Motivational, Affective, and Activity-Related Effects of Teacher and Peer Support in High School Physical Education.

Submitted by

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Abstract

Chapter 1 provides a topical background and justification for this study. A general literature review follows in chapter 2, which aims to specify, in more detail, the overarching themes to be explored, whilst elucidating the relevant literature in the field. Chapter 3 details the main article, and a more specific introduction constructs the research questions that were investigated. Guided by the principles outlined within self-determination theory, the tripartite efficacy framework, and the trans-contextual model of motivation, the purpose of this study was to examine the relationships between physical education (PE) teacher- and peer-based relatedness support, PE teacher- and peer-based relatedness need satisfaction, and PE teacher- and peer-focused relation-inferred self-efficacy (RISE) in an all-female cohort. We also investigated the relations that these relational variables displayed with students' self-determined motivation, worry (i.e., PE and social anxiety), behavioural engagement in PE, and leisure-time physical activity (LTPA).

Students from an all girls' independent school (N = 379; age M = 13.36, SD = 1.19) completed measures assessing all of the aforementioned concepts over two PE lessons, and teachers provided an external rating for students' behavioural engagement. Data were analysed using structural equation modelling procedures.

Results demonstrated that students' perceptions of teacher-based relatedness need satisfaction and teacher-focused RISE were positively aligned with their appraisals of relatedness support provided by their teacher. In addition, students' perceptions of peer-based relatedness need satisfaction and peer-focused RISE were also positively related to their peer-based relatedness support inferences. A number of significant direct pathways also emerged between these relational indices (regarding peers and one's teacher) and students' perceptions in PE (e.g., autonomous motivation and social anxiety). In turn, those students who endorsed relatively more autonomous motives for

participation in PE reported more positive responses in terms of PE and social anxiety, and were also rated by their teachers as displaying greater behavioural engagement in PE. Finally, a significant pathway also emerged between behavioural engagement and students' LTPA. These findings provide novel insight into the diverse relational perceptions – regarding both one's teacher and one's peers – that may underpin students' experiences in PE and their engagement in physical activity outside school. Practical implications of this research were examined in the light of suggestions for future pedagogical changes, with areas for further research also discussed.

Disclaimer

The use of "we" throughout the thesis is (a) in line with the terminology that is typically employed when writing for most academic outlets, and (b) reflective of the supervisory input provided by the candidate's advisors. Irrespective of this stylistic choice, it is important to note that the candidate was primarily responsible for all aspects of design, data collection, analysis, and writing throughout the thesis.

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Chapter 1 Introduction

1.1 Thesis Overview

Obesity is recognised as a leading cause of mortality worldwide, and since 1980, has almost doubled in prevalence (World Health Organisation; WHO, 2014). Obesity contributes to a large number of preventable diseases, including diabetes, ischaemic heart disease, and certain types of cancer (WHO, 2014). Physical inactivity, which is partly responsible for obesity, is also associated with the likelihood of developing these lifestyle diseases. Importantly though, only 15% of 12-17 year old Australians (National Secondary Students' Diet and Activity Survey; NaSSDA, 2010) are currently achieving the recommended Australian guidelines for physical activity (Department of Health and Aging, 2014). Female adolescent physical inactivity is of particular concern with research demonstrating that only 25% of high school girls are achieving the recommended physical activity guidelines (Butcher, Sallis, Mayer, & Woodruff, 2008). This phenomenon could be related to the physical changes girls experience during puberty (Brustad & Partridge, 2002) that result in increased social physique anxiety (i.e., SPA; distress, apprehension, Hart, Leary, & Rejesk, 1989), and ultimately, decreased physical activity and engagement (Carron & Prapavessis, 1997). In seeking to redress this problem, researchers have demonstrated that Physical Education (PE) is one important setting for encouraging physical activity (Ward, Saunders, & Pate, 2007; Shephard & Trudeau, 2000), as it is accessed by almost all youth, and a large number of focused participants can be engaged at once (Fox & Biddle, 1988).

Female inactivity, and participation (or, more specifically, lack of participation) in PE is a problem not only in an acute sense, but also with respect to lifelong activity and health status. This is not only due to the increased chance of developing lifestyle diseases including diabetes (i.e., Kasa-Vubu, Lee, Rosenthal, Singer, & Halter, 2005) and obesity (i.e., Kimm et al., 2005), but also due to the significant role that adolescent

physical activity plays in developing a long-term physically active lifestyle (e.g., Pate et al., 2005). Previous research (e.g., Wilson et al., 2008) has demonstrated the importance of enhancing students' motivation within PE, in an attempt to promote more favourable physical activity experiences and prolonged physical activity participation. With this in mind, the study that is presented within this thesis focused on investigating the specific social factors/agents (i.e., teachers, peers) in PE that may contribute to females' experiences and engagement levels (i.e., anxiety, effort) in PE, and leisure-time physical activity (LTPA).

Self-determination theory (SDT; Deci & Ryan, 1985) was used as one of the three main theoretical frameworks for this study. The relevance and application of SDT for studying motivational processes within PE is well-established (for example see, Cox, Duncheon, & McDavid, 2009; Cox & Ullrich-French, 2010), and this paradigm is often used to investigate the factors that may support or thwart psychological needs satisfaction (i.e., competence, autonomy and relatedness), as well as self-determined (relative to controlled) motivation levels. In accordance with Deci and Ryan's (1985) findings, previous research has demonstrated that the more an individual's psychological needs are met, the greater the level of self-determined motivation that person will exhibit (e.g., Standage & Ryan, 2012). Additionally, researchers (Cox & Williams, 2008; Cox et al., 2009; McDonough & Crocker, 2007) have demonstrated that relatedness need satisfaction negatively correlates with undesirable affective outcomes (i.e., anxiety related responses) in PE.

This study used the main tenets outlined within SDT (described in more detail in the following chapter), including motivation and basic psychological needs, as a lens to understand female adolescent participation in PE. More specifically, this study was designed to focus on students' self-determined relative to controlled motivation for PE and their relatedness perceptions (i.e., the need to feel socially accepted and connected

to others; Ryan & Deci, 2008). Self-determined motivation was a central focus as it is considered to be the most desirable form of motivation, due to the network of adaptive outcomes with which it has shown to be associated (e.g., effort and engagement; for reviews, see Ntoumanis, 2012; Standage & Ryan, 2012). Relatedness support and relatedness need satisfaction formed the other key SDT-based concepts, as Cox and Williams (2008), among others, have previously demonstrated that support for, and satisfaction of, relatedness perceptions in PE is an important indicator of self-determined motivation levels.

In addition to studying motivational and relatedness perceptions, the tripartite efficacy framework (Lent & Lopez, 2002) was also used to support and supplement these SDT-based constructs. The tripartite efficacy model incorporates self-efficacy (i.e., one's belief in one's own ability; Bandura, 1997) and two distinct relational efficacy perceptions (i.e., perceptions regarding those with whom one interacts). Researchers have recently begun to examine this model within PE contexts (Jackson, Whipp, Chua, Pengelley, & Beauchamp, 2012; Jackson, Whipp, Chua, Dimmock, & Hagger, 2013), and consistent with Lent and Lopez's (2002) assertions, evidence has emerged to indicate that students experience greater confidence in their own ability in PE when they report positive relational efficacy beliefs. Initial work in this area has also shown that individuals' relational efficacy appraisals might also be independently associated with motivational responses, demonstrating that integration with SDT may be viable. This study focused on one particular relational efficacy construct, namely, relation-inferred self-efficacy (i.e., RISE), which reflects one's estimation about the level of confidence that another person has in one's ability (e.g., a student's estimation about how confident his/her teacher is in his/her ability in PE). In the work presented in this thesis, aspects from SDT and the tripartite efficacy model were used to extend past research by investigating relatedness and RISE perceptions pertaining separately to

one's peers *and* teachers, and the relations between these perceptions and important affective outcomes (i.e., anxiety) and engagement levels (i.e., effort) in PE, as well as students' LTPA.

In considering the potential links between PE-based perceptions and leisure-time outcomes (i.e., LTPA), this investigation sought to expand on past research regarding the trans-contextual model (see Hagger & Chatzisarantis, 2012; Hagger, Chatzisarantis, Culverhouse, & Biddle, 2003) that describes the ability for self-determined motivation experienced in one context (e.g., PE) being transferred (i.e., across domains) to a new context (e.g., LTPA). It has been previously demonstrated that autonomous motives in an educational setting can be transferred to leisure-time exercise (Hagger & Chatzisarantis, 2012), and may therefore be responsible for promoting behavioural engagement in the related context (e.g., enhanced LTPA). That being the case, this study drew from the trans-contextual principle and examined the potential links between PE-related perceptions and LTPA.

In order to carry out this investigation, two surveys (completed during PE lessons on consecutive days) and a teacher-based engagement rating (completed at the end of the second lesson) were collated from students (and teachers) at an all girls' independent school (N = 379; age M = 13.36, SD = 1.19). A structural equation model incorporating all measurement parameters and structural pathways was then used to anlayse direct and indirect pathways between primary variables, while controlling for important covariates. In sum, guided by theory and previous research, this study strived to determine the key interpersonal indicators of females' physical activity experiences (both inside and outside of PE). Although much of the SDT and tripartite efficacy literature in PE has focused on examining either teacher or peer influences/perceptions, this research investigated the influence of student interactions with both their teachers and their peers (i.e., classmates).

1.2 Context of School for Data Collection

This investigation was conducted in a high-fee independent all-female secondary (i.e., year 7 to 12) school in the Perth metropolitan area. The school consists of approximately 1000 students, most of whom are from a high socio-economic background. All students from years 7 through to year 10 participate in designated PE lessons, varying between 1-3 times per week (depending on the weekly cycle and year group). Students in year 7 through to year 11 also have one designated Health lesson per cycle (6 day cycle). The teaching staff involved in the study consisted of 6 full-time PE teachers and 1 part-time PE teacher.

Students are encouraged to participate in interschool sports competitions each term. Students choose from two 'standard' sports that are presented on a seasonal basis (i.e., tennis or volleyball, hockey or netball, basketball or soccer, and water polo or softball). Selection trials are used to determine interschool teams. Those students who are successful in team selection train once per week and play a weekly game against opposing schools during the 10-week school term. Students are also encouraged, at various times in the school year, to trial for the interschool swimming, athletics, diving, gymnastics, and cross-country running teams. Interschool teams have a competitive focus; they are strongly encouraged to perform at a high level, aspiring to win their grade pennant, win as an overall year group, and win the interschool trophy. As a relatively new innovation, schools can now also win a year pennant for all interschool sports combined (i.e., Overall Sports Champion Shield).

Physical activity is highly valued at the school, not only for its physical benefits, but because it "provides girls with a differing environment to learn, grow as an individual or simply relax, which seems to aid academic performance" (Head of Physical Education Department, personal communication, May 15, 2014). The facilities provided for PE lessons and extra-curricular activity include two gymnasiums

(i.e., indoor basketball courts, netball courts, volleyball and badminton courts), additional outside basketball courts, netball courts, as well as tennis courts, three hockey fields (which convert into two soccer fields), a grass athletics track, designated field event areas, two turf 30m run up long jump pits, as well as additional grass netball courts to accommodate the adjoining junior school. Finally, a 50m-heated swimming pool services PE lessons and interschool squad training.

Due to the large number of students at the school, not all those who trial for an interschool team sport are selected to represent the school. These students are encouraged to continue to train with the squad. If they are unable to do so, they have the option of participating in supervised after school fitness classes. These are available 1-2 times per week, and include classes such as zumba, aerobics, and boxing (depending on the time of year). In addition, students can choose to participate in early morning surfing lessons and afterschool badminton lessons. Finally, students also have the opportunity, providing they have undertaken a familiarisation program, to use the school gymnasium before and after school.

1.3 Statement of the Problem

Compulsory PE provides an opportunity for educators to endorse the benefits of being physically active to a large number of adolescents (Shephard & Trudeau, 2000). However, only a relatively small percentage of Australian high school-aged children (i.e., 12-17 years old; NaSSDA, 2010) achieve the recommended Australian physical activity guidelines (Department of Health and Ageing, 2014), with inactivity particularly prevalent among the female cohort (Butcher et al., 2008). It therefore seems imperative for researchers to investigate how to facilitate experiences (i.e., engagement, affect) within PE, and indirectly, increase LTPA. Guided by the principles outlined within SDT, the tripartite efficacy model, and the trans-contextual model of motivation, the work outlined within this thesis investigates the relationships between

PE teacher- and peer-based relatedness support, PE teacher- and peer-based relatedness need satisfaction, and PE teacher- and peer-focused RISE in an all-female cohort. Furthermore, this study will evaluate the relationships that these variables have with students' self-determined motivation, anxiety in PE, behavioural engagement in PE, and LTPA.

1.4 Research Purpose Objectives

Data collected during this investigation have been gathered to address the following research objectives:

1. Develop a comprehensive understanding of the interpersonal indicators of female PE participation with regards to:
    (a) Relatedness need satisfaction,
    (b) Experiences with teacher and peers,
    (c) Motivational, affective, behavioural and engagement outcomes, and
    (d) Differentiation between the effects of PE anxiety (i.e., participation and skill level) and social anxiety (i.e., self-presentation).
2. Advance previous work regarding SDT and the tripartite efficacy model by integrating aspects of these frameworks and investigating the effects of teachers and peers on relatedness support, relatedness need satisfaction, and RISE, in isolation, as well as their effects on self-determined motivation.
3. Based on trans-contextual principles, determine the extent to which cross-domain effects may be observed between in-class PE and LTPA.

1.5 Anticipated Research Outcomes

It is predicted that in response to this investigation, investigators will be provided with:

1. Innovative work extending current literature regarding the integration of SDT and the tripartite efficacy framework that serves to explain the unique ways in which teachers and peers contribute to adolescents' experiences in PE.
2. Information that may help teachers and administrators in regards to increasing future female adolescent PE participation, and encourage the transfer of PA into leisure time.
3. Novel information regarding the indicators of PE anxiety and social anxiety on female adolescents.
4. Practical information regarding how to create an environment in an all-girls PE context that will support self-determined motivation, engagement (i.e., effort), and LTPA.

1.6 Terminology

There are a number of phrases and terms that are frequently used throughout this thesis. Descriptions of these terms are provided below.

Amotivation: representing a lack of intention and a substantial absence of motivation (Deci & Ryan, 1985, 1991).

Autonomy: the belief that one is the origin and regulator of one's actions (Deci & Ryan, 1985, 1991).

Behavioural Outcome: physical activity levels.

Competence: the belief that one can successfully interact with the environment and carry out the task required in a given domain (Deci & Ryan, 1985, 1991).

Behavioural Engagement: reflecting the effort level students put in to physical activity. Operationalised using the statement, "over the past week, reflect on the level of

engagement each of your students displayed in your PE class".

External Regulation: referring to a controlled motivational regulation characterised by participation in an activity due to factors external to the individual (i.e. promise of rewards or threat of punishment; Deci & Ryan, 1985).

Identified regulation: refers to a relatively autonomous regulatory style characterised by valuing the outcomes of participation in an activity (Deci & Ryan, 1985).

Integrated Regulation: an autonomous regulatory style that occurs when participation aligns with one's sense of self, meaning that an activity is integrated with the individual's values and identity (Ryan & Deci, 2000).

Intrinsic Motivation: refers to highly autonomous regulation, in which an activity is completed for feelings of fun, pleasure, and due to the satisfaction that one derives from participation (Deci & Ryan, 1985; Ryan & Deci, 2000).

Introjected regulation: a sub-category of extrinsic (and a moderately controlled form of) motivation characterised by the perception of internal pressures, such as the desire to avoid guilt and shame (Ryan & Deci, 2002).

Leisure-Time Physical-Activity (LTPA): physical activity completed outside of the PE classroom. That is, any session that is greater than 20 minutes at a time (but doesn't include PE lessons). This includes any voluntary sport or activity students undertook inside or outside of school (e.g., a school sports team, a local sports club, voluntary sport during school time), excluding PE lessons.

PE Anxiety: student anxiety regarding their performance and task execution in PE (Smith, Smoll, Cumming, & Grossbard, 2006).

Relatedness: the seeking and nurturing of secure and close relationships with others in one's social context (Deci & Ryan, 1985, 1991).

Relation-Inferred Self-Efficacy (RISE): students' perceptions of teacher- and peer-focused RISE appraisals. That is, the extent to which they believe their teacher

(classmates) is (are) confident in their (i.e., the student's) ability (Jackson et al., 2012).

Self-Determination Theory: a framework of motivation that considers humans to be dynamically seeking personal challenges and new experiences to master and integrate, and in which a continuum of motivational regulations is presented (Deci & Ryan, 1991).

Social Anxiety: participants' concerns regarding their teacher's and classmates' impressions of them during their PE lessons (Martin & Fox, 2001).

Trans-Contextual Model: the potential for motivational transfer between contexts. For example, PE-based perceptions (e.g., autonomous motivation) and LTPA (e.g., Hagger et al., 2007, 2009).

Tripartite Self-Efficacy Model: overarching framework that incorporates self-efficacy and relational efficacy beliefs (Lent & Lopez, 2002).

1.7 Thesis Structure

A single study, with an initial baseline LTPA assessment, was carried out to address the aforementioned research objectives. This study is presented as a formatted manuscript in Chapter 3 of this thesis. The journal-style paper comprises its own abstract, introduction, method, results, and discussion sections. A more extensive review of the literature relevant to this study that was not detailed within the journal paper is featured in Chapter 2. Further recommendations regarding future work, as well as a general discussion and conclusions are incorporated in Chapter 4. Chapter 5 is an Appendix, containing additional methods, supplementary issues and pertinent detail (e.g., personal motivation) relating to this study. The reference list is also featured.

Chapter 2 Review and Critique of the Literature

2.1 Introduction

This chapter provides a detailed review and critique of the scholarly literature relating to the research topic detailed in Chapter 3. The conceptualisation of this study is framed by self-determination theory (SDT; Deci & Ryan, 1985) and the tripartite efficacy model (Lent & Lopez, 2002), and also draws from principles outlined within the trans-contextual model (Hagger, Chatzisarantis, Barkoukis, Wang, & Baranowski, 2005; Hagger et al., 2003). The focal points for discussion in this chapter include; why physical activity is important (with specific focus on adolescent females and PE), emotional support (i.e., relatedness support and relatedness need satisfaction), RISE, motivational processes (i.e., self-determined motivation), affective outcomes (i.e., PE and social anxiety), and behavioural outcomes (i.e., in-class and leisure-time engagement in physical activity). The review also differentiates the independent effects that teachers and peers may have on students. Information regarding the way in which this work develops and expands upon past work (e.g., Cox & Williams, 2008; Cox et al., 2009; Jackson et al., 2012, 2013; Hagger et al., 2003, 2005, 2009, 2012) is also provided in the following sub-sections.

2.2 Physical Activity Participation

2.2.1 Importance of Physical Activity and Engagement in PE

As is the case in much of the developed world, Australian adolescent physical inactivity levels are problematic (World Health Organisation; WHO, 2008). Despite physical inactivity being the fourth leading risk factor for global mortality (WHO, 2014), only 15% of Australian adolescents (aged 12-17 years; NaSSDA, 2010) are currently meeting the minimal recommended requirement of 60 minutes of moderate-to-vigorous physical activity per day (Department of Health and Aging, 2014).

Physical Education (PE) classes are recognised as an important setting for

endorsing the benefits of physical activity to students (National Association for Sport and Physical Education, 2004). Currently, 71% of students aged 12-17 years partake in a minimum of 120 minutes of PE per week (Australian Bureau of Statistics; ABS, 2013). Despite these encouraging participation data, Australian students (i.e., aged 8-15 years old), when compared for age and gender on international standards, are still considered to have below average cardiorespiratory fitness levels (Hardy, King, Espinel, Cosgrove, & Bauman, 2010). Guided in part by these concerns, this study aimed to provide further insight into PE participation and physical activity motivators (i.e., social agents that may facilitate increased participation). Although previous work has considered issues relating to student engagement in PE, many of these studies have relied on self-report methodologies for the assessment of this variable. For instance, Cox and Ullrich-French (2010) previously used self-report of children's perceived PE engagement (i.e., effort); such methods may be subject to socially desirable response biases. Therefore, in order to extend this work, external ratings (Ntoumanis, 2005) of PE engagement were employed in the current research to further enhance our understanding of PE participation. That is, rather than relying on student self-report measures, teachers rated students engagement to provide more valid insight into students' effort in PE.

2.2.2 Adolescent Females and Physical Activity

Inadequate female adolescent physical activity levels are of particular concern, with research indicating that as few as 25% of high school-aged girls are achieving the recommended physical activity guidelines (Butcher et al., 2008). The social environment in which PE takes place has been acknowledged as being less favourable for females (compared to males; Larsson, Fagrell, & Redelius, 2009), particularly at a high school level (e.g., lowering performance expectations; Domangue & Solmon, 2010). This has resulted in female adolescents possibly experiencing lower levels of

competence and engagement (i.e., effort) in PE (Domangue & Solmon, 2010), and ultimately resulting in lower overall participation and involvement.

A recent study (Hardy et al., 2010) demonstrated that, in comparison to their same-aged male counterparts, the percentage of grade 6 Australian girls demonstrating competent ability is already slightly lower for locomotor skills (e.g., sprint and vertical jump), and substantially lower for object-control skills (e.g., kick, throw and catch). Therefore, the general aims of this study were based on providing an expansion of this literature, and enabling insight into the factors that may contribute to such findings. First, this investigation focused on an all-female, high school-aged (i.e., year 7-10) population, and aimed to explore what it is that encourages females to be physically active (Sabiston & Crocker, 2008) and engage purposefully in PE.

Based on Standage and colleague's (Standage, Duda, & Ntoumanis, 2003) research recommendation, a relatively large sample size was used to enhance research validity regarding gender impact on motivation and affective outcomes. Furthermore, as suggested, the cohort was spread out over a range of year groups (i.e., year 7-10) to try and establish any variability between differing school levels.

2.2.3 Importance of Physical Education

Physical Education (PE) is an important vehicle for educating a large number of adolescent students about the benefits of physical activity (Ward et al., 2007). Past research (Hagger et al., 2009) indicates that if students experience positive PE experiences during school, there is a greater chance that this will transfer into increased LTPA. Furthermore, Sallis and McKenzie (1991) suggested that these positive experiences in PE could also transfer into a physically active lifestyle during adulthood. Currently, PE enables 78% of Australian high school aged students (i.e., 12-17 year olds) to participate in formalised activity two times per week (NaSSDA, 2010). However, these participation rates are reported to be in decline (NaSSDA, 2010). These

data, along with high inactivity levels and relatively poor PE outcomes, reinforce the importance of the current investigation. Specifically, this study expands on research (e.g., Cox et al., 2009) by focusing explicitly on adolescent girls' perceptions about their PE teacher and classmates, and examining how social processes shape their involvement and motivation in PE. An understanding of female PE-related motivators will potentially further our understanding of the variables that enhance and thwart participation in PE and LTPA.

2.3 Self-Determination Theory

2.3.1 Overview

Self-determination theory (Deci & Ryan, 1985) is a conceptualisation that helps us to understand human motivation and psychological need satisfaction. It is based on the concept that humans create a coherent sense of self by actively engaging in activities and behaviours that enhance emotional development (Deci & Ryan, 1985, 1995). Motivation inspires (or when absent, thwarts) individuals in the pursuit of outcomes (Deci, Ryan, & Williams, 1996). According to SDT, when individuals experience the highest sense of self-worth, they are engaged in autonomous (i.e., self-determined) behaviour (Ryan & Connell, 1989), opposed to when they experience more controlled forms of regulation, where lower-quality motivation and avoidance occur (Deci & Ryan, 2000).

Within SDT, it is proposed that individuals may experience qualitatively different types of motivation, and fundamental to the adoption of a given motivation regulation is the desire to satisfy three basic psychological needs (i.e., competence, autonomy, and relatedness). In particular, it is theorised that how well these needs are met will impact on the extent to which individuals adopt the most autonomous (relative to controlled) form of motivation. That is, autonomous motivation is achieved when these psychological needs are satisfied. However, if these needs are not fulfilled,

controlled motivation (or possibly amotivation) is more likely to be encountered (Deci & Ryan, 1985). A more comprehensive description of motivational regulations (and the notions of autonomous and controlled motivation) is presented in the following section.

Recent decades have witnessed the development of PE-based research that has been conducted through a SDT lens (e.g., Ntoumanis, 2001; Standage et al., 2003). The stimulus for such work was the recognition that PE teachers can have a significant positive (or negative) influence on the type of motivation students experience, as well as the behaviour they adopt (Williams & Deci, 1996). Accordingly, if PE teachers are able to create an environment that provides for and nurtures autonomous motivation, there is a possibility that this may not only promote more positive experiences in PE, but may also assist in encouraging students' LTPA. Given the emphasis on motivation in this study, and the wealth of evidence to support the use of SDT in PE, the current work used SDT as the main theoretical framework. SDT-focused research has considered the social and interpersonal factors that impact on students' needs in PE (Hagger & Chatzisarantis, 2007; Ntoumanis, 2012). That said, whilst teacher-derived autonomy-supportive evaluations have been studied in a number of instances (Cox & Williams, 2008), less scholarly interest has been directed toward the enhancement of relatedness-supportive environments, and limited attention has also been directed toward the ways in which one's peers (i.e., classmates) might engage in need-supportive behaviour. That is, there is limited work that has focused on the impact of PE teacher *and* peer-based supportive social interactions in relation to students' perceptions of PE-focused relatedness need satisfaction, self-determined motivation, anxiety, engagement, and potentially, LTPA. Consistent with the findings and limitations of past work, the investigation that is presented in the following chapter focused specifically on relatedness (associated with teachers and peers) and self-determined motivation in an all-female environment, as it seems important to study such processes in a context

where strong interpersonal relationships exist.

2.3.2 Motivation

Self-determination theory (Deci & Ryan, 1985) is a widely-established framework for the study of motivation, and is useful, in part, for understanding the differing forms of motivation experienced by individuals in a given context (Deci & Ryan, 2000). A noteworthy aspect of SDT is that it differentiates between autonomous motivation and more controlled forms of motivation (Deci & Ryan, 1985); that is, proponents of SDT contend that aside from simply studying the absolute magnitude of an individual's motivation, it is necessary to identify the quality of one's motivational experience. As such, it is proposed that the different types of motivation occur along a motivational continuum (Ryan & Connell, 1989) that helps explain the differing forms of motivation individuals may endorse. At the most autonomous (i.e., self-determined) end of this continuum is *intrinsic motivation*. This is followed by *extrinsic motivation*, which consists of *integrated*, *identified*, *introjected* and *external* regulation (listed in descending order from most to least self-determined). At the other end of the continuum to intrinsic motivation is *amotivation*. Within SDT, these distinct motivational constructs are used to explain the differing reasons for engagement in certain activities (Deci & Ryan, 1985).

Intrinsic motivation reflects behaviour that occurs when there is no external reinforcement required or present, and that is characterised by involvement purely for the inherent interest, enjoyment, and fun that one derives from an activity (Deci & Ryan, 1985, 2000). For example, individuals may choose to participate in physical activity due to the feelings of pleasure, interest, and satisfaction that they derive from the activity. Intrinsic motivation is considered the most preferred type of motivation and is deemed to emanate from within the person and is internal to the self (Deci &

Ryan, 2000). An example of intrinsic motivation includes, "I take part in PE because I enjoy learning new skills".

Extrinsic motivation is composed of four distinct constructs, which vary in the extent to which they are viewed as self-determined or controlled in nature. Integrated regulation is the closest form of external regulation to intrinsic motivation. In this type of regulation, one's actions are deemed to be consistent with aspects of an individual's life and identity, and occur due to congruence and by choice. Some individuals, for instance, may participate in exercise because they view themselves as an 'exerciser', and therefore the activity is consonant with their sense of self. However, given that individuals are performing the activity not simply due to feelings of fun, enjoyment, and interest (Deci & Ryan, 1991, 1985), integrated regulation is still considered an extrinsic form of motivation. Identified regulation occurs for reasons including personal importance and conscious valuing (i.e., valuing the outcomes of a behaviour). For example, identified regulation for participation in PE might be measured through items such as, "I participate in PE because I want to develop my skills". Introjected regulation occurs when one's incentive for action is controlled by personal pressures (i.e., shame, guilt, self-guilt). In this case, individuals participate due to reasons including self-control and internal pressures. For example, introjected regulation within PE can be assessed through items such as, "I take part in PE because I would feel shameful if I didn't". External regulation represents the most controlled form of extrinsic motivation. Externally regulated behaviours originate from outside the person (Deci, Eghrari, Patrick, & Leone, 1994), and represent participation in an activity due to external pressures, such as the desire to receive rewards or praise, or to avoid punishment (Deci & Ryan, 1985). For example, external regulation may be assessed in PE with statements such as, "I take part in PE so that the teacher won't get angry with me". Finally, amotivation refers to a complete absence of intention (i.e., no motivation)

to participate in an activity (Deci & Ryan, 1985, 1991). Ryan and Deci (2000) describe amotivation occurring when an individual views an activity as being unimportant (i.e., it doesn't align with their preferred outcome). Furthermore, this motivational state may occur when individuals feel incompetent or lack control. Assessing amotivation within PE may take the form of statements such as, "I take part in PE but I really feel that I'm wasting my time in PE".

This investigation, in line with work by other scholars (e.g., Vallerand, 1997), focused on the study of individuals' autonomous (i.e., self-determined) relative to controlled motivation, as it has been shown that autonomous forms of motivation represent the most sought after form of regulation. This is due to relatively greater self-determined motivation mediating the relationship between need satisfaction and positive outcomes (e.g., anxiety; Vallerand, 1997). Thus, when appropriate support is provided to fulfill student need satisfaction, self-determined motivation is theorised to be enhanced, resulting in increased positive (or decreased negative) outcomes.

2.3.3 Basic Psychological Needs

SDT identifies that enhanced levels of autonomous motivation (opposed to controlled motivation) results in improved performance levels and personal change (Deci & Ryan, 1991). Thus, the more self-determined someone feels in a given context, the more likely it is that person will demonstrate desired outcomes, including greater effort and persistence (Deci & Ryan, 1991; Vallerand, 1997). Based on self-determination theory (Deci & Ryan, 1985: Ryan & Deci, 2007), individuals experience a sense of 'satisfaction' regarding the extent to which their three basic psychological needs (i.e., autonomy, competence, and relatedness) are met. SDT posits that need satisfaction is required in order to perform at an optimal level. Ryan and Powelson (1991) describe the need for *autonomy* as the capacity to regulate one's own behaviour (i.e., be the source/originator of one's actions) and feel a sense of volition regarding

one's pursuits. Second, Ryan and Deci (2002) describe the need for *competence* as representing one's desire to effectively interact in one's environment (i.e., achieve preferred results and operate effectively in a given domain). Finally, the need for *relatedness* reflects the desire to experience meaningful relationships, and to feel cared for by, and close to, significant others (Deci & Ryan, 2000). Therefore, social and interpersonal support is required in order for individuals to achieve relatedness need satisfaction in PE (see, for example, Ntoumanis, 2012), and importantly, relatedness support can be provided by both teachers (e.g., Cox & Williams, 2008) and peers (e.g., Cox et al., 2009) with the purpose of enhancing the recipient's perceptions of relatedness need satisfaction. A relatedness-supportive (or interpersonally involving) environment, therefore, provides individuals with nurturing interactions that foster feelings of trust, cooperation, and understanding.

Individuals are more likely to display more desirable outcomes, as well as increased psychological wellness (i.e., function at an optimal level), when their relatedness – in addition to competence and autonomy – needs are satisfied (e.g., Bartholomew, Ntoumanis, Ryan, Bosch, & Thorgersen-Ntoumani, 2011). Specifically, as need satisfaction increases, individuals are proposed to experience greater self-determined (relative to controlled) motivation (see, e.g., Standage, Duda, & Ntoumanis, 2003), subsequently resulting in desirable outcomes, including greater effort and persistence (Deci & Ryan, 1991). Despite this knowledge, existing research in PE has focused primarily on either autonomy-supportive or competence-supportive (termed 'structure') instructional practices among teachers (i.e., Standage, Duda, & Ntoumanis, 2003, 2006). For that reason, and with an emphasis on extending existing relatedness-based enquiry (e.g., Cox & Williams, 2008; Cox et al., 2009), the work outlined in the following chapter focused on relatedness support (and relatedness need satisfaction) by seeking to identify the interpersonal indicators of students' feeling of social connection

(i.e., relatedness) in class. This emphasis is of particular relevance to PE based work, as relatedness support has previously been found to be an important indicator of self-determined motivation (e.g., Cox & Williams, 2008; Standage et al., 2003).

2.3.4 Relatedness

Grounded in an extensive literature on the importance of belonging, and the significance of experiencing positive social relationships (e.g., Baumeister & Leary, 1995), SDT (Ryan & Deci, 2000) explains that relatedness is a fundamental requirement of human action (i.e., the need to feel acknowledged, understood, cared for, and valued by significant others). This need to feel related to significant others drives one's need to make interpersonal contact and feel socially connected, in the case of, with one's peers and teacher. Despite the fact that teachers (e.g., Cox & Williams, 2008) and peers (e.g., Cox et al., 2009) are both recognised as important 'social agents' that may provide relatedness support, there has been limited research regarding their independent effects on relatedness. That is, there are a limited number of studies in which students' perceptions about their teacher and their peers have been modelled within a single investigation. With that in mind, the study reported in the following chapter builds on previous educational research (e.g., Cox et al., 2009; Cox, Ullrich-French, Madonia, & Witty, 2011; Cox & Ullrich-French, 2010; Hagger et al., 2009), by examining multiple social agents (i.e., teachers and peers) and their influence on emotional support (i.e., relatedness support and relatedness need satisfaction), independently. That is, by exploring the impact these two distinct agents can have, in isolation, on students in PE.

2.4 Tripartite Efficacy Model

2.4.1 Overview

Developed in line with self-efficacy theory (Bandura, 1997) and the literature on interpersonal perceptions (e.g., Kenny & DePaulo, 1993; Snyder & Stukas, 1999), Lent and Lopez's (2002) tripartite efficacy framework provides a model for understanding

the efficacy beliefs that exist in relational and instructional scenarios. Alongside individuals' confidence in their own ability (i.e., self-efficacy), Lent and Lopez described that individuals also hold two 'relational efficacy' constructs, namely other-efficacy and relation-inferred self-efficacy (i.e., RISE). Lent and Lopez hypothesised that each of the three efficacy components may be independently (and positively) associated with adaptive personal outcomes (e.g., motivation, positive affect), as well as favourable relationship processes (e.g., closeness, pro-social behaviour).

2.4.2 Self-Efficacy

Self-efficacy beliefs develop over time and emanate from four key sources (Bandura, 1986, 1997), including performance accomplishments (i.e., performing an activity well, or displaying adaptive coping efforts), vicarious experience (i.e., observing others performing/coping well), social persuasion (i.e., positive verbal feedback from important others), and favourable physiological and affective states. Self-efficacy beliefs are domain-specific, and reflect an individual's confidence (or belief) in his/her own ability to achieve a given outcome (Bandura, 1997). As Bandura (1986) noted, "self-appraisals are influenced by evaluative reactions of others" (p. 420), and as such, friends, family, and other important third parties (e.g., peers, teachers) have the potential to influence these beliefs due to the fact that efficacy information is often received and processed within public environments. Importantly, in addition to documenting the ways in which self-efficacy beliefs develop, researchers have consistently demonstrated that a strong belief in one's ability accounts for more positive achievement-related outcomes (for a review, see Feltz, Short, & Sullivan, 2008), including self-determined motivation (e.g., Jackson et al., 2012) and effort (e.g., Gao, Lodewyk, & Zhang, 2009) in PE.

2.4.3 Relational Efficacy Perceptions

Lent and Lopez (2002) described two relational efficacy beliefs that individuals form when working alongside/underneath others. Other-efficacy represents an individual's belief in another's capabilities. For example, a student may use multiple cues in forming an impression about the capabilities of his/her teacher (e.g., "I really think I've got a great PE teacher"). This belief may or may not align with the person's actual abilities, and is shaped by information processed during the teacher's interactions with his/her students. Lent and Lopez proposed that individuals are more likely to take on board feedback from the other person, be more willing to continue to engage with that person, and feel more self-efficacious if they believe the other person (e.g., the teacher) is highly capable.

The second relational efficacy construct that Lent and Lopez (2002) discussed is termed relation-inferred self-efficacy. RISE beliefs develop through the appraisals that individuals make regarding others, and refer specifically to how much one believes others' are confident in one's ability (see Kenny & DePaulo, 1993). For example, RISE beliefs relate to whether a student believes his/her teacher (or peers) thinks she/he is capable or not (e.g., "my teacher/peers think I'm capable in PE"). This inference develops as individuals interpret others' behaviour toward them. Again, these beliefs may not necessarily align with the other person's actual opinion (i.e., they may be distorted views). Consistent with the way in which Lent and Lopez discussed the function of other-efficacy, favourable RISE beliefs are theorised to align with positive self-efficacy appraisals. Although existing tripartite efficacy work has focused on exploring the inter-relationships between the tripartite constructs (e.g., Jackson et al., 2012), there is scope for further work that examines in more detail the independent predictive effects associated with individuals' relational efficacy beliefs. In light of the aims of this investigation (i.e., to examine students' teacher- and peer-focused

perceptions), the work described in the following chapter focused specifically on examining the role of RISE beliefs in PE.

2.4.4 RISE and Self-Determined Motivation

Past research has demonstrated a link between the efficacy perceptions and SDT-based constructs, such as self-determined motivation (e.g., Rothman, Baldwin, & Hertel, 2004). Based on Jackson and colleagues (2013) recommendations that researchers further explore the relationships between RISE and interpersonal perceptions couched within SDT (e.g., relatedness), the study reported in the following chapter focused on investigating whether teacher-based relatedness support (i.e., behaviours performed by teachers that are designed to make students feel accepted and comfortable) was related to enhanced RISE appraisals (i.e., the inference that one's teacher is confident in one's ability). In addition, this investigation extended Jackson and colleagues (2013) work by investigating the way in which peer-derived relatedness support might relate to students' peer-focused RISE beliefs, and in turn, whether peer-focused RISE beliefs may support students' self-determined motivation (when modelled alongside the relatively more established role of teacher-focused appraisals).

2.5 Trans-Contextual Model

2.5.1 Overview

The trans-contextual model of motivation focuses on the potential for motivational 'transfer' between contexts, and one of the primary tenets outlined within this model is the notion that autonomous motivation experienced in one setting (e.g., PE) may promote motivation and behaviour outcomes in other related settings (e.g., LTPA; see Hagger & Chatzisarantis, 2012). Similar models have previously outlined the way in which motivational processes may generalise between different contexts (e.g., Vallerand, 2007), and the trans-contextual model describes how motivation in one context may be responsible for behavioural promotion in other similar contexts. Hagger

and Chatzisarantis (2012) articulated that adaptive forms of motivation in one context (e.g., PE) may promote more favourable perceptions in other domains (e.g., more positive attitudes, intentions, and motivation toward LTPA in general), which may subsequently align with enhanced levels of LTPA. Although work couched strictly in the trans-contextual model has sought to examine the processes through which this concept of motivational 'transfer' might occur, other studies have simply drawn from this generality principle and have examined the potential for cross-contextual motivation effects (e.g., the relations between one's experiences in PE and one's engagement in LTPA). With that in mind, one of the aims of the study reported in the following chapter was to draw from this principle to examine whether students' relational perceptions in PE might be distally related to their LTPA participation, through the promotion of more positive motivational, affective, and engagement-related responses in PE (Hagger & Chatzisarantis, 2007).

Consistent with previous work that has sought to investigate students' LTPA (e.g., Jackson et al., 2013), the investigation reported in Chapter 3 incorporated a measure of baseline/typical LTPA (at time point 1), before carrying out a full round of measurements (at time point 2). This assessment was completed in order to enable baseline/typical activity levels to be included as a covariate when examining the effects for all primary psychosocial variables. In addition to baseline LTPA, it was also deemed to be important to account for students' year/grade level as an additional covariate when exploring predictive effects in relation to key outcome variables (i.e., motivation, anxiety, engagement, LTPA).

2.6 Affective and Engagement-Related Outcomes in PE

Perceived teacher- and peer-derived emotional support, and resulting levels of self-determined motivation, may directly (or indirectly) promote more adaptive affective PE outcomes such as reduced anxiety (Cox et al., 2009; Cox & Williams,

2008). Furthermore, these have been linked to enhanced levels of engagement in LTPA. Directed by past research (e.g., Cox et al., 2008, 2009), this investigation focused on the way in which adolescent girls' experiences with their teachers and peers (i.e., teacher/peer support) aligned with their levels of self-determined motivation, and how that motivational factor subsequently aligned with their affective (i.e., anxiety) outcomes in PE. Two forms of anxiety were investigated. First, this study incorporated an assessment of what was termed 'PE anxiety', which has previously been considered by Cox and colleagues (2009), and reflects students' worry regarding their level of skill execution/participation. Second, students' 'social anxiety' responses were also gauged (Martin & Fox, 2001). In this instance, this assessment was designed to focus on students' evaluative concerns and self-presentation worries; specifically, the extent to which they were concerned regarding the impression they portray, and evaluations they elicit, with respect to their peers and teacher. The decision to investigate both forms of anxiety extended past work (Cox et al., 2009; Martin & Fox, 2001) that has not fully considered the potential for evaluation apprehension that may stem from unfavourable interpersonal perceptions.

2.7 Conclusion

The literature examined in this chapter outlines the body of theory and research that was used in devising the study that is reported in the following chapter. Although previous studies have investigated issues relating to SDT, the tripartite efficacy model, and the trans-contextual principle within PE, this work aimed to provide novel insight into these issues by (a) focusing specifically on an all-female cohort, (b) recognising that students' relatedness/RISE perceptions relating to their teachers *as well as* their peers may warrant investigation in their own right, and (c) exploring the independent effects associated with teacher- and peer-related interpersonal perceptions, in relation to motivational, affective (e.g., PE and social anxiety) and behavioural (e.g., physical

activity) outcomes. Guided by Deci and Ryan (1985), Lent and Lopez (2002), and Hagger and colleagues (2003, 2005, 2009, 2012) scholarly work, the central purpose of this thesis was to support, and ultimately, expand this body of literature. The variables of relevance to this study are displayed in Figure 1 and 2, and described within the introductory material that is presented in Chapter 3.

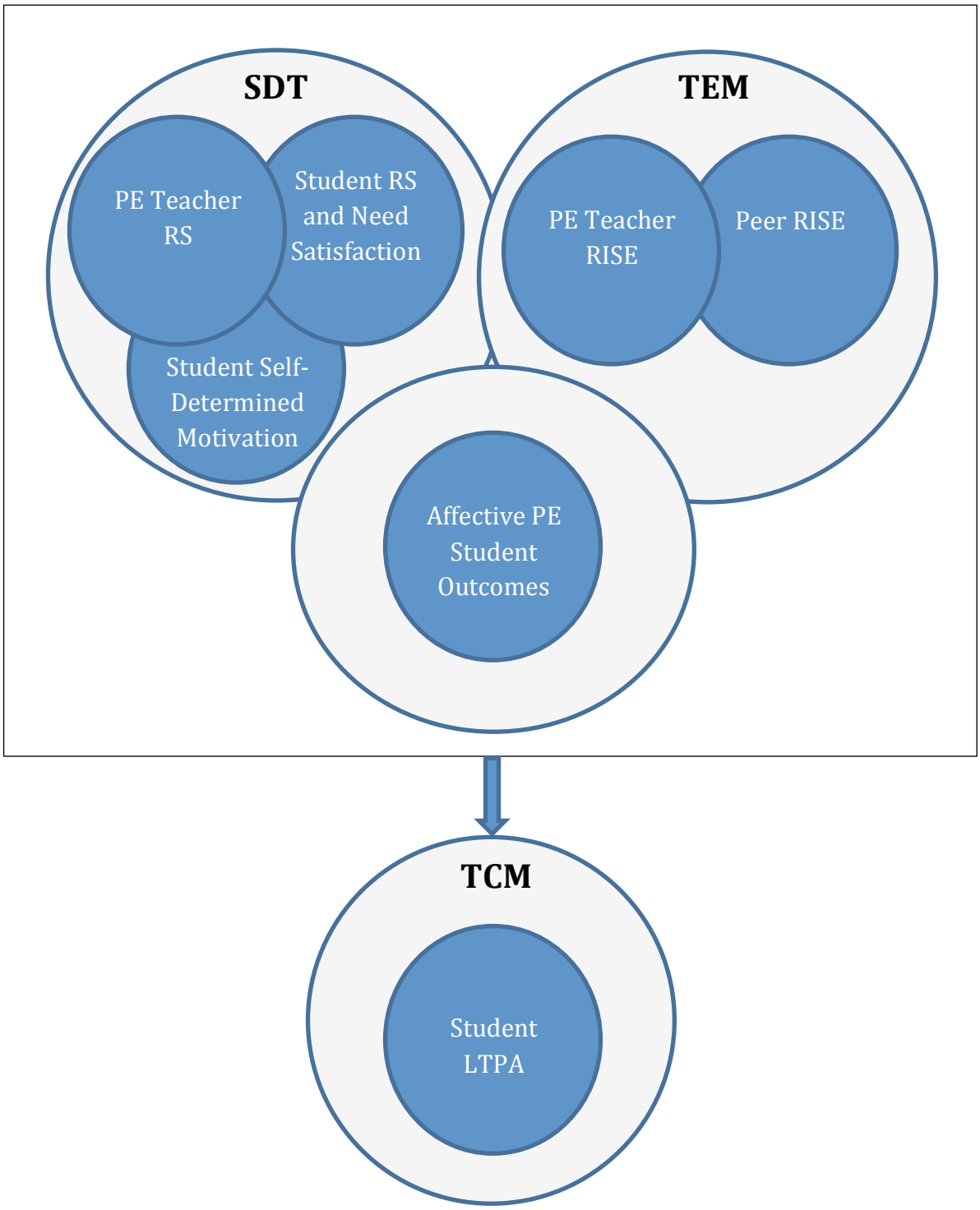

Figure 1. Conceptual Model.

Chapter 3 The Paper

Abstract

Previous investigations have established that teachers play an important role in shaping students' perceptions of emotional support in physical education (PE). We have less understanding, however, regarding the role that peers (i.e., classmates) play in supporting one another. Moreover, relatively little research has adopted a holistic approach to studying interpersonal influences, by considering teacher- and peer-based perceptions in a single investigation. Guided by principles outlined within self-determination theory, the tripartite efficacy framework, and the trans-contextual model of motivation, the purpose of this study was to examine the relationships between PE teacher- and peer-based relatedness support, PE teacher- and peer-based relatedness need satisfaction, and PE teacher- and peer-focused relation-inferred self-efficacy (RISE) in an all-female cohort. We also investigated the relations that these relational variables displayed with students' self-determined motivation, worry (i.e., PE and social anxiety), behavioural engagement in PE, and leisure-time physical activity (LTPA). Students from an all girls' independent school (N = 379; age M = 13.36, SD = 1.19) completed measures assessing all of the aforementioned concepts over two PE lessons, and teachers provided an external rating for students' behavioural engagement.

Data were analysed using structural equation modelling procedures. Results demonstrated that students' perceptions of teacher-based relatedness need satisfaction and teacher-focused RISE were positively aligned with their appraisals of relatedness support provided by their teacher. In addition, students' perceptions of peer-based relatedness need satisfaction and peer-focused RISE were also positively indicative of their peer-based relatedness support inferences. A number of significant direct pathways also emerged between these relational indices (regarding peers and one's teacher) and students' perceptions in PE (e.g., autonomous motivation and social

anxiety). In turn, those students who endorsed relatively more autonomous motives for participation in PE reported more positive responses in terms of PE and social anxiety, and were also rated by their teachers as displaying greater behavioural engagement in PE. Finally, a significant pathway also emerged between behavioural engagement and students' LTPA. These findings provide novel insight into the diverse relational perceptions – regarding both one's teacher and one's peers – that may underpin students' experiences in PE and their engagement in physical activity outside school.

Keywords: Adolescent, affect, interpersonal involvement, need support, student PE experiences

3.1 Introduction

Physical inactivity among youth and adolescents represents a significant health and economic concern in Australia and across the Western world (World Health Organisation, 2008). It is also recognised that lifestyle diseases, such as childhood obesity and type II diabetes, are increasing (Department of Health, 2004), potentially as a function of the prevalence of inactivity (Kimm et al., 2005; Kasa-Vubu, Lee, Rosenthal, Singer, & Halter, 2005). Despite the potential health benefits of physical activity, only 19% of Australian young people, aged 5-17 years, meet physical activity recommendations of accumulating at least 60 minutes of moderate-to-vigorous physical activity every day (Australian Bureau of Statistics (ABS), 2013; Department of Health and Aging, 2014). The significance of one's childhood/adolescent activity engagement is also underscored by the evidence that shows the patterns of physical activity that we develop in our early years may carry-over into adulthood (e.g., Pate et al., 2005).

There is a large body of evidence indicating that physical education (PE) classes are an important setting for endorsing the benefits of a physically active lifestyle (National Association for Sport and Physical Education, 2004), and for promoting engagement in physical activity both within (e.g., Stratton, Fairclough, & Ridgers, 2008) and outside school (e.g., Fox & Biddle, 1988; National Standards for Physical Education, 1995). Almost all adolescents participate in some form of formalised school-based PE, and it is widely acknowledged that adolescents' experiences in these classes are an important factor in shaping their physical activity levels (Cox, Smith, & Williams, 2008). Physical activity levels are of particular concern with regard to early adolescent girls, who experience pubertal changes that have been linked to body dissatisfaction (Levine & Smolak, 2002) and social physique anxiety (SPA; Hart, Leary, & Rejeski, 1989). Together, these maladaptive physique-related perceptions may align with enhanced concern relating to one's relationships with others, and can lead to lack

of engagement (among other strategies) in some physical activity modalities (Hart et al., 1989). It is particularly important, therefore, to examine how adolescent girls' experiences in PE may be important in encouraging (or discouraging) their engagement in physical activity.

Numerous antecedent factors have been identified that might contribute to individuals' PE involvement (see, for example, Garn, McCaughtry, Shen, Martin, & Fahlman, 2013), but one continued area of research has focused upon the way in which students' experiences might be shaped by their interactions with their teachers and/or classmates. In particular, past research has highlighted the role that one's PE teachers (e.g., Bourne et al., in press) and one's classmates (e.g., Cox, Duncheon, & McDavid, 2009; Cox & Ullrich-French, 2010) might play in shaping one's experiences in PE, and subsequently, how students' interpersonal perceptions might directly and/or indirectly indicate their attitudes toward, and engagement in, PE and leisure-time physical activity (LTPA; e.g., Ntoumanis, 2012). The broad aim of this investigation was to examine the way in which adolescent girls' perceptions about their PE teacher and classmates might shape their involvement in PE. In order to achieve this aim, we examined constructs that were drawn from two established conceptual frameworks (i.e., self-determination theory and the tripartite efficacy model), both used recently to evaluate interpersonal perceptions in PE. In the following sections, a review of relevant conceptual and empirical evidence is presented to support the specific aims of this study.

3.1.1 Self-Determination Theory

A number of investigators have explored the role of social agents (i.e., teachers, classmates) using the lens of self-determination theory (SDT; Deci & Ryan, 1985). Within SDT, Deci and Ryan (1985) proposed that a motivational continuum exists, whereby individuals may be motivated to pursue a given activity due to substantively different reasons (or motives). Broadly, Deci and Ryan contended that individuals may

participate in an activity due to relatively self-determined motives (e.g., fun, interest, value), and/or due to relatively more controlled motives (e.g., coercion, reward, internal or external pressure). At the most self-determined, or autonomous, end of the spectrum, they asserted that individuals may experience intrinsic motivation (i.e., participating in an activity due to the fun, interest, and enjoyment that one derives from it). At the other end of the spectrum, it was theorised that individuals can experience amotivation (i.e., an absence of motivation). A number of different forms of extrinsic motivation exist in between these two extremes. From most to least 'self-determined', these dimensions are termed integrated regulation (i.e., participation due to reasons such as congruence and awareness, and consistency with one's identity), identified regulation (i.e., participating because an activity is valued and personally important), introjected regulation (i.e., due to internal pressures such as guilt and shame that are associated with non-participation), and external regulation (i.e., participating due to external rewards or coercion; Deci & Ryan, 1985). According to theory and research, autonomous motives are generally viewed as being the most desirable, and have been shown to support adaptive outcomes (e.g., effort, engagement, persistence and well-being; for reviews, see Ntoumanis, 2012; Standage & Ryan, 2012).

Aside from distinguishing between different motivational regulations, SDT outlines that in order for individuals to be optimally (i.e., autonomously) motivated, it is important that three basic psychological needs are satisfied (i.e., autonomy, competence, and relatedness). The need for autonomy represents one's desire for input, choice, and a sense of agency or volition regarding one's pursuits (Ryan & Deci, 2008). Competence reflects one's desire to feel capable with respect to one's environment, and relatedness refers to the desire to feel connected to, and understood by, important others (Ryan & Deci, 2008). Theory and research indicates that in instances where individuals feel that their needs are satisfied, they display relatively greater self-determined (relative to

controlled) motivation, which in turn promotes more positive achievement behaviour (e.g., Standage & Ryan, 2012).

There is a well-established SDT-focused evidence base regarding the social and interpersonal factors that provides support for the realisation of students' needs in PE (see, for example, Hagger & Chatzisarantis, 2007; Ntoumanis, 2012). The majority of this work has been focused specifically on the indicative effects and promotion of autonomy-supportive instructional practices among teachers (i.e., strategies that emphasise the provision of choice and rationale, and instil a sense of agency among students; e.g., Barkoukis, Hagger, Lambropoulos, & Tsorbatzoudis, 2010; Ntoumanis, 2005. However, despite the proliferation of research on teacher-derived autonomy-support (Cox & Williams, 2008), less attention has been directed toward the development (and potential implications) of interpersonally-involving, or relatedness-supportive environments (i.e., quality, supportive social interactions) in PE.

There are two important 'social agents' that exist within PE through which individuals may derive relatedness support; that is, relatedness supportive behaviours may be provided by one's teacher (e.g., Cox & Williams, 2008), as well as one's peers, or classmates (e.g., Cox et al., 2009). It has been demonstrated that students' perceptions of supportive behaviours (e.g., caring, showing interest) from both of these sources underpin students' feelings of relatedness (and subsequently) motivation in class. Cox and colleagues (2009), for example, demonstrated that in PE, levels of relatedness experienced by students mediated the relationship between peers/teacher-related perceptions and self-determined motivation, indicating that perceptions of interpersonal support enhance students' autonomous motivation. Identifying the range of factors that may support PE students' feelings of relatedness is particularly important, as studies have demonstrated that feeling socially connected with peers (i.e., Smith, Ullrich-French, Walker, & Hurley, 2006; Ullrich-French & Smith, 2006) and

teachers (Cox & Williams, 2008) can influence self-determined motivation in PE. Moreover, past research has further underscored the role of relatedness support by demonstrating that this perception might directly or indirectly promote more adaptive affective outcomes (i.e., anxiety and engagement; Cox & Williams, 2008), as well as greater engagement in LTPA (Jackson, Whipp, Chua, Dimmock, & Hagger, 2013).

Although the provision of relatedness support to students appears to be an important aspect in promoting positive experiences within PE, there are important ways in which the literature (and hence our understanding) in this area may be advanced. First, the majority of work has considered the role of teacher-derived relatedness support, and limited work has been conducted that has examined students' perceptions of relatedness support provided by peers/classmates *alongside* teachers. For example, researchers have demonstrated that students who experience higher levels of social support from their teachers report favourable levels of competence, autonomy, and relatedness in class (Cox & Williams, 2008; Standage, Duda, & Ntoumanis, 2005). However, previous relatedness-based research in PE has often focused squarely on teacher-related perceptions, and has (in comparison) failed to fully explore the *independent* role that may be played by one's peers/classmates. That being the case, this study was designed in order to determine the extent to which peer- *and* teacher-provided relatedness support (and relatedness need satisfaction) may be differentiated from one another, and may independently support adaptive motivational responses on the part of students.

3.1.2 The Tripartite Efficacy Framework

Aside from SDT-based work, there also exist a limited number of studies that have explored interpersonal perceptions/influences in PE from the perspective of Lent and Lopez's (2002) tripartite efficacy model. This framework comprises self-efficacy as well as relational efficacy beliefs. Self-efficacy represents an individual's confidence

in his or her own capabilities (see Bandura, 1997), and is considered an important concept in PE given that it aligns with adaptive motivational and engagement-related outcomes (e.g., Chase, 2001; Gao, Lodewyk, & Zang, 2009). In instructional and interpersonal settings, though, such as those that exist within PE (i.e., teacher-student, classmates-to-student), Lent and Lopez (2002) proposed that individuals also develop other important 'relational' efficacy perceptions regarding those with whom they interact. With particular relevance for this investigation, Lent and Lopez contended that when individuals interact with others, one of the relational efficacy beliefs that they develop represents their estimations regarding the confidence that other people have in their ability. This construct, which Lent and Lopez termed *relation-inferred self-efficacy*, or RISE (Lent & Lopez, 2002), represents a metaperception pertaining to individuals' appraisals of another's (or others') confidence in their ability. Accordingly, alongside their confidence in their own ability, PE students might, for example, make appraisals regarding the extent to which their teacher is confident in their ability (e.g., "I think my teacher really believes in me").

The tripartite efficacy model has only recently begun to be applied within PE settings, and work to date regarding RISE has focused on students' estimations of their teacher's confidence in their ability (i.e., teacher-focused RISE; Bourne et al., in press; Jackson, Whipp, Chua, Pengelley, & Beauchamp, 2012; Jackson et al., 2013). Preliminary evidence indicates that, in line with theorising by Lent and Lopez (2002), RISE beliefs may act as an important perceptual mechanism that supports student experiences in PE. Jackson and colleagues (2012), for instance, demonstrated alignment between teacher-focused RISE and students' self-efficacy, in-class effort, and LTPA. Although the emphasis on teacher-related perceptions is understandable given their position of authority and key role in guiding/instructing students in PE, it is possible that students might also develop inferences about the extent to which their

classmates (as a whole) are confident in their ability (e.g., "my classmates don't seem to think I'm very good at PE"). Despite the potential for students to form estimations regarding their classmates' confidence in their ability, researchers have yet to examine RISE perceptions focused on one's classmates' confidence in one's ability (i.e., peer-focused RISE). With that in mind, we sought to extend the literature in this area by examining both teacher- *and* peer-focused RISE beliefs separately as potential indicators of students' relatedness perceptions, as well as the relations between these two distinct RISE perceptions and important in-class (e.g., worry and engagement) and extra-curricular (e.g., LTPA) outcomes.

3.1.3 The Current Study: Aims and Hypothesised Model

In sum, it appears that student relationships with, and perceptions about, their teachers *and* peers in PE potentially play a pivotal role in supporting feelings of relatedness, and indirectly, promoting more self-determined forms of motivation. Although some of these issues have been considered (often in isolation) in previous work, there are several novel aspects to this study. Specifically, aside from being the first study to integrate SDT and tripartite efficacy proposals in order to examine both peer and teacher influences, we also sought to extend the current literature in a number of ways. In terms of conceptual advancements, this study extends existing SDT-based work by (a) separately accounting for students' relatedness support perceptions regarding their teacher *and* peers, and (b) exploring how students' relatedness needs may be satisfied in unique ways by their teacher and peers (and by considering the extent to which these two forms of relatedness need satisfaction represent distinguishable constructs). In addition, we sought to extend the literature that has explored teacher and peer perceptions (e.g., Cox et al., 2009) by considering a different range of indicators of relatedness need satisfaction in PE in an all-girl population. Past research has demonstrated that there is a decrease in female participation in PE as they

reach puberty (Centres for Disease Control and Prevention, 1999). Guided by previous studies (e.g., Cox et al., 2008; 2009), this investigation focuses on the way in which adolescent girls' experiences with their teachers and peers (i.e., teacher/peer support) in PE align with motivational, affective (e.g., anxiety) and behavioural (e.g., physical activity) outcomes, as well as their engagement in LTPA. With regards to affective outcomes, although previous work has considered students' anxiety about their participation and general skill execution in PE (e.g., Cox et al., 2009), researchers have devoted less attention to the self-presentation / social anxiety that individuals might feel regarding the ways that they are evaluated by their teacher and peers. This seems particularly relevant when considering the implications of 'relationship-oriented' predictors, and so this current study included an assessment of 'social' (e.g., self-presentational) anxiety, on top of PE anxiety. Finally, from a methodological perspective, we sought to extend previous research and avoid relying solely on self-report data by obtaining external (i.e., teacher) ratings of student engagement.

On a separate note, although recent trans-contextual research has illustrated that students' PE-related perceptions and motivation might shape their physical activity behaviour both inside and outside school (see Hagger & Chatzisarantis, 2012; Jackson et al., 2012), previous research addressing peer- and teacher-focused contributors to relatedness have not considered whether peer- and teacher-derived relatedness might indirectly align with extra-curricular outcomes (e.g., Cox et al., 2009). It has been demonstrated that cross-contextual relations might exist between PE-based perceptions (e.g., autonomous motivation) and LTPA (e.g., Hagger et al., 2007, 2009), and with that in mind, this study incorporated the assessment of LTPA to enable potential cross-domain issues to be addressed.

Guided by existing SDT and tripartite efficacy research, we developed a hypothesised model that is displayed in Figure 2. In broad terms, this model focused on

identifying the direct and indirect ways through which students' teacher-/peer-based perceptions (i.e., teacher/peer-based relatedness support, teach/peer-focused RISE, teacher/peer-based relatedness need satisfaction) might support adaptive in-class (i.e., autonomous motivation for PE, anxiety within PE, and behavioural engagement) and leisure-time (i.e., LTPA) outcomes. In the material that follows, we outline (and provide theoretical and empirical support for) the predictive pathways that we sought to test within this model.

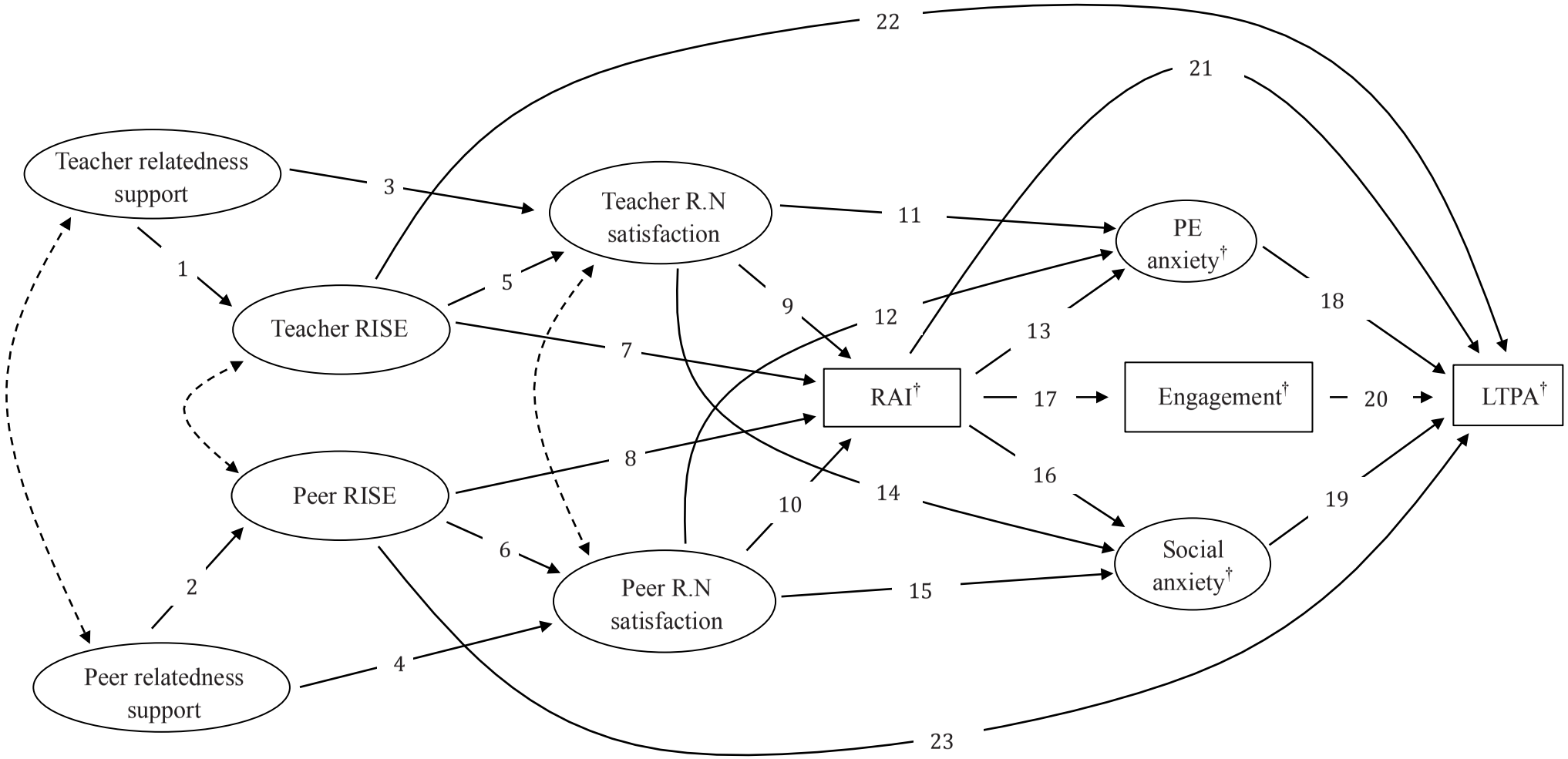

Figure 2. Hypothesised model. Latent variables marked with † indicates that covariates (i.e., baseline LTPA and year group) were also modeled as predictors of these variables alongside the primary pathways shown below.

By drawing from recent teacher-based tripartite efficacy research (Jackson et al., 2013), and Lent and Lopez's (2002) original proposals, it was hypothesised that when students perceived that their teacher and peers created a highly interpersonally-involving environment (i.e., favourable perceptions of teacher/peer-based relatedness support), this would indicate higher levels of teacher- and peer-focused RISE, respectively (see pathways 1 and 2 in Figure 2). Second, we hypothesised that favourable teacher/peer-based relatedness support perceptions would also indicate greater teacher- and peer-based relatedness need satisfaction, respectively (see pathways 3 and 4 in Figure 2). These pathways were guided by the need support literature within SDT (see Ryan & Deci, 2008), and previous research has also supported the hypothesis that relatedness supportive environments foster greater student relatedness need satisfaction (e.g., Ryan & Powelson, 1991). Aside from being predicted by relatedness support perceptions, we also hypothesised that individuals would report greater teacher- and peer-based relatedness need satisfaction when they believed that their teacher and peers (respectively) were highly confident in their ability (see pathways 5 and 6 in Figure 2). This proposition is supported by Lent and Lopez's (2002) proposals, insofar as favourable RISE beliefs are theorised to promote more inclusionary and cohesive relational perceptions (i.e., feelings of closeness, support, and trust).

We hypothesised a range of predictive pathways between interpersonal (i.e., teacher-/peer-related) perceptions and students' autonomous motivation for PE. Specifically, we anticipated that both teacher- and peer-focused RISE would be directly (and positively) related to autonomous motivation (pathways 7 and 8 in Figure 2). This hypothesis aligns with work by Jackson et al. (2012) and Lent and Lopez (2002), who theorised that RISE beliefs promote adaptive outcomes and autonomous motivation in PE. In addition, given that teacher- and peer-derived relatedness need satisfaction should align with more desirable forms of motivation (Ryan & Deci, 2008; Ryan &

Powelson, 1991; Smith et al., 2006), we hypothesised that increased levels of teacher- and peer-based relatedness need satisfaction would also indicate greater autonomous (relative to controlled) motivation in PE (pathways 9 and 10 in Figure 2).

Guided by previous research that has demonstrated the adaptive processes that accompany autonomous motivation (Cox et al., 2009; Ntoumanis, 2005), we anticipated that autonomous motivation would negatively align with undesirable affective responses in PE (i.e., PE anxiety and social anxiety) and would positively indicate students' engagement levels (i.e., effort) in PE (i.e., pathways 13, 16 & 17 in Figure 2). Indeed, Ntoumanis (2005) has previously identified that when students' reported higher levels of autonomous motivation, they reported less negative affect (i.e., anxiety) and greater engagement (i.e., effort) during class.

Although we anticipated that anxiety-related outcomes would be partly indicated by autonomous motivation, we also drew from previous research in order to specify other indicators of task-related and social anxiety in PE. In particular, Cox and Williams (2008) reported a predictive relationship between students' perceptions of support and affective consequences (e.g., worry) in PE, and accordingly, we hypothesised that favourable relatedness need satisfaction perceptions (regarding one's teacher and peers) would align with lower PE-related worry (i.e., PE and social anxiety; pathways 11, 12, 14 and 15 in Figure 2).

Finally, in line with existing trans-contextual (e.g., Hagger & Chatzisarantis, 2007) and tripartite efficacy (e.g., Jackson et al., 2013) research, we sought to account for the potential relationships that may exist between students' PE experiences/perceptions and their engagement in LTPA. Accordingly, we hypothesised that decreased levels of anxiety (i.e., PE, social), greater PE engagement, alongside greater self-determined (relative to controlled) motivation for participation in PE and

positive RISE perceptions, would be related to greater levels of LTPA (pathways 18 to 23 in Figure 2).

3.2 Method

3.2.1 Participants

The sample consisted of 379 female students (*Mage* = 13.36 *SD* = 1.19; range = 11-16 years) recruited from 19 classes within one independent all girls' school in the Perth metropolitan region. The sample used was predominantly caucasians with the majority of these students of anglo-saxon heritage. Participants were drawn from year 7 (6 classes; n = 138), year 8 (4 classes; n = 85), year 9 (4 classes; n = 78), and year 10 (5 classes; n = 78). On average, students in years 7 and 8 participated in 1.73 hours of in-school PE per week with their teacher prior to the first assessment. Students in year 9 and year 10 participated in 1.15 hours of in-school PE per week with their teacher prior to the first assessment. All seven PE teachers involved in the study were female with an average of 15 years teaching experience (range = 7 to 28 years).

3.2.2 Measures

3.2.2.1 Teacher- and Peer-Based Relatedness Support

Teacher-based relatedness support (i.e., the degree to which students perceived their PE teacher displayed interpersonally-involving behaviors) was measured with a PE-specific instrument used previously by Standage and colleagues (2005). Using the common stem, 'At the moment, in my PE class…', students were asked to respond to five statements about their teacher (e.g., "My PE teacher supports me"), and the same five statements regarding their classmates (e.g., "My classmates support me"), using a response scale anchored at 1 (*strongly disagree*) and 7 (*strongly agree*). Previous work with similar-aged students has demonstrated support for the internal reliability of the this instrument (e.g., Jackson et al., 2013). The teacher-based ($\alpha = 0.94$) and peer-based ($\alpha = 0.93$) measures derived from this instrument displayed acceptable internal

consistency.

3.2.2.2 Students' Teacher- and Peer-Focused RISE Appraisals

Students' perceptions of teacher- and peer-focused RISE appraisals were assessed using Jackson and colleagues' (2012) high-school PE tripartite instruments. Students were asked to respond to nine items using a response scale ranging from 1 (*no confidence at all)* to 5 (*complete confidence*). In order to measure teacher-focused RISE, respondents were instructed to think about their PE class and estimate "right at this moment in time, how confident do you think your PE teacher is in your ability to…". To ensure understanding, a further statement was included, "we're not focusing on how confident you are; we're focusing on whether you think your PE teacher is confident in you or not". Example items included, "try your hardest in every PE class", and "perform all the skills you are taught in PE". In order to measure students' peer-focused RISE, modifications were made to instructions, including "right at this moment in time, how confident do you think your peers are in your ability to…" and "we're not focusing on how confident you are; we're focusing on whether you think your peers are confident in you or not". Measures derived from this instrument have previously been shown to demonstrate acceptable internal consistency, factorial validity, and criterion validity with similar aged school students (Jackson et al., 2012). An acceptable level of internal consistency was observed for the teacher-focused ($\alpha = 0.90$) and peer-focused ($\alpha = 0.93$) measures derived from this instrument.

3.2.2.3 Teacher- and Peer-Based Relatedness Need Satisfaction

Student perceptions of teacher- and peer-based relatedness need satisfaction (i.e., feelings of belonging or connection regarding their PE teacher or peers) were measured using Richer and Vallerand's (1998) need for relatedness scale. In order to assess teacher-based relatedness need satisfaction the stem was modified to read, "With my teacher in this PE class I feel…". Five items were subsequently presented (e.g.,

"supported", "listened to"), and participants responded on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). In order to measure students' peer-based relatedness need satisfaction, modifications were made to instructions, to read "With my peers in this PE class I feel…". Standage, Duda, and Ntoumanis (2003, 2006) reported the construct validity and internal reliability of measures derived from this instrument within PE settings, and in the present study we observed acceptable levels of internal consistency for measures derived from teacher-based (α = 0.95) and peer-based (α = 0.95) instruments.

3.2.2.4 Motivation

Students' motivation for PE was measured using the Perceived Locus of Causality scale (PLOC-Q; Goudas, Biddle, & Fox, 1994). Following the common stem, "At the moment, I take part in PE classes…", students responded to statements that measured intrinsic motivation (four items; e.g., "because I enjoy learning new skills"), identified regulation (four items; e.g., "because I want to learn sport skills"), introjected regulation (four items; e.g., "because I want the teacher to think I'm a good student"), external motivation (four items; e.g., "because that's what I'm supposed to do") and amotivation (four items; e.g., "but I don't really know why"). Students responded to each item on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), and a single relative autonomy index was subsequently created using a weighting formula (i.e., 2 x intrinsic motivation + identified regulation – introjected regulation – 2 x external regulation) that accounts for relatively more self-determined as well as controlled motives. Considerable research in PE has demonstrated support for the psychometric properties of this scale (e.g., Lonsdale, Sabiston, Taylor, & Ntoumanis, 2011). Measures derived from this instrument displayed acceptable internal consistency (amotivation; α = 0.85, external; α = 0.85, introjected; α = 0.76, identified; α = 0.83, intrinsic; α = 0.90).

3.2.2.5 PE Anxiety

Student anxiety regarding their performance in PE was assessed using the five-item worry subscale from the Sport-Anxiety Scale-2 (Smith, Smoll, Cumming, & Grossbard, 2006). In line with previous PE-based work (e.g., Cox et al., 2009), this instrument was modified to measure the extent students worried before and during PE classes (e.g., "I worry that I will not do well"). The common stem, "Before or while I take part in my current PE classes…", was utilised to specifically emphasise students' PE (as opposed to general sport-related) perceptions. Students responded to these items using a 4-point response scale ranging from 1 (*not at all*) to 4 (*very much*). Scores for negatively worded items were reversed, before mean scores were calculated for each student. Smith and colleagues (2006) presented evidence supporting the validity and reliability of measures derived from this instrument within high school PE, and we observed an acceptable level of internal consistency for the measure derived from this instrument ($\alpha = 0.93$).

3.2.2.6 Social Anxiety

In line with previous research (Martin & Fox, 2001), participants' concerns regarding their teacher's and classmates' impressions of them during their PE lessons were each measured using four items. Minor revisions were made to Martin and Fox's (2001) instrument (i.e., the term 'instructor' was changed to 'teacher', and 'participants' was changed to 'classmates'), and students responded to 8 items in total (e.g., "I am concerned about looking uncoordinated in front of my teacher/classmates", "I worry about embarrassing myself in front of my teacher/classmates") using the stem, 'Thinking about how I feel in my current PE lessons…'. Responses were made on a 5 point scale ranging from 1 (*not at all concerned*) to 5 (*extreme concern*). Martin and Fox (2001) presented evidence to support the internal consistency of measures derived from this instrument, and the measures derived from this instrument displayed

acceptable internal consistency in the present investigation (i.e., teacher; α = 0.88, peer; α = 0.92, combined = 0.94).

3.2.2.7 Engagement

Students' levels of in-class behavioural engagement were obtained using a single-item teacher rating. Teachers responded to the question, "over this week, what level of engagement have each of your students shown in your PE class". Specifically, teachers rated each student on a 7 point scale, anchored at 1 (*no engagement*), 4 (*average engagement*), and 7 (*very high level of engagement*) based on the intensity of their participation (relative to their classmates) within the last week. Ntoumanis (2005) previously used a similar behavioural engagement scale that was shown to be reliable.

3.2.2.8 Leisure-time physical activity

Students' LTPA levels were measured using the Leisure-Time Exercise Questionnaire (LTEQ; Godin & Shephard, 1985). Definitions and examples for mild, moderate, and vigorous activity categories were provided, and all students were asked to record bouts of mild, moderate, and vigorous physical activity (>20 minutes) that they had completed in their leisure-time over the previous week. Students were asked to exclude any curriculum-based (e.g., PE) activity, as well as any compulsory school-based physical activity in which they had participated. Godin and Shephard's (1985) original formula (i.e., 9 x number of vigorous bouts + 5 x number of moderate bouts + 3 x number of mild bouts) was then used to calculate an overall LTPA score.

3.2.3 Procedure

Once ethical approval was obtained from The University of Western Australia, information sheets were provided to the Australian all-girls private school principal, parents/guardians, teachers, and students, in which the purpose, design and procedure of the study was described. Informed active consent was sought from all students, teachers, and principals, and passive consent was obtained from parents/guardians (i.e.,

parents were provided with an information letter and stamped addressed envelope following the first data collection period, and were instructed to mail the return slip to the investigators should they wish to withdraw their daughter from the study). Upon receiving written consent, suitable times were arranged to collect data. The lead researcher was present at the school to answer any questions during all data collection sessions. All PE teachers of year 7-10 students were invited to participate in the study, and classes taught by these teachers were subsequently selected at random. All students within the selected classes were invited to participate in the study and were informed that they could refuse to answer any questions, they had the right to withdraw from the study at any time, that all information would remain confidential, and that their peers and teachers had no influence whatsoever on their decision to participate.

Data were collected at two different occasions, throughout a 15-week time frame (i.e., across two different four to six week sport/activity blocks) from August to November 2013. At time one, participants completed baseline measures assessing their LTPA, and at time 2 (approximately two months later) participants were asked to complete measures of all primary variables, including a repeat recording of LTPA. Data collection procedures included student questionnaires and teacher ratings. The first time point collection comprised of measuring students baseline LTPA. Within the time two assessment, measurement of primary variables was split across two different time points. At the beginning of a specified lesson, measures of teacher- and peer-based relatedness support, along with teacher- and peer-focused RISE were completed over approximately 20 minutes. Another battery of measures comprising teacher- and peer-based relatedness need satisfaction, motivation, PE anxiety, social anxiety, and LTPA was administered at the end of the subsequent lesson (and lasted for approximately 20 minutes). Finally, all teachers completed ratings for each student's engagement at the

end of the second lesson, reflecting students' levels of participation in PE during that week (i.e., the period over which the student assessments had been made).

3.2.4 Data Analysis

First, we examined item-level descriptive statistics in order to determine distributional properties and to screen for outliers. Second, we estimated a structural equation model incorporating all measurement parameters and structural pathways (as outlined in Figure 2) in Mplus version 7.11 (Muthén & Muthén, 1998-2013). Given that students were nested within classes, we implemented a correction for non-independence of observations based on student clustering (Asparouhov & Muthén, 2006). Missing data were treated within the model, and we used a robust maximum likelihood estimator (MLR), which creates standard errors that are robust to any deviation from normality, and to the use of categorical indicators that comprise four or more response categories (e.g., Beauducel & Herzberg, 2006). We specified a single model that included all direct and indirect pathways between latent (i.e., relatedness support, RISE, relatedness need satisfaction, anxiety variables) and single-item observed (i.e., autonomous motivation, engagement, LTPA) variables. In order to control for the effects of year group and previous LTPA on our primary outcomes, we included students' year group and baseline LTPA as single-item observed continuous variables. We modeled predictive pathways between year group and baseline LTPA in relation to LTPA, anxiety variables, engagement, and autonomous motivation. We considered a range of indices when gauging overall model fit, namely the χ^2 goodness-of-fit index, comparative fit index (CFI), Tucker-Lewis index (TLI), and root mean square error of approximation (RMSEA). We used established norms in order to assess acceptable model fit, namely CFI and TLI $\geq .90$, and RMSEA $\leq .08$ (Hu & Bentler, 1999).

3.3 Results

3.3.1 Descriptive Statistics and Fit Indices

Mean (and *SD*) scores and factor loadings for latent and observed variables are displayed in Table 1. Item-level skewness and kurtosis estimates for all latent variable indicators identified no problematic distributional properties. Analyses indicated acceptable fit for a single model that simultaneously included all measurement parameters, as well as structural pathways between latent and observed variables (see Figure 1), χ^2 (1426) = 2481.19, $p < .001$, CFI = .93, TLI = .92, and RMSEA = .046 (90% confidence interval .043 to .049). Missing case analyses conducted in SPSS revealed that data were missing at random, $\chi^2(1669) = 1760.53$, $p = .06$.

Table 1. Descriptive Statistics (mean and standard deviations) and standardised factor loading range for latent variables.

Variable	*M*	*SD*	Factor loading range
Teacher-based relatedness support	5.77	1.25	.82 - .92
Peer-based relatedness support	5.36	1.28	.77 - .93
Teacher-focused RISE	4.07	0.62	.45 - .76
Peer-focused RISE	3.97	0.68	.58 - .77
Teacher-based relatedness need satisfaction	5.82	1.20	.68 - .93
Peer-based relatedness need satisfaction	5.46	1.25	.72 - .92
Autonomous motivation	7.05	6.50	--
Social anxiety	2.30	1.01	.68 - .88
PE anxiety	1.85	0.76	.78 - .91
Engagement	5.64	1.23	--
LTPA	62.48	51.91	--

Note. Teacher- and Peer-based relatedness need satisfaction, Teacher- and Peer-based relatedness support, Autonomous motivation and Engagement measured from 1-7, Teacher- and Peer-focused RISE and Social Anxiety measured from 1-5, PE anxiety measured from 1-4, with higher scores representing more favourable perceptions. Higher motivation and LTPA scores represent higher levels of physical activity and autonomous motivation.

3.3.2 Main Analyses

3.3.2.1 Direct effects

A number of significant direct pathways emerged between latent and observed variables, which were interpreted in line with Cohen's (1992) recommended effect size criteria (i.e., .10 = small, .30 = moderate, .50 = large). With respect to teacher-related perceptions, teacher-based relatedness support displayed a moderate, positive effect in relation to teacher-focused RISE, and a large, positive effect in relation to teacher-based relatedness need satisfaction (see Table 2; pathways 1 and 3 in Figure 2). Moreover, a small-to-moderate, positive pathway was observed between teacher-focused RISE appraisals and teacher-based relatedness need satisfaction (pathway 5). Taken together, these pathways demonstrated that students reported feeling more connected to their teacher when they felt that their teacher (a) engaged in relatedness-supportive (i.e., interpersonally-involving) behaviours, and (b) believed strongly in their (i.e., the student's) ability. In addition, students reported more positive assessments of their teacher's confidence in their ability when they felt that their teacher displayed relatedness-supportive instructional practices.

With regard to peer-related perceptions, peer-based relatedness support also displayed a moderate, positive effect in relation to peer-focused RISE, and a large, positive effect in relation to peer-based relatedness need satisfaction (i.e., pathways 2 and 4). A small-to-moderate, positive pathway was also observed for peer-focused RISE in relation to peer-based relatedness need satisfaction (i.e., pathway 6). Collectively, these effects showed that students reported feeling more connected to their classmates (as a whole) when they felt that their classmates displayed relatedness-supportive behaviours, and when their classmates, as a whole, believed strongly in their (i.e., the student's) ability. In addition, students felt that their classmates believed strongly in their ability when they displayed relatedness-supportive behaviours.

Focusing on the variables that were hypothesised to align with motivational processes (i.e., pathways 7 to 10 in Figure 2), a moderate-to-large, positive pathway was observed for teacher-focused RISE. That is, favourable estimations regarding one's teacher's confidence in one's ability indicated greater self-determined (relative to controlled) forms of motivation for PE (i.e., pathway 7). Analyses also revealed a small, positive effect between peer-based relatedness need satisfaction and autonomous motivation, insofar as students endorsed more autonomous (relative to controlled) motives for their participation in PE when they felt valued and understood by their classmates (pathway 10). Significant pathways did not emerge, however, for peer-focused RISE or teacher-based relatedness need satisfaction, in relation to autonomous motivation (i.e., pathways 8 and 9).

With respect to the first of the PE-based outcomes that was examined in the model (i.e., PE anxiety), a small-to-moderate, negative effect emerged for students autonomous motivation (i.e., pathway 13). In particular, when students endorsed more self-determined motives (e.g., fun and enjoyment, relative to controlled forms of motivation), they reported relatively lower levels of anxiety in relation to their participation in PE. Aside from this effect, no significant pathways emerged for teacher-based relatedness need satisfaction or peer-based relatedness need satisfaction in relation to PE anxiety (i.e., pathways 11 and 12). In terms of students' social anxiety[1] perceptions (i.e., their self-presentation concerns in relation to their teacher and peers), peer-based relatedness need satisfaction displayed a small-to-moderate, negative effect (i.e., pathway 15). Analyses also revealed a moderately sized, negative pathway between autonomous motivation and social anxiety (i.e., pathway 16). Taken together,

[1] It is worth noting that when running exactly the same model, but treating students' peer- and teacher-focused social anxiety perceptions as separate latent variables, the correlation between these latent variables was .91 (p<.001). The magnitude of this correlation indicated that (in an empirical sense) these variables were likely indistinguishable, and so the final model (reported above) included a single 'social anxiety' latent variable that was represented by eight indicators (i.e., four regarding one's peers, and four regarding one's teacher).

these effects indicated that when students felt a strong connection to their teacher, and endorsed autonomous (relative to controlled) motives for their participation in PE, they experienced reduced concerns regarding their classmates' and teacher's impression of them. It is important to note, however, that a significant pathway did not emerge for teacher-based relatedness need satisfaction in relation to social anxiety (i.e., pathway 14).

In terms of the final pathways outlined within the hypothesised model, analyses revealed that students' autonomous motivation for PE displayed a small-to-moderate, positive effect in relation to their engagement (i.e., pathway 17). This pathway demonstrated that students who reported that they engaged in PE due to relatively more autonomous reasons were rated by their teachers as displaying greater levels of engagement in their PE lessons. With respect to trans-contextual effects (i.e., the role of PE-based variables in indicating LTPA), analyses also revealed a significant, positive pathway that was small in magnitude between students' engagement in PE and their LTPA (i.e., pathway 20). Importantly, this pathway indicated that students who were independently rated (by their teachers) as being highly engaged within PE, themselves reported greater engagement in LTPA. Significant pathways did not emerge, however, for PE anxiety, social anxiety, autonomous motivation, teacher-focused RISE or, peer-focused RISE, in relation to LTPA (i.e., pathways 18, 19, 21, 22 and 23).

Table 2. Direct standardised effects for all pathways specified within Figure 2.

Pathway	Estimate	SE	*p*
Directional pathways			
1: Teacher R-S → Teacher RISE	.39	.07	<.001
2: Peer R-S → Peer RISE	.39	.07	<.001
3: Teacher R-S → Teacher R.N.S.	.62	.08	<.001
4: Peer R-S → Peer R.N.S.	.63	.05	<.001
5: Teacher RISE → Teacher R.N.S.	.28	.08	.001
6: Peer RISE → Peer R.N.S.	.22	.05	<.001
7: Teacher RISE → RAI	.48	.08	<.001
8: Peer RISE → RAI	-.04	.06	.55
9: Teacher R.N.S. → RAI	.05	.07	.44
10: Peer R.N.S. → RAI	.19	.06	.003
11: Teacher R.N.S. → PE anxiety	-.03	.09	.70
12: Peer R.N.S. → PE anxiety	-.10	.08	.18
13: RAI → PE anxiety	-.26	.07	<.001
14: Teacher R.N.S. → Social anxiety	.04	.10	.72
15: Peer R.N.S. → Social anxiety	-.24	.08	.002
16: RAI → Social anxiety	-.33	.07	<.001
17: RAI → Engagement	.25	.05	<.001
18: PE anxiety → LTPA	-.02	.08	.84
19: Social anxiety → LTPA	.04	.04	.30
20: Engagement → LTPA	.11	.06	.048
21: RAI → LTPA	-.01	.04	.83
22: Teacher RISE → LTPA	-.03	.07	.69
23: Peer RISE → LTPA	.06	.04	.17
Covariance pathways			
Teacher R-S ↔ Peer R-S	.50	.07	<.001
Teacher RISE ↔ Peer RISE	.70	.06	<.001
Teacher R.N.S. ↔ Peer R.N.S.	.46	.08	<.001

Note. R-S = relatedness support (specifically regarding teacher or peers); RISE = relation-inferred self-efficacy; R.N.S. = relatedness need satisfaction (derived specifically from teacher or peers); RAI = relative autonomy index; PE anxiety = anxiety related to one's PE class in general; Social anxiety = anxiety related to interactions with teacher and peers in PE; LTPA = leisure-time physical activity. With the exception of anxiety, higher scores denote more positive perceptions. Variance explained: Teacher RISE = 16%*; Peer RISE = 15%*; Teacher R.N.S. = 61%**; Peer R.N.S. = 56%**; RAI = 39%**; PE anxiety = 12%*; Social anxiety = 20%**; Engagement = 8%; LTPA = 29%** (* = p <.01, ** = p <.001).

It is important to emphasise that all significant effects that emerged in relation to PE-based outcomes (i.e., anxiety responses and engagement) and LTPA were observed while controlling for the effects of baseline LTPA and year group. A number of significant effects were observed for these covariate pathways (see Table 3, and note to Figure 2); for baseline LTPA, a small, negative effect emerged in relation to students' PE anxiety, and a large positive effect was apparent for time two LTPA. These effects indicated that students who reported greater engagement in physical activity at baseline, experienced lower levels of anxiety in their PE classes, and participated in greater prospective LTPA. In terms of year group, we observed a small-to-moderate, negative effect in relation to autonomous motivation, and a small, negative effect on both forms of anxiety. Therefore, as year level (i.e., student age) increased, students reported greater controlled (relative to autonomous) forms of motivation, and experienced lower task-related and social anxiety.

Table 3. Direct standardised effects for all covariate pathways specified within the structural model.

Effect	Estimate	SE	*p*
Baseline LTPA → RAI	-.03	.03	.30
Baseline LTPA → PE anxiety	-.16	.04	<.001
Baseline LTPA → Social anxiety	-.11	.06	.056
Baseline LTPA → Engagement	-.02	.05	.72
Baseline LTPA → LTPA	.52	.06	<.001
Year → RAI	-.28	.05	<.001
Year → PE anxiety	-.12	.06	.029
Year → Social anxiety	-.11	.03	.001
Year → Engagement	-.10	.15	.51
Year → LTPA	-.02	.05	.76

Note. LTPA = leisure-time physical activity; RAI = relative autonomy index; PE anxiety = anxiety related to one's PE class in general; Social anxiety = anxiety related to interactions with teacher and peers in PE. 'Year' denotes the academic year/grade of the student (i.e., Year/Grade 7-10). For example, analyses indicated that as year group increased (i.e., for older students), RAI and anxiety decreased.

3.3.2.2 Indirect effects

Given the multitude of possible indirect effects, we requested the estimation of indirect pathways solely in relation to our primary PE-based (i.e., engagement and anxiety) and leisure-time (i.e., LTPA) outcomes. No significant indirect effects emerged in relation to LTPA; however, several indirect pathways were apparent with regard to our primary PE-based outcomes (an overview of all significant specific indirect effects upon these variables is presented in Table 4). The most intricate specific indirect pathway that emerged for student engagement in PE incorporated students' perceptions of peer-based relatedness support, peer-focused RISE, peer-based relatedness need satisfaction, and motivation (i.e., β = .004, *SE* = .001, *p* = .007). As shown in Table 4, the various subcomponents (i.e., smaller chains) contained within this indirect pathway were also significant (i.e., Peer-focused RISE → Peer-based relatedness need satisfaction → Motivation → Engagement: β = .010, *SE* = .004, *p* = .01; Peer-based relatedness support → Peer-based relatedness need satisfaction → Motivation → Engagement: β = .029, *SE* = .008, *p* = < .001). Favourable peer-based relatedness support perceptions were also associated with increased engagement via a less complex pathway, which included only student autonomous motivation as an intermediary variable (i.e., Peer-based relatedness support → Motivation → Engagement: β = .046, *SE* = .013, *p* < .001). Aside from peer-related indicators, teacher-based perceptions were also indirectly associated with student engagement (i.e., Teacher-based relatedness support → Teacher-focused RISE → Motivation → Engagement: β = .047, *SE* = .016, *p* = .004; Teacher-focused RISE → Motivation → Engagement: β = .119, *SE* = .032, *p* = < .001).

Table 4. Significant standardised specific indirect effects in relation to primary PE-based outcomes (i.e., anxiety, engagement).

Effect	Estimate	SE	95% CI	*p*
Outcome: Engagement				
Peer R.N.S → RAI → Engagement	.046	.013	.021, .071	<.001
Teacher R-S → Teacher RISE → RAI → Engagement	.047	.016	.015, .079	.004
Teacher RISE → RAI → Engagement	.119	.032	.055, .182	<.001
Peer R-S → Peer R.N.S. → RAI → Engagement	.029	.008	.014, .044	<.001
Peer R-S → Peer RISE → Peer R.N.S. → RAI → Engagement	.004	.001	.001, .007	.007
Peer RISE → Peer R.N.S. → RAI → Engagement	.010	.004	.002, .018	.01
Outcome: PE anxiety				
Peer R.N.S → RAI → PE anxiety	-.047	.021	-.088, -.007	.021
Teacher R-S → Teacher RISE → RAI → PE anxiety	-.048	.016	-.080, -.016	.003
Teacher RISE → RAI → PE anxiety	-.122	.040	-.200, -.045	.002
Peer R-S → Peer R.N.S. → RAI → PE anxiety	-.030	.013	-.055, -.005	.018
Outcome: Social anxiety				
Peer R.N.S → RAI → Social anxiety	-.062	.020	-.101, -.022	.002
Teacher R-S → Teacher RISE → RAI → Social anxiety	-.063	.020	-.103, -.023	.002
Teacher RISE → RAI → Social anxiety	-.159	.043	-.242, -.075	<.001
Peer R-S → Peer R.N.S. → RAI → Social anxiety	-.039	.012	-.062, -.016	.001
Peer R-S → Peer RISE → Peer R.N.S. → Social anxiety	-.021	.010	-.040, -.002	.032
Peer R-S → Peer RISE → Peer R.N.S. → RAI → Social anxiety	-.005	.002	-.010, -.001	.022
Peer RISE → Peer R.N.S → Social anxiety	-.053	.023	-.099, -.008	.022
Peer RISE → Peer R.N.S → RAI → Social anxiety	-.014	.006	-.026, -.001	.031

Note. No specific indirect effects emerged in relation to LTPA. R-S = relatedness support (specifically regarding teacher or peers); RISE = relation-inferred self-efficacy; R.N.S. = relatedness need satisfaction (derived specifically from teacher or peers); RAI = relative autonomy index; PE anxiety = anxiety related to one's PE class in general; Social anxiety = anxiety related to interactions with teacher and peers in PE.

The most complex specific indirect pathway that arose in relation to PE anxiety involved teacher-based relatedness support, teacher-focused RISE, and motivation (i.e., β = -.048, *SE* = .016, *p* = .003). As Table 4 displays, one smaller chain within this indirect pathway was also significant (i.e., Teacher-focused RISE → Motivation → PE anxiety: β = -.122, *SE* = .040, *p* = .002). Analyses also revealed indirect effects for students' peer-related perceptions in relation to PE anxiety (i.e., Peer-based relatedness support → Peer-based relatedness need satisfaction → Motivation → PE anxiety: β = -.030, *SE* = .013, *p* = .018). In addition, one smaller chain within this peer-based indirect pathway was also significant (i.e., Peer-based relatedness need satisfaction → Motivation → PE anxiety: β = -.047, *SE* = .021, *p* = .021).

Finally, with respect to students' social anxiety perceptions, the most intricate indirect pathway began with peer-based relatedness support, and included peer-focused RISE, peer-based relatedness need satisfaction, and autonomous motivation (β = -.005, *SE* = .002, *p* = .022). As illustrated in Table 4, a number of smaller indirect chains within this pathway also emerged (i.e., Peer RISE → Peer R.N.S → Motivation → Social anxiety: β = -.014, *SE* = .006, *p* = .031; Peer-based relatedness support → Peer-based relatedness need satisfaction → Motivation → Social anxiety: β = -.039, *SE* = .012, *p* = .001; Peer-based relatedness support → Peer-focused RISE → Peer-based relatedness need satisfaction → Social anxiety: β = -.021, *SE* = .010, *p* = .032). Peer-based relatedness need satisfaction was also associated with decreased social anxiety via a more simple pathway, which included only autonomous motivation as an intermediary variable (i.e., β = -.062, *SE* = .020, *p* = .002). Similarly, favourable peer-focused RISE beliefs aligned indirectly with decreased social anxiety via a simple pathway that included only peer-based relatedness need satisfaction as an intermediary variable (i.e., β = -.053, *SE* = .023, *p* = .022). In terms of indirect pathways stemming from teacher-related perceptions, analyses demonstrated that teacher-based relatedness support was

indirectly associated with students' social anxiety in PE, via a pathway that included students' teacher-focused RISE and motivation perceptions (i.e., Teacher-based relatedness support → Teacher-focused RISE → Motivation → Social anxiety: β = -.063, *SE* = .020, *p* = .002). As Table 4 demonstrates, one smaller chain within this indirect pathway was also significant (i.e., Teacher-focused RISE → Motivation → Social anxiety: β = -.159, *SE* = .043, *p* < .001).

3.4 Discussion

Physical inactivity, particularly among adolescents, has become of great concern across Australia and the Western World (ABS, 2013; Department of Health and Aging, 2014; WHO, 2008) in light of established links with a range of lifestyle diseases (Department of Health, 2004; Kimm et al., 2005; Kasa-Vubu et al., 2005). In seeking to redress the economic and social problems associated with inactivity, students' experiences in PE have been found to be of importance in encouraging engagement within class, as well as motivating participation in voluntary LTPA (e.g., Hagger, Chatzsarantis, Culverhouse, & Biddle, 2003). Moreover, research within PE contexts has documented that interactions with one's teachers (Bourne et al., in press) and classmates (e.g., Cox et al., 2009; Cox & Ullrich-French, 2010) are influential in shaping students' experiences. These social interactions may be of particular importance for adolescent girls who are more likely to avoid physical activity when they are put in a position where their bodies can be analysed by their peers (Hart et al., 1989).

Guided by these considerations, SDT (Deci & Ryan, 1985) has been used to underpin a significant amount of PE- and physical activity-based research. Within the SDT literature, empirical scrutiny has often been directed toward the role of teachers in shaping student motivation; however, far less investigation has been devoted toward studying the influence that one's peers might have on one's experiences in PE.

Similarly, in existing work that has utilised Lent and Lopez's (2002) tripartite efficacy model to understand students' interpersonal perceptions in PE (e.g., Jackson et al., 2012, 2013), investigators have focused their attention on teacher-related perceptions, but have yet to differentiate the unique effects that may arise out of one's appraisals regarding one's peers and one's teacher. Finally, the majority of past research has focused on the influences of peer/teacher emotional support in relation to outcomes within the PE classroom, with limited research looking at the effects on LTPA. In order to advance the literature in this area, the focus of this study was based on integrating concepts from SDT (Deci & Ryan, 1985), the tripartite efficacy model (Lent & Lopez, 2002), and the trans-contextual model (Hagger & Chatzisarantis, 2012). More specifically, this investigation was focused on exploring the links between teacher- and peer-based relatedness support, teacher- and peer-focused RISE, teacher- and peer-based relatedness needs satisfaction, autonomous motivation, anxiety (i.e., PE and social) and behavioural engagement within PE, as well as LTPA.

Firstly, we examined relations between interpersonally-involving environments (i.e., teacher- and peer-based relatedness support), teacher- and peer-focused RISE appraisals, and teacher- and peer-based relatedness need satisfaction. As hypothesised, and consistent with existing PE-based work (Jackson et al., 2013), our findings demonstrated that perceived relatedness support from one's teacher and peers aligned with greater teacher- and peer-focused RISE perceptions, respectively. Although previous work has demonstrated the relations that exist between relatedness support and RISE in terms of students' inferences regarding their teacher, these findings provided support for the notion that students believe that their classmates are confident in their ability when they provide a high level of relatedness support (see pathway 2 in Figure 2). This pathway indicated that when students feel sufficiently emotionally supported by their teacher/peers (i.e., inclusivity and trusted), students more favourably estimated

the degree to which their teacher/peers believed in their ability. Importantly, the relations between students' teacher- and peer-focused RISE perceptions also appeared to indicate that these appraisals represent distinct (yet related) constructs, and encourage future work that explores the different types of RISE appraisals that emerge in interpersonal contexts.

In accordance with theory (Deci & Ryan, 1985) and previous research (Ryan & Powelson, 1991), our findings also demonstrated that when students reported favourable perceptions of peer- and teacher-based relatedness support, they experienced stronger peer- and teacher-based relatedness need satisfaction. Although the teacher-focused part of this model has been documented previously, this study provided novel insight into interpersonal processes in PE by demonstrating that (a) students experience greater relatedness need satisfaction regarding their peers when they infer that those peers create a highly interpersonally-involving climate, and (b) individuals may distinguish between the degree of relatedness need satisfaction that they derive from their teacher and their peers. Indeed, when modelling the relationship between the two separate need satisfaction variables, analyses demonstrated a shared variance of approximately 21%, highlighting that individuals experience need satisfaction to different degrees regarding their teacher and peers.

In terms of the other relations between these interpersonal perceptions, our findings provided support for Lent and Lopez's (2002) proposals by demonstrating that students reported greater relatedness need satisfaction (e.g., closeness, understanding) when they felt that their teacher and peers were confident in their ability. Lent and Lopez (2002) asserted that when individuals believe that others are confident in their ability, then this serves to promote more positive relational perceptions (i.e., feelings of closeness and satisfaction). Collectively, these effects emphasise the significance of students' RISE appraisals with respect to foreseeing adaptive interpersonal outcomes,

and underscore the importance of promoting different types of RISE inferences within PE.

Although both teacher- and peer-focused RISE were expected to indicate enhanced autonomous motivation in PE, the findings only partially supported our hypothesis. That is, only teacher-focused (and not peer-focused) RISE had a positive direct effect in relation to autonomous motivation. The value of teacher-focused RISE supported previous PE-based research (Jackson et al., 2012; 2013), and the non-significant association between peer-focused RISE and autonomous motivation may be due to the position of authority (e.g., providing instruction, guidance, evaluating students' performance) that teachers occupy in comparison to peers (e.g., Cox & Williams, 2008). Indeed, in cases where students believe that their teacher believes strongly in their ability but that their peers do not, they may retain enjoyment, interest, and fun (i.e., autonomous motives) due to the teacher's perceived position of status, expertise, and authority within the classroom.

Aside from the effects of RISE beliefs, and in line with the novel contributions previously addressed, this study expanded on past research and considered the possibility that peer- *and* teacher-based relatedness need satisfaction might separately align with students' autonomous motivation within PE. The modelling results partially supported our hypotheses, showing a significant, positive relationship for peer-based relatedness need satisfaction with respect to autonomous motivation. This is consistent with existing SDT-based work (Ryan & Deci, 2007); Ryan and Powelson (1991), for example, highlighted that when students felt connected to others (i.e., experienced strong feeling of relatedness need satisfaction), their self-determined motivation levels were enhanced (see also Ullrich-French & Smith, 2006). Further underscoring the relevance of relatedness need satisfaction derived specifically from one's peers was the finding that peer-based relatedness need satisfaction related to decreased social anxiety

within PE. Previous peer-based relatedness need satisfaction research has reported negative associations with anxiety-related responses (e.g., Cox & Williams, 2008, McDonough & Crocker, 2007); that is, the closer students feel to their peers, the lower the levels of negative affective outcomes they experience. Previous studies have examined students' anxiety with respect to the tasks required of them in PE, however, and the investigation of social anxiety – students' concerns regarding their physique, physical condition, and coordination (Leary, 1992) – is novel to this investigation. Given the heightened concerns that may be experienced by females in physical activity contexts (Hart et al., 1989; Levine & Smolak, 2002), this finding is particularly relevant in seeking to understand how to create PE environments that do not elicit maladaptive affective outcomes and doubts regarding the impression one makes to others.

Despite the indicative effects that were observed for peer-based relatedness need satisfaction, theory and research indicates that teacher-based relatedness need satisfaction should also display strong, positive relations with autonomous motivation (e.g., Cox & Williams, 2008); our results did not support this finding. Past research has illustrated that when students experience close, important relationships, they are able to adopt the values that the significant figure imparts on them, and ultimately, become more self-determined (Ryan & Powelson, 1991). If peers were able to provide this necessary support (i.e., communicate the value of PE with their classmates), however, then this may help explain why teacher-based relatedness need satisfaction had a non-significant result. Whilst only speculative, this result may be reflective of the all-female cohort used in this study and the supportive, non-competitive, nature of the students. These qualities possibly served to foster their peer-based relatedness need satisfaction to a level that made redundant a need for a high level of support from their PE teachers. In contrast to the findings for peer-based relatedness support, it is worth noting that we observed a non-significant relationship between teacher-based relatedness need

satisfaction and social anxiety. Although we can only speculate as to the reason for this non-significant effect, it is possible that feeling close to (and not excluded by) one's peers, rather than one's teacher, takes precedence when envisaging students' apprehension about the way in which they will be evaluated. For example, students may believe that the greatest 'threat' of evaluation comes from their peers (and not their teacher), and so it is possible that feeling comfortable around one's classmates is most crucial for alleviating social anxiety concerns.

Interestingly, we also observed non-significant relationships between both teacher- and peer-based relatedness need satisfaction and PE anxiety. PE anxiety focuses on the degree to which students worry previous to, or within PE classes (i.e., about their performance). These findings do not support previous research (Cox & Williams, 2008; McDonough & Crocker, 2007) that reported need fulfilment should negatively correlate with negative affective outcomes (i.e., worry and anxiety). Despite the fact that both their teacher and peers were meeting their emotional support needs (i.e., satisfaction), this did not decrease the levels of PE anxiety experienced. Such findings may be due to female adolescents' tendency to experience negative self-related feelings despite their relatedness needs being met (Ryan & Deci, 2000). An alternative explanation for the non-significant relations between relatedness need satisfaction and PE anxiety may be due to the aligning pathway that did emerge between autonomous motivation and affective outcomes (i.e., both PE and social anxiety). Specifically, when students endorsed more autonomous motives for PE, they reported lower PE-related and social anxiety concerns (see Ntoumanis, 2005).

Despite the fact that self-determined motivation negatively correlated with both PE anxiety and social anxiety (see pathways 13 and 16 in Figure 2), these negative affective outcomes did not subsequently align with LTPA (see pathways 18 and 19). It is possible that the lack of effects for in-class anxiety perceptions with respect to LTPA

may be due to the different contextual conditions that exist in PE versus LTPA. Specifically, students have the opportunity to choose their own activity modality within their leisure-time, thus negating the effects associated with any concerns that they have regarding their imposed PE activities. Moreover, students are also able to select whether they complete LTPA alone or in a group, as well as choosing the individuals with whom they wish to exercise, thus minimising the potential for PE-based social anxiety to impact their LTPA engagement. Similarly, students' teacher- and peer-focused RISE appraisals were not related to LTPA (i.e., pathways 22 & 23 in Figure 2). Previous research (e.g., Bourne et al., in press) has demonstrated that when students experience higher levels of support from their teachers (i.e., teacher-focused RISE), they report greater participation in recreational activity (i.e., LTPA). In this instance, although students felt that their PE teacher and peers believed in their ability in class, these feelings did not directly transfer to the next environment and create enhanced levels of LTPA. Further research is clearly warranted that explores the boundary conditions (i.e., moderators) that dictate whether direct relationships emerge between RISE appraisals and LTPA.

Although a number of our hypothesised direct effects for LTPA were not supported, some relevant findings did emerge. Specifically, in line with Hagger and Chatzisarantis' (2007) trans-contextual proposals (i.e., that PE-based experiences might be aligned with leisure-time outcomes), and consistent with previous work (Ntoumanis, 2005), students' autonomous motivation was found to positively indicate students' engagement levels, which in turn, positively aligned with participation in LTPA. Taken together, these effects upon motivation and engagement underscore the potential health-related implications of this work, by providing a link between the interpersonal relationships that students develop within PE, and their involvement in extra-curricular physical activity.

In addition to revealing direct relationships between study variables, two noteworthy indirect effects emerged, which linked students' relational perceptions with important PE outcomes, and provided insight into the mechanisms (i.e., intermediary variables) through which these relationships operated. In particular, we observed indirect pathways for students' peer-based relatedness support upon their PE engagement and social anxiety, via favourable perceptions of peer-focused RISE, peer-based relatedness need satisfaction, and autonomous motivation. One plausible explanation for these significant indirect effects is that when students are provided with more emotional support from their peers, they are also more likely to be given a higher rating of their sporting ability by their peers. This leads to greater peer-based relatedness need satisfaction being achieved by students. When these needs are being satisfied, it creates an environment that facilitates students to become more autonomously motivated. This overall emotionally supportive environment and needs satisfaction can, firstly, lead to increased engagement levels (i.e., they are more likely to put in more effort in class), as well as lead to decreased anxiety levels experienced within class (i.e., less likely to worry about their performance).

It is important to consider general design limitations of this study, and to consider related directions for future research. First, it is worth noting our use of self-report measures regarding physical activity levels, and the mis-reporting to which these measures are susceptible. With that in mind, it would be valuable in future investigations to incorporate the use of accelerometers or pedometers to provide more objective physical activity measures. Indeed, incorporating such equipment within the class would also enable researchers to verify the teacher engagement ratings of student in-class behaviour (i.e., effort). Additionally, students' LTPA levels were measured via the LTEQ (Godin & Shephard, 1985), which does not provide a precise estimate of actual duration of physical activity/exercise sessions (lasting for more than 20 minutes).

In future, researchers may choose to record the exact number of minutes students are active for each session, possibly via an exercise diary. Another limitation of this study lies in the fact that all responses regarding teachers' perceived support were also in a self-report format. In future studies, recording and evaluating the teacher's voice during PE lessons would assist to validate the level of teachers' support for the students. Finally, researchers could consider the use of longitudinal designs in future that enable students to be tracked over an extended time frame (e.g., over two or three time points), and enable researchers to monitor changes in responses in relation to changes in sports that students are being evaluated in.

In sum, this investigation documented that some aspects of peer- and teacher-related perceptions may be more important than others in foreseeing students' emotional support, motivation, engagement, and LTPA. This study extended previous investigations by exploring relational processes relating to teachers *and* peers (e.g., teacher- and peer-based relatedness support, teacher- and peer-focused RISE). It is important in future to apply this knowledge across different settings (i.e., investigate whether this knowledge is applicable in a different faculty, or if gender variations occur in co-educational and male-only schools), and to determine the most effective methods through which PE teachers and students can promote peer-based social/emotional support in their classrooms.

In terms of the applied implications of these findings, an interesting outcome for PE teachers and students is deciphering how to improve their level of relatedness support in order to create an environment that nurtures students' feelings of relatedness. With regards to RISE beliefs, for example, students could be encouraged to convey confidence to one another, and teachers may be able to explicitly target students' RISE appraisals through their instruction and feedback, with the goal of enhancing recipients' estimations of their confidence in their ability. Similarly, in relation to relatedness need

satisfaction (i.e., teacher- and peer- based), teachers and students could focus on providing relatedness supportive behaviours that help optimise individuals' need satisfaction in PE. Indeed, such strategies may help foster (or improve) their level of autonomy, align with decreased levels of PE and social anxiety, and indicate enhanced in-class engagement and LTPA levels.

By integrating motivational and efficacy-based conceptual models, this investigation furthers our awareness of the interpersonal processes that contribute to students' PE experiences. In addition to advancing our understanding of the factors that foster autonomous motivation, this investigation also demonstrates the direct and indirect associations between students' relational appraisals and important PE-based and leisure-time outcomes. By exploring the different ways through which one's classmates and teacher might influence one's involvement in PE, a host of fascinating opportunities remain for future research in this area.

Chapter 4 General Discussion and Future Research

4.1 Overview

This chapter offers additional considerations regarding study outcomes, including highlighting a number of practical implications for teachers and administrators within female secondary schools, and providing some suggestions for future research. Although the results of this study indicated that direct relationships existed between variables (which were specified on the basis of theory), it is important to note that these analyses (and the study design) do not provide insight into the causal nature of proposed relationships. With that in mind, it is important to acknowledge that although the following practical suggestions are rooted in theory and the hypothesised model, they are not underpinned by causal evidence (in this instance).

4.2 Practical Implications

4.2.1 Recommendations for Enhanced Relatedness Support and Relatedness Need Satisfaction

The results that emerged in Chapter 3 indicated that PE teachers and classmates can provide important emotional support to students (i.e., to ensure they feel connected to, and understood by, significant others; Ryan & Deci, 2008), and that each of these 'agents' may contribute to the satisfaction of students' relatedness needs (Ryan & Powelson, 1991). In light of these findings, we recommend school administrators and Physical Education Heads of Department explore and implement strategies to help create a positive, nurturing environment in PE so that all students are able to experience enhanced levels of emotional support (see, for example, Ntoumanis, 2012). Although these findings do not allow us to specifically identify what it is (i.e., in terms of staff-peer supportive behaviours, actions, or verbal comments) that foster relatedness support for all students, it is recommended that researchers and teachers evaluate, through small group discussion with students, the qualities of both PE teacher and peer-based

relatedness supportive behaviours and the outcomes of those behaviours. In addition, researchers might further refine questionnaire and observation schedules to further explore in detail the nature of teacher- and peer-derived interpersonally-involving environments in PE. Moreover, through professional development, teachers could evaluate their own interpersonal supportive behaviours and, in turn, potentially enhance students' relatedness need satisfaction. Teachers might also utilise video (and/or capture voice recordings) during lessons, and analyse them with their colleagues with a view to determining behaviours, comments, and actions that are consistent with enhancing students' perceptions of support, as well as those that serve to thwart student motivation and participation.

In addition to focusing on teacher-mediated strategies, students could also be educated by their teachers (or external speakers) with regards to how they can provide emotional support (i.e., how they speak and interact) to one another. Students might also discuss what they say and how they act (e.g., how students might feel when they are left out of partnerships/teams), and identify through self-reflection and peer discussion what it is that allows them to feel more comfortable within class, not only with their peers, but also with their teachers. By developing additional understanding of this issue, teachers could therefore encourage activities to support the development of student relationships (e.g., team building, fun interactions) with the aim of improving need satisfaction.

4.2.2 Recommendations for Enhanced RISE Appraisals

Consistent with theory (Lent & Lopez, 2002), this investigation provided support for the pro-social effects that are proposed to be associated with RISE (i.e., both teacher- and peer-focused). First, when students felt that their teachers and/or peers engaged in relatedness-supportive behaviours (i.e., promoting inclusivity and trust), they were more likely to estimate that their teacher/peers believed strongly in their PE

ability. In turn, when students felt that their teacher/peers believed in their ability (i.e., high RISE), they reported greater perceptions of trust, support, and understanding regarding these agents. One recommendation based on these results is to encourage students to convey their confidence to one another more frequently. That is, if students were encouraged to explicitly express their belief in their peers (e.g., when observing their classmates performing well, or mastering a task), this may encourage members of the class to develop more favourable peer-focused RISE appraisals. Although this appears a somewhat straightforward recommendation, it is imperative that students take time to ensure the authenticity of their feedback to one another, and take time to provide praise rather than remaining silent (e.g., telling a classmate when they seem to have improved, providing applause and praise for positive actions, etc).

Additionally, the way that teachers interact with their students (i.e., verbally and non-verbally) can greatly influence a student's level of RISE estimations (regarding the teacher). That is, if a teacher only provides general feedback (e.g., "nice try") or barely notices what students are achieving in class, students may potentially interpret these cues as lacking in relatedness support, and indicative of a lack of belief in their ability. Instead, teachers may be encouraged to specifically point out when students have performed well, and might be instructed to provide RISE-enhancing feedback even in cases where student performance falls short of desired levels (e.g., "hard luck, it didn't work that time, but I know you are able to do it, so keep trying!"). On that note, further research that explores the specific benefits of PE teacher professional development – focused on the provision of relatedness supportive behaviours and RISE-enhancing feedback – would be valuable to help improve student's emotional support and their teacher-focused RISE evaluations.

4.2.3 Recommendations for Enhanced Self-Determination, Engagement Levels and Leisure-Time Physical-Activity (LTPA)

Self-determined motivation is recognised as an influential construct for promoting well-being and adaptive functioning in diverse achievement contexts, and in this study positive relations emerged for students' motivation in relation to desirable outcomes (e.g., the level of engagement students' displayed in class, and indirectly, the amount of LTPA they participated in outside of school). Therefore, the results of this study further underline the value of determining PE class actions that serve to enhance student self-determination, which may have flow on effects to engagement and LTPA (see Figure 2). Suggestions have already been made in regards to increasing students emotional support and relatedness need satisfaction experienced from their teachers (Cox & Williams, 2008) and their peers (Cox et al., 2009; Ullrich-French & Smith, 2006). In order to further increase student self-determined motivation, alongside support for theorised determinants relating to autonomy- and competence-support, students may potentially benefit from positive role models (Ryan & Powelson, 1991), and adopting significant other's values and attitudes. If students' PE teacher, peers, and parents were encouraged to set a positive example for their student/friend/child in regards to their participation in physical activity (i.e., positive attitude, regularly participate, endorse the benefits, encourage enjoyment), students may be able to display enhanced intrinsic motivation (e.g., participate for fun, interest, value), and therefore, greater engagement levels. Additionally, if students are experiencing this enhanced level of self-determined motivation and displaying greater engagement levels, a positive transfer to their LTPA is possible (e.g., Hagger & Chatzisarantis, 2007). This relationship was partly supported by our results, displaying a direct, positive relationship between self-determined motivation and engagement levels, followed by a direct, positive relationship between engagement levels and LTPA.

4.2.4 Differentiation between Peers and Teacher

In line with existing studies that have considered teacher and peer influences, this investigation found that teachers (e.g., Cox & Williams, 2008) and peers (e.g., Cox et al., 2009; Cox & Ullrich-French, 2010) were both important influences in terms of the level of emotional support students receive, and indirectly, their need satisfaction. Furthermore, the agents can also play a role in determining students' attitudes toward PE and LTPA (e.g., Ntoumanis, 2012). The level of influence that peers and teachers had on relatedness support, RISE, and in-class processes (i.e., self-determined motivation, anxiety and engagement) in PE and LTPA varied, depending on the variable investigated. Therefore, it is important that both teachers and peers are properly educated (and encouraged to develop their skills) about the impact (positive or negative effect) they can have on their students (or classmates), and that it is acknowledged that they can have separate, detrimental, effects.

4.2.5 How to Enhance Female PE Participation

This study was conducted with an all-female, adolescent cohort, providing evidence of factors that serve to motivate (or thwart) students' participation within class, and during their leisure-time. Due to the specific changes that occur among females during their teenage years (Hart et al., 1989; Levine & Smolak, 2002), it is important to recognise specific strategies that can be applied to enhance (and continue) their involvement in physical activity. First, the PE environment is often (inadvertently or deliberately) more supportive of male students (Larsson et al., 2009). For example, the expectation of female participation is often lowered, possibly reducing engagement levels (Domangue & Solmon, 2010; McCaughtry, 2004). Therefore, it is important that teachers are well-educated about how to create an ideal environment for females to flourish. An emphasis should be placed on how to create a balance between a supportive, yet challenging, environment that allows females to feel need satisfaction

and competence (Silverman, 2005), and provides an opportunity to excel. Such classroom qualities will potentially encourage females to have greater intentions to be physically active (Sproule, Wang, Morgan, McNeil, & McNorris, 2007) and enhanced future intentions (Sabiston & Crocker, 2008).

Second, the levels of anxiety students experience in class can influence the degree to which they engage and experience enjoyment. In order to encourage low levels of anxiety among females in high school PE, students need to be educated on how to provide appropriate emotional support (i.e., help satisfy peers needs) to one another, in order to minimise their peers concerns about being judged. Educators could also potentially stream classes to ensure they that they are participating with students of a similar ability to them, and can maintain a focus on eliminating any negative feedback or ridicule between students.

Third, although the PE teachers' pedagogical practice is not analysed within this study, PE teaching effectiveness has been shown to correlate with student affective outcomes and compliance. Additionally, it has been strongly linked with issues relating to lesson differentiation, quality pedagogy, as well as student learning (Whipp, Taggart, & Jackson, 2014). Past work (Alfie, Assor, & Katz, 2004) shows that when pedagogical practices meet students' relatedness need satisfaction, they are more likely to experience enhanced motivation and affective outcomes. Therefore, by encouraging teachers to provide autonomy-supportive environments (e.g., selection of sport, drill) students may exhibit increased levels of relatedness need satisfaction and affective outcomes.

Gillison, Osborn, Standage, and Skevington (2009) reported that within the realm of sport and exercise, the motivation of the two genders differed markedly. They found that boys' relied on their involvement in sporting activities to enhance their sense of self-worth as well as to obtain peer approval. Conversely, girls' reasons for

participation were mainly due to the failure to achieve health and fitness results. The outcomes of this thesis support the notion of further research to evaluate if single gender PE classes could be tailored to the opposing motivations of the sexes, and that this may lead to enhanced student motivation, affective outcomes, and indirectly, LTPA.

Effective teachers are those who are able to assist their students by providing stimulating PE-related content, processes, and assessment strategies, according to student interest and readiness. That is, female adolescents have a particular environment that they flourish in, and teachers need to attend to, and nurture, these needs through differentiated teaching methods. For example, peer teaching is one method that may allow more competent students, in particular girls (Whipp et al., 2014), to enhance their interpersonal skills, whilst lower ability students are still able to gain physical benefits from the lesson. The social skills students require to peer teach encourages emotionally supportive environments, which potentially leads to increased levels of motivation and affective outcomes (Antil, Jenkins, Wayne, & Vadasy, 1998).

Finally, there are two established landmark styles of teaching (i.e., productive and reproductive) that influence student's social and emotional development (Mosston & Ashworth, 2002). Reproductive teaching involves students' reproducing skills that have been demonstrated to them (i.e., by the teacher). At the other end of the spectrum is productive teaching (i.e., problem solving), where students learn and demonstrate skills they have not previously seen. By virtue of the enhanced opportunity to access students' interpersonal interaction when using productive teaching methods (Parker & Curtner-Smith, 2012), such pedagogy would be worthy of consideration for teachers wishing to facilitate relatedness supportive and autonomously regulated learning environments.

4.3 Future Research

One limitation of this study, previously addressed in Chapter 3, was the use of self-report measures regarding physical activity levels. This could be addressed through the use of accelerometers, allowing a more objective measure of student physical activity levels. Although costly, students would be able to record their daily levels both within class and during their leisure-time. To complement this measure, students could complete an exercise diary. Rather than estimating how many sessions greater than 20 minutes they have completed in the previous week, by recalling the number of sessions they have completed, the exact number of minutes they participated for, as well as the type of activity and intensity level they participated at, a more accurate record could be attained. Furthermore, when a coach/instructor supervises the physical activity carried out, these individuals may also be recruited to provide an external engagement rating (as their teacher provided them within class in this study).

The use of a longitudinal design in future research would also be plausible and beneficial. First, as suggested in Chapter 3, results could be collated over an extended time frame (e.g., once per term) to investigate whether changes occur on psychosocial variables in relation to the type of sport in which students are competing. Such a study could also explore whether the time of year (e.g., term 2 opposed to term 4) influences the results. Additionally, this kind of study could focus on one year group (i.e., start with year 7's) and assess them annually as they progress through to the end of year 10 to determine age-related variations in key variables. Although such approaches would no doubt provide rich information on PE and LTPA processes, these designs are not without difficulty due to the way schools annually change classes, teachers, and timetables.

Another interesting concept would be comparing results collated within PE classes to an academic setting (e.g., health or science). A similar analysis could be

carried out within these classes, during the same assessment timeframe, to determine whether teachers and peers have the same influence on students (e.g., emotional support) within both educational settings. Again though, this may not be a straightforward task to carry out (and may result in confounded results) if students within a PE class have different academic teachers (i.e., if students are streamed).

This particular study was carried out at in an all-female, high socio-economic private school. It would be interesting to see the results that would be produced if this study was replicated in an all-male school, in a co-educational school, or finally, in a school with a lower socio-economic status. Additionally, friendship quality is another concept that could be focused on in future investigations. Whilst this study differentiated between peer and teacher support, it didn't determine the quality of friendships and the effect they could have on students emotional support, RISE and self-determined motivation experienced. This would be worthy of consideration.

Finally, as previously suggested, the use of audio (or video) recordings to collate the verbal support (and actions) teachers provide would expand, as well as validate student's self-report data collected via the surveys. Interestingly, future research could determine what support teachers verbally provide in class (i.e., manipulate what different teachers say) to determine more specifically how to best provide for students' needs in PE.

4.4 Conclusion

This thesis extends our knowledge and understanding of the inter-relations between constructs drawn from SDT and the tripartite efficacy model. The results also indicated that interpersonal perceptions relating to one's teachers and peers play a significant role in shaping students' relatedness perceptions and motivation. Importantly, these findings also showed that teachers and peers can provide differing levels of emotional support, and encourage future work that separates the influence of

these important agents in PE. Finally, analyses revealed support for the predictive effects associated with this network of interpersonal variables. That is, students who reported relatively more autonomous motives for participation in PE also reported more positive responses in terms of anxiety, and displayed greater engagement in PE, which had a predictive relationship to students' LTPA. Although some of our results did not support past research by displaying direct effects between all variables, it is not to say that in future research, with slightly different conditions, that they would display significant results worthy of further investigation for educational purposes. Finally, this study emphasised some of the strategies that teachers, administrators, and significant others might utilise to provide female adolescent students with the environment necessary for optimal PE experiences.

Chapter 5

APPENDICES

5.1 EXTENDED METHOD

5.1.1 Teacher and Student Instructions

At the beginning of the first assessment lesson (designated by researchers) teachers were instructed to distribute survey one (Appendix 5.3.1) and the permission slip (Appendix 5.2.3) to all students (unless previously acknowledged that certain students should be excluded; e.g., exchange students, long term sick and injured students). Teachers and students were informed that if students did not want to participate, that they were free to decline to participate. Should they choose to withdraw, students would undertake Health and/or Physical Education (PE) related topic whilst other students completed the survey. For the students who chose to participate, they were requested to complete the permission slip. For those who preferred to further discuss their participation with their parents before signing the permission slip, spare copies were provided for them to take home. Students were reminded that although it was an anonymous survey, they were required to complete all personal details to ensure their data were correctly matched before analysis, or before their details were deleted. Students were also reminded that their answers were confidential (i.e., their principal, teacher and peers would never see their answers, and that their results would not influence their PE standing or their end of year report). Finally, they were informed that it was important that they answered all questions honestly.

Each teacher was instructed to read with and explain to all participating students Part A of Questionnaire one (acknowledging the complex nature of the question). Upon completion of Part A, students were instructed to complete Parts B-to-E in their own time, although to maintain a brisk pace (i.e., not to think about each question for too long). Once finished, students placed their completed survey into the sealed box, which only the researchers would access. Teachers were instructed to provide their class with approximately 20 minutes to complete the survey. If students were late/sick/injured, but

usually participated in PE classes, they were asked to complete the survey (i.e., providing there was sufficient time). If students were absent for the entire lesson, the researcher, where possible, met with and administered the questionnaire to the student at a mutually convenient time (minimising further PE lesson interruption). However, if this wasn't achievable, students were asked to complete the survey at the beginning of the next PE lesson, before they completed survey two.

With 20 minutes remaining in the end of the next PE lesson (if possible), teachers were asked to hand out survey two (Appendix 5.3.2). Teachers were asked to check that all students had completed survey one. Students were only to complete survey two if they had already completed survey one. If they had not done so, students were asked to complete survey one first (at separate time points if possible). Students were encouraged to answer sections A to F at their own pace. Again, they were required to fill out their personal details to ensure their results were appropriately matched with their survey one results, before all identifying details were removed. Students were again reminded that their answers were confidential and encouraged to answer all questions honestly. Once complete, they returned the survey into the sealed box. Teachers were encouraged to provide students with no more than 20 minutes to complete the survey. If students were late/sick/injured, teachers were encouraged to facilitate the students to complete the surveys. If students were absent, names were clearly noted for researchers to follow-up.

At the end of this period, the second PE lesson, teachers were asked to complete a student engagement rating (Appendix 5.3.3) referencing their observations for that week, for all students who were participating (even if sick/injured/absent that particular day). Teachers were informed that this information would be kept confidential and they also submitted their ratings into the sealed collection box. Where possible, they were encouraged to complete this sheet at the time the students were completing the

questionnaire or at the nearest convenient time. Finally, teachers were asked to thank all students for participating and informed them that their answers were invaluable. If they (or the teachers) had any further questions, they could be directed towards the research team for clarification.

5.1.2 Discontinued Measurement

Peer acceptance was measured during survey 1, using a subscale from Harter's (1985) Self-Perception Profile for Children. The peer acceptance subscale presented five items in a structured alternative format, whereby students were asked to select one of two statements that describes them better (e.g., "some students find it hard to make friends with others in this class, OR for other students it's pretty easy to make friends with others in this class") and then indicate if that statement was really true for them or just sort of true for them. Items were scored from 1 (*sort of true for them*) to 4 (*really true for them*), with higher scores indicating greater perceived acceptance by one's peers. Negatively worded questions were reverse coded to ensure consistency in results. However, due to poor internal consistency ($\alpha = 0.65$), the decision was made to remove this measurement from our final results. Despite the researcher providing explicit instructions to the teachers to verbally deliver this specific survey question in time with the student responses, the relatively poor internal consistency could only be attributed to poor instructions or poor student comprehension. A significant number of students returned no response at all, or only completed half of each question, rendering the results void.

5.1.3 Participation

In total, 382 students were invited to participate in this investigation, with 379 students consenting to participate. The three students who chose not to participate withdrew at their parents' request. All seven staff members who were invited to partake in this study willingly participated. The eighth staff member was unable to participate

due to a prolonged period of absence during data collection.

5.1.4 Personal Motivation

When deciding what area to investigate for this study, I based my decision on my life motto and what has become my vocation, keeping physically active. I've been a qualified Secondary Physical Education teacher for the past 7 years, but have always promoted physical activity, being very active myself growing up and becoming a swimming instructor whilst completing my university degree. I always participated positively and enthusiastically in my PE classes throughout primary school and secondary school. For a variety of reasons, many of my female classmates did not engage in PE with the same enthusiasm. I was always very self-determined, participating to the best of my ability in class and representing the state in both Athletics and Hockey. I've continued this passion into adulthood, representing the WA Diamonds in the National Hockey League, competing in the Busselton Half Iron Man Triathlon, and my proudest and most recent achievement, completing the Melbourne Marathon.

Choosing to be active was never a challenge for me, largely due to an active, very supportive group of friends, teachers and family. My motivation behind completing this investigation was to ensure that all students (particularly females) have the opportunity to experience the joy of regular physical activity, both within and outside of the PE class, as I did growing up (and continue to do). By establishing what helps female adolescents become more self-determined, I'm hoping that this will help improve their enjoyment levels in both PE and extracurricular activity, which will ultimately lead to increased PA throughout their lives.

5.2 ADMINISTRATIVE FORMS

5.2.1 Ethics Approval

THE UNIVERSITY OF WESTERN AUSTRALIA
Achieving International Excellence

Research Ethics and Biosafety Office
Research Services
Phone: +61 6 6488 1610
Fax: +61 8 6488 8775
email: hreo-research@uwa.edu.au
MBDP: M459

Our Ref: RA/4/1/6150 17 June 2013

Associate Professor Peter Whipp

School of Sport Science, Exercise & Health

MBDP: M408

Dear Professor Whipp

HUMAN RESEARCH ETHICS APPROVAL - THE UNIVERSITY OF WESTERN AUSTRALIA

Motivational, affective, and activity-related effects of teacher and peer support in high school physical education.

Student(s): Felicity Gairns - MSc - 10419065

Ethics approval for the above project has been granted in accordance with the requirements of the *National Statement on Ethical Conduct in Human Research* (National Statement) and the policies and procedures of The University of Western Australia. Please note that the period of ethics approval for this project is five (5) years from the date of this notification. However, ethics approval is conditional upon the submission of satisfactory progress reports by the designated renewal date. Therefore initial approval has been granted from 14 June 2013 to 01 July 2014.

You are reminded of the following requirements:

1. The application and all supporting documentation form the basis of the ethics approval and you must not depart from the research protocol that has been approved.

2. The Human Research Ethics Office must be approached for approval in advance for any requested amendments to the approved research protocol.

3. The Chief Investigator is required to report immediately to the Human Research Ethics Office any adverse or unexpected event or any other event that may impact on the ethics approval for the project.

4. The Chief Investigator must inform the Human Research Ethics Office as soon as practicable if a research project is discontinued before the expected date of completion, providing reasons.

Any conditions of ethics approval that have been imposed are listed below:

Special Conditions

None specified

The University of Western Australia is bound by the National Statement to monitor the progress of all approved projects until completion to ensure continued compliance with ethical standards and requirements.

The Human Research Ethics Office will forward a request for a Progress Report approximately 60 days before the due date. A further reminder will be forwarded approximately 30 days before the due date.

If your progress report is not received by the due date for renewal of ethics approval, **your ethics approval will expire**, requiring that all research activities involving human participants cease immediately.

If you have any queries please contact the HREO at hreo-research@uwa.edu.au.Please ensure that you quote the file reference – RA/4/1/6150 – and the associated project title in all future correspondence.

Research Ethics and Biosafety Office Research Services

Phone: +61 6 6488 1610Fax: +61 8 6488 8775email: hreo-research@uwa.edu.au MBDP: M459

Yours sincerely

Peter Johnstone

Manager, Human Research Ethics Office

5.2.2 Thesis Declaration

THE UNIVERSITY OF WESTERN AUSTRALIA

DECLARATION FOR THESES CONTAINING PUBLISHED WORK AND/OR WORK PREPARED FOR PUBLICATION

The examination of the thesis is an examination of the work of the student. The work must have been substantially conducted by the student during enrolment in the degree.

Where the thesis includes work to which others have contributed, the thesis must include a statement that makes the student's contribution clear to the examiners. This may be in the form of a description of the precise contribution of the student to the work presented for examination and/or a statement of the percentage of the work that was done by the student.

In addition, in the case of co-authored publications included in the thesis, each author must give their signed permission for the work to be included. If signatures from all the authors cannot be obtained, the statement detailing the student's contribution to the work must be signed by the coordinating supervisor.

Please sign one of the statements below.

1. This thesis **does not contain** work that I have published, nor work under review for publication.

Student Signature
.....

2. This thesis contains **only sole-authored** work, some of which has been published and/or prepared for publication under sole authorship. The bibliographical details of the work and where it appears in the thesis are outlined below.

Student Signature .....Felicity Gairns.....

3. This thesis contains published work and/or work prepared for publication, **some of which has been co-authored**. The bibliographical details of the work and where it appears in the thesis are outlined below.
The student must attach to this declaration a statement for each publication that clarifies the contribution of the student to the work. This may be in the form of a description of the precise contributions of the student to the published work and/or a statement of percent contribution by the student. This statement must be signed by all authors. **If signatures from all the authors cannot be obtained, the statement detailing the student's contribution to the published work must be signed by the coordinating supervisor**.

Student Signature
……

Coordinating Supervisor Signature.
……

5.2.3 Information Sheet to Students, Consent Form and Debrief Sheet

THE UNIVERSITY OF WESTERN AUSTRALIA | A CENTURY OF ACHIEVEMENT 1913 - 2013
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Mrs Felicity Gairns, Associate Professor Peter Whipp,
& Dr Ben Jackson
School of Sport Science, Exercise and Health
The University of Western Australia
35 Stirling Highway, Crawley WA 6009

Student Information Sheet

Full title	Motivational, affective, and activity-related effects of teacher and peer support in high school physical education		
Research Institution	School of Sport Science, Exercise and Health, The University of Western Australia		
Research location	Perth		
Principal Investigator	Associate Professor Peter Whipp	**Researcher**	Felicity Gairns
Contact Number	6488 2793		

Introduction

- You are invited to participate in this study due to your involvement in this physical education (PE) class.
- Taking part in this research project is optional. You will receive the best possible care whether or not you take part. Your standing in this class and your relationship with the school will not be affected in any way by your choice about participation.
- Please read this information carefully, as it will tell you all about the research, procedures, risks and benefits. If you are unsure about anything, feel free to talk with a relative, friend, or your teacher before you make a decision, and feel free to ask the researcher present if you have any questions at all.
- If you need help reading, or English is not your first language, please tell the researcher present so he/she can get you some assistance.
- This study is being conducted by the School of Sport Science, Exercise and Health (SSEH) of The University of Western Australia (UWA). UWA provides the funding for this research and will compensate staff for the costs associated with the work done and materials used to run this study.
- This study has been approved by The University of Western Australia Human Research Ethics Committee, whose primary concerns are the safety, welfare and rights of participants in this research. The ethics committee members are independent of the study team.

Purpose

- The aim of the study is to investigate students' interactions with each other and with their teacher in PE.

Procedures

- As a participant, you will be asked simply to complete three brief questionnaires, which includes questions about your thoughts and behaviours during your PE class.
- It is expected that each questionnaire will take no longer than 20 minutes to complete.
- Your teacher will also be asked to complete a brief questionnaire about your PE class.
- Your responses on the questionnaire will not be seen by your teacher or your classmates at any time, and will not impact upon your standing or grade in your PE class in any way.
- A report based on information gained from this study will be made. Information may also be used for publication in an academic journal or conference presentation. In any material that is produced, we will not include any information that will make it possible to identify you as an individual or your class/school.
- The most important thing for us is that you are completely honest when answering all questions.
- You will be asked to complete each questionnaire on TWO separate occasions during term three.

Risks

- There are no anticipated risks at all associated with taking part in the study.
- All information will be viewed only by the researchers, you and your responses will not be identified at any time, and the questions asked are not of a sensitive nature.

Benefits

- Completing this survey will give you the opportunity to consider your thoughts and behaviours during your PE class. For example, you may gain some insight into your PE attitudes and experiences.

Confidentiality

- All information will remain strictly confidential.
- Your responses will not be visible to your teacher or classmates at any time.
- All data will be kept in a secure location at the School of Sport Science, Exercise and Health at UWA.
- Any information you provide will be visible only to the researchers named above, and will not be accessed by any other parties unless required by law.

Participant Rights

- Participation in this research is voluntary and you are free to withdraw from the study at any time.

- Your decision to participate or not to participate will not impact your standing or grade in this class in any way.
- You can withdraw for any reason and you do not need to justify your decision. If you decide to withdraw all data collected from you will be destroyed.
- Your participation in this study does not prejudice any right to compensation that you may have under statute of common law.
- If you have any questions concerning the research at any time please feel free to ask the researcher present.

Further information regarding this study may be obtained from the researcher and lead investigator (see information listed above).

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to hreo-research@uwa.edu.au. *All research participants are entitled to retain a copy of any Participant Information for and/or Participant Consent Form relating to this research project.*

Experiences and Interactions in Physical Education

-- Student Consent Form --

I, _____ *(please write your name clearly in BLOCK CAPS)*

- Have read the information provided, and any questions I have asked have been answered to my satisfaction
- Agree to participate in this study, realising that I may withdraw at any time without reason and without prejudice
- Understand that all information provided is treated as strictly confidential and will not be released by the investigator unless required by law
- Have been advised as to what data are being collected, what the purpose is, and what will be done with the data upon completion of the research
- Am aware that my PE teacher and/or classmates will not be made aware of my responses at any time
- Understand that my participation in this research will not influence my standing in my PE class or school in any way
- Agree that the research data gathered from the study may be published, provided my name or other identifying information is not used

Signed: _____

Date (day/month/year): _____ / _____ / _____

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to hreo-research@uwa.edu.au. All research participants are entitled to retain a copy of any Participant Information for and/or Participant Consent Form relating to this research project.

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Mrs Felicity Gairns, Associate Professor Peter Whipp,
& Dr Ben Jackson
School of Sport Science, Exercise and Health
The University of Western Australia
35 Stirling Highway, Crawley WA 6009

Experiences and Interactions in Physical Education

-- Student Debrief Sheet --

Today you participated in a psychology research project in which you were asked to complete questionnaires assessing your thoughts and behaviours regarding your PE class, and your interactions with your teacher and classmates.

The survey package that you completed involved a number of different questionnaires. These questionnaires measured various related concepts, including your perceptions about the support you receive from your teacher, your interactions with your classmates, and your comfort, motivation, stress, and enjoyment in PE. The main purpose of the research was to examine the relationships between the support you receive from your teacher and classmates in relation to your motivation and feelings in PE.

We would like to remind you that all responses are completely confidential, and your completed survey will be stored in a secure location where only the researchers (see letterhead) will have access to it. We also remind you that no individuals or locations will identified at any stage in the presentation of our findings, and that your responses will not be shared with your teacher or classmates at any time. We very much appreciate and thank you for giving your time to participate in this study.

If you have any questions about this research please discuss them with Mrs Gairns, or contact the research team named above at any time.

Thank you very much for completing the survey!

5.2.4 Information Sheet to Teachers, Consent Form and Debrief Sheet

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Mrs Felicity Gairns, Associate Professor Peter Whipp,
& Dr Ben Jackson
School of Sport Science, Exercise and Health
The University of Western Australia
35 Stirling Highway, Crawley WA 6009

Teacher Information Sheet

Full title	Motivational, affective, and activity-related effects of teacher and peer support in high school physical education		
Research Institution	School of Sport Science, Exercise and Health, The University of Western Australia		
Research location	Perth		
Principal Investigator	Associate Professor Peter Whipp	**Researcher**	Felicity Gairns
Contact Number	6488 2793		

Introduction

- You are invited to participate in this study due to your roles as the teacher of this physical education (PE) class.
- Taking part in this research project is optional. You will receive the best possible care whether or not you take part. Your standing with your class and your relationship with the school will not be affected in any way by your choice about participation.
- Please read this information carefully, as it will tell you all about the research, procedures, risks and benefits. If you are unsure about anything, feel free to talk with a relative, friend, or your principal before you make a decision, and feel free to ask the researcher present if you have any questions at all.
- This study is being conducted by the School of Sport Science, Exercise and Health (SSEH) of The University of Western Australia (UWA). UWA provides the funding for this research and will compensate staff for the costs associated with the work done and materials used to run this study.
- This study has been approved by The University of Western Australia Human Research Ethics Committee, whose primary concerns are the safety, welfare and rights of participants in this research. The ethics committee members are independent of the study team.

Purpose

- The aim of the study is to investigate students' interactions with each other and with their teacher in PE.

Procedures

- As a participant, you will be asked to complete a student participation rating on TWO separate occasions during term three, which includes a single question about how engaged each of your students are during your PE class. You will also be asked to wear a voice recorder during TWO of your classes preceding the lesson with the student ratings.
- It is expected that the student participation ratings will take no longer than 3-4 minutes to complete.
- Your students will also be asked to complete three brief questionnaires about their interactions in their PE class and their PE class experiences.
- Your responses on the student participation ratings will not be seen by your students at any time.
- A report based on information gained from this study will be made. Information may also be used for publication in an academic journal or conference presentation. In any material that is produced, we will not include any information that will make it possible to identify you as an individual or your class/school.
- The most important thing for us is that you are completely honest when answering all questions.
- This is NOT designed in any way as an assessment of teachers' abilities – we are simply examining how students feel that their interactions in PE might influence their engagement.

Risks

- There are no anticipated risks at all associated with taking part in the study.
- All information will be viewed only by the researchers, you and your responses will not be identified at any time, and the questions asked are not of a sensitive nature.

Benefits

- Research shows that children's experiences in PE are related to their broader exercise attitudes and behaviours. This research will help us better understand why this is the case, and what we might be able to do to foster greater physical activity in children.
- We hope the information gained from this research will be of practical relevance to educators (particularly PE teachers) in relation to understanding children's involvement and interest in their class.

Confidentiality

- All information will remain strictly confidential.
- Your responses will not be visible to your students, colleagues, or principal at any time.
- All data will be kept in a secure location at the School of Sport Science, Exercise and Health at UWA.

- Any information you provide will be visible only to the researcher named above, and will not be accessed by any other parties unless required by law.

Participant Rights

- Participation in this research is voluntary and you are free to withdraw from the study at any time.
- Your decision to participate or not to participate will not impact your standing with the school in any way.
- You can withdraw for any reason and you do not need to justify your decision. If you decide to withdraw all data collected from you will be destroyed.
- Your participation in this study does not prejudice any right to compensation that you may have under statute of common law.
- If you have any questions concerning the research at any time please feel free to ask the researcher present.

Further information regarding this study may be obtained from the researcher and lead investigator (see information listed above).

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to hreo-research@uwa.edu.au. *All research participants are entitled to retain a copy of any Participant Information for and/or Participant Consent Form relating to this research project.*

Experiences and Interactions in Physical Education

-- Teacher Consent Form --

I, _____ *(please write your name clearly in BLOCK CAPS)*

- Have read the information provided, and any questions I have asked have been answered to my satisfaction
- Agree to participate in this study, realising that I may withdraw at any time without reason and without prejudice
- Understand that all information provided is treated as strictly confidential and will not be released by the investigator unless required by law
- Have been advised as to what data are being collected, what the purpose is, and what will be done with the data upon completion of the research
- Am aware that my principal, colleagues, and students will not be made aware of my responses at any time
- Understand that my responses in the student participation rating and audio recording will not be used for anything other than research purposes
- Agree that the research data gathered from the study may be published, provided my name or other identifying information is not used

Signed: _____

Date (day/month/year): _____ / _____ / _____

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to hreo-research@uwa.edu.au. All research participants are entitled to retain a copy of any Participant Information for and/or Participant

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School of Sport Science, Exercise and Healt
The University of Western Austral
35 Stirling Highway, Crawley WA 600

Experiences and Attitudes in Physical Education

-- Teacher Debrief Sheet --

Today you participated in a psychology research project in which you were asked to complete a questionnaire assessing your students' engagement in your PE class. The survey that you completed was aimed solely at determining how engaged the students in your class are. We will use these 'engagement' scores to determine how students' self-reported motivation for PE might predict how engaged they are in the class.

We would like to remind you that all responses are completely confidential, and your completed survey will be stored in a secure location where only the researchers (see letterhead) will have access to it. We also remind you that no individuals or locations will identified at any stage in the presentation of our findings, and that your responses will not be shared with your students at any time. We very much appreciate and thank you for giving your time to participate in this study.

If you have any questions about this research please discuss them with me, or contact the research team named above at any time.

Thank you very much for completing the survey!

5.2.5 Information Sheet to Principal and Consent Form

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Mrs Felicity Gairns, Associate Professor Peter Whipp,
& Dr Ben Jackson
School of Sport Science, Exercise and Health
The University of Western Australia
35 Stirling Highway, Crawley WA 6009

Principal Information Sheet

Full title	Motivational, affective, and activity-related effects of teacher and peer support in high school physical education		
Research Institution	School of Sport Science, Exercise and Health, The University of Western Australia		
Research location	Perth		
Principal Investigator	Associate Professor Peter Whipp	**Researcher**	Felicity Gairns
Contact Number	6488 2793		

Project Background

At The University of Western Australia we are currently running a research project focusing on student experiences in high school PE. During this project we will be asking students to complete three questionnaires, lasting no more than 20 minutes each. We will also ask teachers to answer a single-question about each of their students, in which they report each student's engagement in PE. This will take 3-4 minutes to complete. These procedures will be repeated TWO times throughout term three, to enable us to look at potential fluctuations in students' experiences.

In line with our ongoing research efforts focused on understanding and enhancing children's experiences in PE, the aim of the study is to examine how students' perceptions of their interactions with teachers and peers might shape their motivation and engagement in PE, as well as their leisure-time physical activity.

All answers will remain absolutely confidential at all times. This research is not intended as any form of student/teacher/school assessment, and will not be used as such. At no point will the participating school, teachers, or students be identified. We envisage that the results of this study will provide important and novel information about how social interactions shape student engagement in PE and exercise.

Participation in this research is entirely voluntary; the school, students, and teachers are free to withdraw from the study at any time without prejudice. The results of this study may be published in future through academic journals and presentations. Once again, no individual or school will be identifiable.

We are not requesting any information from the principal or parents, and three small questionnaires (undertaken twice) is all that your pupils will be requested to complete. The PE teachers will be requested to complete one student participation questionnaire along with having audio recordings of their lessons taken (twice). If you have any questions at all concerning the project please feel free to contact the researchers named above at any time.

Specific Information – Introduction

- You have been approached to participate in this study (on behalf of your school) due to your role as principal of St Mary's Anglican Girls' School.
- Taking part in this research project is optional.
- If you are unsure about anything, feel free to ask the researcher present if you have any questions at all.
- This study is being conducted by the School of Sport Science, Exercise and Health (SSEH) of The University of Western Australia (UWA). UWA provides the funding for this research and will compensate staff for the costs associated with the work done and materials used to run this study.
- This study has been reviewed by The University of Western Australia Human Research Ethics Committee, whose primary concerns are the safety, welfare and rights of participants in this research. The ethics committee members are independent of the study team.

Purpose

- The aim of the study is to investigate students' interactions with each other and with their teacher in PE.

Procedures

- Your students and (respective PE) teachers will be asked to complete three brief questionnaires, which include questions about their thoughts and behaviours during their PE class (students), or their ratings of student engagement (teachers).
- It is expected that the three student questionnaires will take no longer than 20 minutes to complete (repeated on two occasions), and the teacher questionnaire will take no more than 3-4 minutes to complete (also repeated on two occasions).
- Student and teacher responses will not be seen by anyone outside the research team at any time, and will not impact upon anyone's standing in their PE class in any way.
- A report based on information gained from this study will be made. Information may also be used for publication in an academic journal or conference presentation. In any material that is produced, we will not include any information that will make it possible to identify any individual, class, teacher, or school.

Risks

- There are no anticipated risks at all associated with taking part in the study.
- All information will be viewed only by the researchers, participants' responses will not be identified at any time, and the questions asked are not of a sensitive nature.

Benefits

- Research shows that children's experiences in PE are related to their broader exercise attitudes and behaviours. This research will help us better understand why this is the case, and what we might be able to do to foster greater physical activity in children.
- We hope the information gained from this research will be of practical relevance to educators (particularly PE teachers) in relation to understanding children's involvement and interest in their class.

Confidentiality

- All information will remain strictly confidential.
- Student responses will not be visible to teachers or classmates at any time.
- Teacher responses will not be made visible to colleagues or students at any time.
- All data will be kept in a secure location at the School of Sport Science, Exercise and Health at UWA.
- Any information provided will be visible only to the researchers named above, and will not be accessed by any other parties unless required by law.

Participant Rights

- Participation in this research is voluntary and school/teachers/students are free to withdraw from the study at any time.
- You can withdraw for any reason and you do not need to justify your decision. If you decide to withdraw all data collected from your school will be destroyed.
- Your school's participation in this study does not prejudice any right to compensation that you may have under statute of common law.
- If you have any questions concerning the research at any time please feel free to contact the researchers.

Further information regarding this study may be obtained from the researcher and lead investigator (see information listed above).

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to hreo-research@uwa.edu.au. *All research participants are entitled to retain a copy of any Participant Information for and/or Participant Consent Form relating to this research project.*

Experiences and Interactions in Physical Education

-- Principal Consent Form --

I, _____ *(please write your name clearly in BLOCK CAPS)*

- Have read the information provided, and any questions I have asked have been answered to my satisfaction
- Agree to allow students and teachers from my school to participate in this study, realising that I may withdraw this consent at any time without reason and without prejudice
- Understand that all information provided is treated as strictly confidential and will not be released by the investigator/s unless required by law
- Am aware that no individuals or location/school will be identified at any point in any reports associated with this project
- Have been advised as to what data are being collected, what the purpose is, and what will be done with the data upon completion of the research
- Understand that my school's participation in this project is purely for research purposes only, and nothing else is required of the school/teachers/students
- Understand that all teachers, students, and parents will also be made fully aware of the nature of the project, and will be given the opportunity to make an informed decision about their (or their daughter's) participation

Signed: _____

School: St Mary's Anglican Girls' School

Date (day/month/year): _____ / _____ / _____

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to hreo-research@uwa.edu.au. All research participants are entitled to retain a copy of any Participant Information for and/or Participant Consent Form relating to this research project.

5.2.6 Information Sheet to Parents and Consent Form

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Mrs Felicity Gairns, Associate Professor Peter Whipp,
& Dr Ben Jackson
School of Sport Science, Exercise and Health
The University of Western Australia
35 Stirling Highway, Crawley WA 6009

Parent Information Sheet

Full title	Motivational, affective, and activity-related effects of teacher and peer support in high school physical education		
Research Institution	School of Sport Science, Exercise and Health, The University of Western Australia		
Research location	Perth		
Principal Investigator	Associate Professor Peter Whipp	**Researcher**	Felicity Gairns
Contact Number	6488 2793		

Project Background

At The University of Western Australia we are currently running a research project focusing on student experiences in high school PE. During this project we will be asking students to complete three short questionnaires, lasting no more than 20 minutes each. These procedures will be repeated TWO times throughout term three, to enable us to look at potential fluctuations in students' experiences. In line with our ongoing research efforts focused on understanding and enhancing children's experiences in PE, the aim of the study is to examine how students' perceptions of their interactions with teachers and peers might shape their motivation and engagement in PE, as well as their leisure-time physical activity.

All answers will remain absolutely confidential at all times. This research is not intended as any form of student/teacher/school assessment, and will not be used as such. At no point will the participating school, teachers, or students be identified. We are extremely hopeful that the results of this study will provide important and novel information about how social interactions shape student engagement in PE and exercise.

Participation in this research is entirely voluntary; the school, students, and teachers are free to withdraw from the study at any time without prejudice. The results of this study may be published in future through academic journals and presentations. Once again, no individual or school will be identifiable. We are not requesting any information from parents. If you have any questions at all concerning the project please feel free to contact the researchers named above at any time.

If you are happy for us to include the information provided by your daughter in our study, you do not need to do anything at all in response to this letter. However, should you prefer to withdraw the participation of your daughter, please just complete and sign the form at the end of this letter and send it back to us using the pre-paid self-addressed envelope provided. If you have any questions at all concerning the project (before or after making a decision) please feel free to contact the researchers or the principal investigator at any time.

Specific Information – Introduction

- Your child will be/has been invited to participate in this study due to her involvement in their physical education (PE) class.
- Your child's participation in this research project is optional. Your child's standing in this class and relationship with the school will not be affected in any way by your choice to participate or withdraw your child from the study.
- Please read this information carefully, as it will tell you all about the research, procedures, risks and benefits. If you are unsure about anything, feel free to talk to the school or the researchers at any time.
- This study is being conducted by the School of Sport Science, Exercise and Health (SSEH) of The University of Western Australia (UWA). UWA provides the funding for this research and will compensate staff for the costs associated with the work done and materials used to run this study.
- This study has been reviewed by The University of Western Australia Human Research Ethics Committee, whose primary concerns are the safety, welfare and rights of participants in this research. The ethics committee members are independent of the study team.

Purpose

- The aim of the study is to investigate students' interactions with each other and with their teacher in PE.

Procedures

- As a participant, your child will be asked to complete three brief questionnaires, which includes questions about her thoughts and behaviours during PE class.
- It is expected that each questionnaire will take no longer than 20 minutes to complete.
- Your child's teacher will also be asked to complete a brief questionnaire about your child's engagement in PE class.
- Your child's responses on the questionnaires will not be seen by her teacher or classmates at any time, and will not impact upon her standing or grade in PE class in any way.
- A report based on information gained from this study will be made. Information may also be used for publication in an academic journal or conference presentation. In any material that is produced, we will not include any information that will make it possible to identify your daughter as an individual or the class/school.

Risks

- There are no anticipated risks at all associated with taking part in the study. All information will be viewed only by the researchers and your child. Your child's responses will not be identified at any time, and the questions asked are not of a sensitive nature.

Benefits

- Research shows that children's experiences in PE are related to their broader exercise attitudes and behaviours. This research will help us better understand why this is the case, and what we might be able to do to foster greater physical activity in children.
- We hope the information gained from this research will be of practical relevance to educators (particularly PE teachers) in relation to understanding children's involvement and interest in their class.

Confidentiality

- All information will remain strictly confidential.
- Your child's responses will not be visible to her teacher or classmates at any time.
- All data will be kept in a secure location at the School of Sport Science, Exercise and Health at UWA.
- Any information you provide will be visible only to the researchers named above, and will not be accessed by any other parties unless required by law.

Participant Rights

- Participation in this research is voluntary and you are free to withdraw your child from the study at any time.
- Your decision to participate or not to participate will not impact your child's standing or grade in this class in any way.
- You can withdraw your child for any reason and you do not need to justify your decision. If you decide to withdraw all data collected from your child will be destroyed.
- Your participation in this study does not prejudice any right to compensation that you may have under statute of common law.
- If you have any questions concerning the research at any time please feel free to ask the researcher or lead investigator.

Further information regarding this study may be obtained from the researcher and principal investigator (see information listed above).

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to hreo-research@uwa.edu.au. *All research participants are entitled to retain a copy of any Participant Information for and/or Participant Consent Form relating to this research project.*

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PLEASE COMPLETE THE FORM ON THIS PAGE ONLY IF YOU WISH TO WITHDRAW YOUR DAUGHTER FROM THE INVESTIGATION

Thank you for your consideration. Please **only complete and return this form if you wish to withdraw** your daughter from participation in this research project.

If you have any questions prior to making a decision, please feel free to contact the researchers with any questions you might have (contact details provided previously).

Your daughter's name: _____

School: St Mary's Anglican Girls' School

Parent/guardian signature: _____

Date: _____ / _____ / *2013*

Please just seal in the pre-paid, self-addressed envelope provided and pop in the post

5.3 Questionnaires

5.3.1 Survey 1

Student Experiences in PE Survey (1)

Thank you for completing this questionnaire. For the answers to be useful, please be totally honest with your responses. All information is strictly confidential, and at no point will any of your answers be made available to your classmates or teacher. If you have any questions, please feel free to discuss these with the person administering the questionnaire.

Personal Information

Your name: _____

Your age: _____ years

Class number: _____

Year: 7 / 8 / 9 / 10

Please turn over and complete all of the questions…

A. There are 5 pairs of statements below. For each statement, first circle whether option A or B best describes your feelings about yourself in this class (just choose whichever is closest to you). Then, each time, circle whether that statement is really true for you or sort of true for you. So, for each pair of statements, **first circle whether A or B best describes you in this PE class, and then circle how true you think that choice is for you.**

	Option A		**Option B**
1. Some students find it hard to make friends with others in this class		**OR**	For other students it's pretty easy to make friends with others in this class
and is that choice…	*Really true for you*	*OR*	*Just sort of true for you*
2. Some students have a lot of friends in this class		**OR**	Other students don't have many friends in this class
and is that choice…	*Really true for you*	*OR*	*Just sort of true for you*
3. Some students are kind of hard to like in this class		**OR**	Other students are really easy to like in this class
and is that choice…	*Really true for you*	*OR*	*Just sort of true for you*
4. Some students are popular with others in this class		**OR**	Other students are not very popular with others in this class
and is that choice…	*Really true for you*	*OR*	*Just sort of true for you*
5. Some students feel that they are socially accepted in this class		**OR**	Other students wish that more people in this class accepted them
and is that choice…	*Really true for you*	*OR*	*Just sort of true for you*

Please turn over and carry on with the next set of questions…

B. This time, the questions focus on how you feel about your PE teacher **right at this moment in time**. You are asked to select the answer that best applies to you. Please remember, there is no right or wrong answer. Please be honest, and circle the number which best applies to you.

At the moment, in my PE class…	**Strongly disagree**						**Strongly agree**
1. My PE teacher supports me	*1*	*2*	*3*	*4*	*5*	*6*	*7*
2. My PE teacher encourages us to work together in practice	*1*	*2*	*3*	*4*	*5*	*6*	*7*
3. My PE teacher has respect for me	*1*	*2*	*3*	*4*	*5*	*6*	*7*
4. My PE teacher is interested in me	*1*	*2*	*3*	*4*	*5*	*6*	*7*
5. I feel that my PE teacher is friendly towards me	*1*	*2*	*3*	*4*	*5*	*6*	*7*

Please turn over and carry on with the next set of questions…

C. In this section, we would like you to estimate (or guess) **how confident your PE teacher is in your ability in PE** at this moment in time. We're not focusing on how confident you are; we're focusing on whether you *think* your PE teacher is confident in you or not. For example, you might not be all that confident yourself, but you might think that your PE teacher has lots of confidence in you.

So, right at this moment in time, how confident do you think your PE teacher is in your ability to…	**No confidence at all**	**Low confidence**	**Moderate confidence**	**High confidence**	**Complete confidence**
1. Try your hardest in every PE class	*1*	*2*	*3*	*4*	*5*
2. Be physically fit enough to always perform well in PE	*1*	*2*	*3*	*4*	*5*
3. Be enthusiastic in PE, even when the activity is hard or unfamiliar to you	*1*	*2*	*3*	*4*	*5*
4. Learn all the skills and activities you are taught, even the most difficult ones	*1*	*2*	*3*	*4*	*5*
5. Carry out your PE teacher's instructions at all times	*1*	*2*	*3*	*4*	*5*
6. Perform all the skills you are taught in PE	*1*	*2*	*3*	*4*	*5*
7. Attempt all the activities you cover in PE, even the hard or unfamiliar ones	*1*	*2*	*3*	*4*	*5*
8. Practice and improve your skills in PE	*1*	*2*	*3*	*4*	*5*
9. Perform well whenever you play games against classmates in PE	*1*	*2*	*3*	*4*	*5*

Please turn over and carry on with the next set of questions…

D. This set of questions focuses on how you feel about **your classmates right at this moment in time**. You are asked to select the answer that best applies to you. Please remember, there is no right or wrong answer. Please be honest, and circle the number which best applies to you.

At the moment, in my PE class…	**Strongly disagree**						**Strongly agree**
1. My classmates support me	*1*	*2*	*3*	*4*	*5*	*6*	*7*
2. My classmates encourage one another to work together	*1*	*2*	*3*	*4*	*5*	*6*	*7*
3. My classmates have respect for me	*1*	*2*	*3*	*4*	*5*	*6*	*7*
4. My classmates are interested in me	*1*	*2*	*3*	*4*	*5*	*6*	*7*
5. I feel that my classmates are friendly towards me	*1*	*2*	*3*	*4*	*5*	*6*	*7*

Please turn over and carry on with the next set of questions…

E. This time, we would like you to estimate (or guess) **how confident your PE classmates as a whole are in your ability in PE** at this moment in time. So, we're not focusing on how confident you are, or what your teacher thinks of you; we're focusing on whether you *think* your classmates, as a whole, are confident in you or not. For example, you might not be all that confident yourself, but you might think that your classmates have lots of confidence in you...

So, right at this moment in time, how confident do you think your classmates as a whole are in your ability to…	**No confidence at all**	**Low confidence**	**Moderate confidence**	**High confidence**	**Complete confidence**
1. Try your hardest in every PE class	*1*	*2*	*3*	*4*	*5*
2. Be physically fit enough to always perform well in PE	*1*	*2*	*3*	*4*	*5*
3. Be enthusiastic in PE, even when the activity is hard or unfamiliar to you	*1*	*2*	*3*	*4*	*5*
4. Learn all the skills and activities you are taught, even the most difficult ones	*1*	*2*	*3*	*4*	*5*
5. Carry out your PE teacher's instructions at all times	*1*	*2*	*3*	*4*	*5*
6. Perform all the skills you are taught in PE	*1*	*2*	*3*	*4*	*5*
7. Attempt all the activities you cover in PE, even the hard or unfamiliar ones	*1*	*2*	*3*	*4*	*5*
8. Practice and improve your skills in PE	*1*	*2*	*3*	*4*	*5*
9. Perform well whenever you play games against classmates in PE	*1*	*2*	*3*	*4*	*5*

Thank you very much for completing part 1 of the survey– we really appreciate your help!

5.3.2 Survey 2

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Student Experiences in PE Survey (2)

Thank you for completing this questionnaire. For the answers to be useful, please be totally honest with your responses. All information is strictly confidential, and at no point will any of your answers be made available to your classmates or teacher. If you have any questions, please feel free to discuss these with the person administering the questionnaire.

Personal Information

Your name: _____

Class name: _____

Please turn over and complete all of the questions…

A. Please respond to the following questions about **how you feel regarding your PE teacher** at this moment in time.

With my teacher in this PE class I feel…	**Strongly disagree**						**Strongly agree**
1. Supported	*1*	*2*	*3*	*4*	*5*	*6*	*7*
2. Understood	*1*	*2*	*3*	*4*	*5*	*6*	*7*
3. Listened to	*1*	*2*	*3*	*4*	*5*	*6*	*7*
4. Valued	*1*	*2*	*3*	*4*	*5*	*6*	*7*
5. Safe	*1*	*2*	*3*	*4*	*5*	*6*	*7*

B. Please respond to the following questions about **how you feel regarding your classmates** in PE at this moment in time. You **do not** have to provide the same responses about your classmates and your teacher.

With the other students in this PE class I feel…	**Strongly disagree**						**Strongly agree**
1. Supported	*1*	*2*	*3*	*4*	*5*	*6*	*7*
2. Understood	*1*	*2*	*3*	*4*	*5*	*6*	*7*
3. Listened to	*1*	*2*	*3*	*4*	*5*	*6*	*7*
4. Valued	*1*	*2*	*3*	*4*	*5*	*6*	*7*
5. Safe	*1*	*2*	*3*	*4*	*5*	*6*	*7*

Please turn over and carry on with the next set of questions…

C. These statements ask you about **your reasons for engaging in PE**. Please indicate how true each statement is for you right at this moment in time. Again, we are only interested in your honest response; please don't feel you have to respond in a specific way.

At the moment, I take part in PE classes…	**Strongly Disagree**			**Neither agree nor disagree**			**Strongly agree**
1. …but I don't really know why	*1*	*2*	*3*	*4*	*5*	*6*	*7*
2. …because I'll get into trouble if I don't	*1*	*2*	*3*	*4*	*5*	*6*	*7*
3. …because I want the teacher to think I'm a good student	*1*	*2*	*3*	*4*	*5*	*6*	*7*
4. …because I want to learn sport skills	*1*	*2*	*3*	*4*	*5*	*6*	*7*
5. …because PE is fun	*1*	*2*	*3*	*4*	*5*	*6*	*7*
6. …but I don't really see why we should have PE	*1*	*2*	*3*	*4*	*5*	*6*	*7*
7. …because that's what I am supposed to do	*1*	*2*	*3*	*4*	*5*	*6*	*7*
8. …because I would feel guilty if I didn't	*1*	*2*	*3*	*4*	*5*	*6*	*7*
9. …because it is important for me to do well in PE	*1*	*2*	*3*	*4*	*5*	*6*	*7*
10. …because I enjoy learning new skills	*1*	*2*	*3*	*4*	*5*	*6*	*7*
11. …but I really feel I am wasting my time in PE	*1*	*2*	*3*	*4*	*5*	*6*	*7*
12. …so that the teacher won't yell at me	*1*	*2*	*3*	*4*	*5*	*6*	*7*
13. …because I would feel bad about myself if I didn't	*1*	*2*	*3*	*4*	*5*	*6*	*7*
14. …because I want to improve in PE	*1*	*2*	*3*	*4*	*5*	*6*	*7*
15. …because PE is exciting	*1*	*2*	*3*	*4*	*5*	*6*	*7*
16. …but I don't see what I get out of PE	*1*	*2*	*3*	*4*	*5*	*6*	*7*
17. …because that's the rule	*1*	*2*	*3*	*4*	*5*	*6*	*7*
18. …because it bothers me when I don't	*1*	*2*	*3*	*4*	*5*	*6*	*7*
19. …because I can learn skills which I could use in other areas of my life	*1*	*2*	*3*	*4*	*5*	*6*	*7*
20. …because of the enjoyment I feel when learning new skills	*1*	*2*	*3*	*4*	*5*	*6*	*7*

D. Many students can get tense or nervous before or during PE. Please read each question, and then circle the number that reflects **how you feel before or while you participate in your current PE lessons**. There are no right or wrong answers. Please be as truthful as you can, and think about the activity you are currently covering when answering.

Thinking about how I feel in my current PE lessons…	**Not at all concerned**		**Average Concern**		**Extreme Concern**
1. I am concerned about looking uncoordinated in front of my teacher	*1*	*2*	*3*	*4*	*5*
2. I am concerned about looking uncoordinated in front of my classmates	*1*	*2*	*3*	*4*	*5*
3. I worry about embarrassing myself in front of my teacher	*1*	*2*	*3*	*4*	*5*
4. I worry about embarrassing myself in front of my classmates	*1*	*2*	*3*	*4*	*5*
5. I worry that my teacher evaluates my sporting ability	*1*	*2*	*3*	*4*	*5*
6. I worry that my classmates evaluate my sporting ability	*1*	*2*	*3*	*4*	*5*
7. I am concerned that my teacher thinks I have poor physical fitness	*1*	*2*	*3*	*4*	*5*
8. I am concerned that my classmates think I have poor physical fitness	*1*	*2*	*3*	*4*	*5*

Please turn over and carry on with the next set of questions…

E. This time, please read each of the following statements and indicate **the extent to which these things concern you at the moment in your PE classes**. Please just be honest, and remember that nobody will see these responses.

Before or while I take part in my current PE classes…	**Not at all**	**A little bit**	**Pretty much**	**Very much**
1. I worry that I will not do well	*1*	*2*	*3*	*4*
2. I worry that I'll let others down	*1*	*2*	*3*	*4*
3. I worry that I will not play my best	*1*	*2*	*3*	*4*
4. I worry that I'll do badly	*1*	*2*	*3*	*4*
5. I worry that I will mess up during the lesson	*1*	*2*	*3*	*4*

Please turn over and carry on with the final set of questions…

F. **In the last week**, please write down how many sessions of the following kinds of exercise you did for **more than 20 minutes at a time (but don't include PE lessons).** This includes any sport or activity that you choose to do inside or outside of school (e.g., a school sports team, a local sports club, voluntary sport during school time), but does not include PE.

A) **STRENUOUS EXERCISE** *Number of sessions (over 20 mins)…*

…exercise that makes you sweat and makes your heart beat rapidly e.g., running, vigorous swimming, vigorous cycling, vigorous sports

_____ sessions

A) **MODERATE EXERCISE**

…exercise that makes you sweat lightly but is not exhausting e.g., fast walking, easy cycling, easy swimming

_____ sessions

B) **MILD EXERCISE**

…exercise that does not make you sweat, and requires minimal effort e.g., yoga, archery, golf, easy walking

_____ sessions

Thank you very much for completing part 2 of the questionnaire – we really appreciate your help!

5.3.3 PE Engagement Rating

Over this week, what level of engagement have each of your students shown in your PE class…	**No engagement at all**	**Low level of engagement**	**Below average engagement**	**Average engagement**	**Above average engagement**	**High level of engagement**	**Very high level of engagement**
Eg 1. Student 1	*1*	*2*	*3*	*4*	*5*	*6*	*7*
Eg 2. Student 2	*1*	*2*	*3*	*4*	*5*	*6*	*7*
	1	*2*	*3*	*4*	*5*	*6*	*7*
	1	*2*	*3*	*4*	*5*	*6*	*7*
	1	*2*	*3*	*4*	*5*	*6*	*7*
	1	*2*	*3*	*4*	*5*	*6*	*7*
	1	*2*	*3*	*4*	*5*	*6*	*7*
	1	*2*	*3*	*4*	*5*	*6*	*7*
	1	*2*	*3*	*4*	*5*	*6*	*7*
	1	*2*	*3*	*4*	*5*	*6*	*7*
	1	*2*	*3*	*4*	*5*	*6*	*7*
	1	*2*	*3*	*4*	*5*	*6*	*7*
	1	*2*	*3*	*4*	*5*	*6*	*7*
	1	*2*	*3*	*4*	*5*	*6*	*7*
	1	*2*	*3*	*4*	*5*	*6*	*7*
	1	*2*	*3*	*4*	*5*	*6*	*7*
	1	*2*	*3*	*4*	*5*	*6*	*7*
	1	*2*	*3*	*4*	*5*	*6*	*7*
	1	*2*	*3*	*4*	*5*	*6*	*7*

5.4 Aggregate-level Correlations for all Variables

Table 5. Aggregate-level correlations for all variables.

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Teacher R-S		.54**	.76**	.44**	.47**	.45**	.38**	-.13*	-.19**	.15**	-.08
2. Teacher RISE			.58**	.43**	.73**	.48**	.58**	-.25**	-.34**	.28**	.12*
3. Teacher RNS				.46**	.54**	.63**	.48**	-.20**	-.28**	.21**	.12*
4. Peer R-S					.51**	.73**	.30**	-.23**	-.33**	.16**	-.00
5. Peer RISE						.54**	.47**	-.20**	-.31**	.24**	.11*
6. Peer RNS							.43**	-.27**	-.37**	.22**	.12*
7. RAI								-.32**	-.45**	.28**	.09
8. PE Anxiety									.65**	-.12*	-.07
9. Social anxiety										-.14**	-.07
10. Engagement											.13*
11. LTPA											

Note. Correlations calculated using aggregate-level data within SPSS version 21. R-S = relatedness support; RISE = relation-inferred self-efficacy; RNS = relatedness need satisfaction. R-S measured 1 to 7, RISE 1 to 5, and RNS 1 to 7, where higher scores denote more positive perceptions; RAI = relative autonomy index. Higher scores for RAI denote stronger endorsement of autonomous relative to controlled motivation; Social anxiety = anxiety related to interactions with teacher and peers in PE (measured 1 to 5, where higher scores denote greater concern); PE anxiety = student anxiety regarding their performance and task execution in PE (measured 1 to 4, where higher scores denote greater concern); LTPA = leisure-time physical activity (higher scores denote greater activity levels); Engagement scored 1 to 7, where higher scores denote greater engagement.
** Correlation is significant at the 0.01 level (2-tailed) * Correlation is significant at the 0.05 level (2-tailed)

5.5 References

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