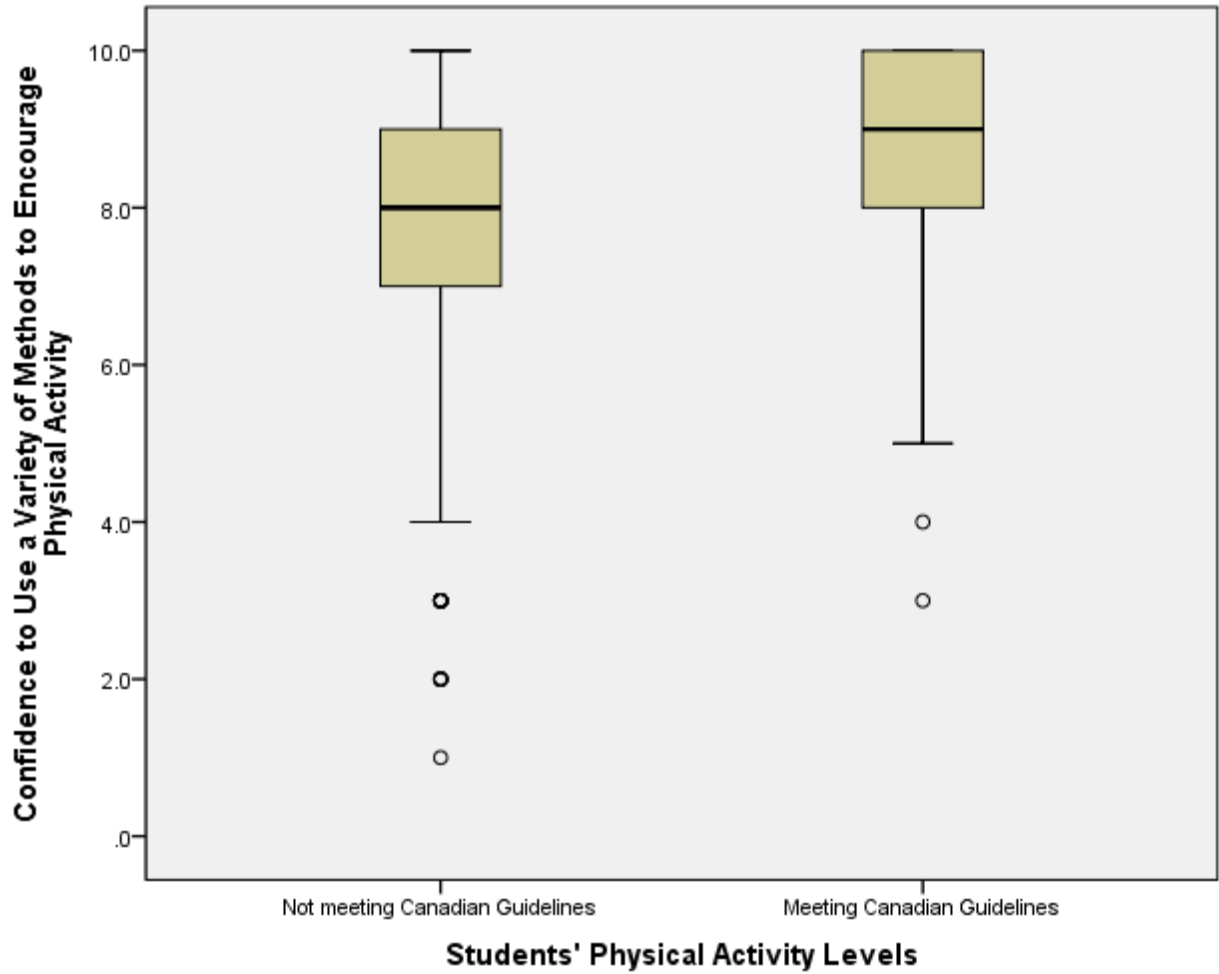


Figure 10. ECE Students' Confidence to Use a Variety of Methods to Encourage Physical Activity Based on the Amount of Students' Moderate-to-Vigorous Physical Activity Minutes Accumulated Per Week. Confidence was reported on a self-efficacy rating scale from 1-10.

Appendix I
CURRICULUM VITAE

Personal Information

Name: Olivia Martyniuk

**Post-secondary
Education and
Degrees:** University of Western Ontario
London, Ontario, Canada
2006-2010 B.HSc.

The University of Western Ontario
London, Ontario, Canada
2012-2013 M.Sc.

**Honours and
Awards:** Western Scholarship of Distinction
2006

Cancer Assistance Award for Pursuing an Education in Health Sciences
2006

Dean's Honors List
2008-2010

Recipient of Western Graduate Research Scholarship
2012-2013

Nominated for Ontario Graduate Scholarship
2013

**Related Work
Experience** Research Assistant
The University of Western Ontario
2012-2013

Teaching Assistant
The University of Western Ontario
2013

Papers Submitted Vanderloo, L. M., Martyniuk, O. J., & Tucker, P. Physical Activity
Among Preschoolers in Home-Based Childcare: A Systematic Review.
Manuscript submitted for publication. Journal of Physical Activity and
Health.

Papers in Progress **Martyniuk, O.,** Vanderloo, L., Tucker, T., Irwin, J., & Burke, S. (2013). *An Assessment of the Nutrition Practices and the Nutrition Environment in Childcare Settings.*

Presentations **Martyniuk, O.,** Lutz, S., & Marrocco, S. (October, 2012). *Therapy: Alternative Designs.* Quantitative Research Methods Course, The University of Western Ontario – London, Ontario, Canada

Martyniuk, O., Bhatti, N., & MacDonald, A. (November, 2012). *eHealth: Obesity & Child Development.* Current Topics in Health Promotion Course, The University of Western Ontario – London, Ontario, Canada

Martyniuk, O. (February, 2013). *The Parent-to-Child Transmission of Anxiety Symptoms and Disorders.* Current Topics in Child & Youth Health Course, The University of Western Ontario – London, Ontario, Canada

Martyniuk, O., & Tucker, T. (February, 2013) *An Exploration of Early Childhood Education Students' Knowledge and Preparation to Facilitate Physical Activity.* The University of Western Ontario- Health & Rehabilitation Sciences Graduate Research Forum – London, Ontario, Canada