Adolescent Students' Multiple Goal Pursuits in Primary and Secondary School Physical Education

by

Krystal Charlotte Morgan Bishop
100052452

A thesis submitted for the degree of Doctor of Philosophy

School of Education and Lifelong Learning

University East Anglia

January 2023

Abstract

Physical education (PE) offers a unique setting to examine students' achievement motivation compared to both other physical contexts and school subjects. PE is the only physical environment that can play a significant role in encapsulating every child up to the age of 16 from all backgrounds and characteristics. Numerous studies have shown that PE plays an essential role in influencing students' attitudes and behaviours towards physical activity and their participation beyond school (e.g., Biddle, 2001; Hagger et al., 2003; Wang et al., 2008, 2016; Polet et al., 2019). However, with continuous concern over young peoples' physical inactivity, PE has become a crucial setting for researchers and educators to better understand changes in young people's motivation in order to thwart the continuous decline in physical activity (Warburton, 2008). Achievement goal theory, and in particular, Elliot's model (e.g., Elliot, 1999, 2005; Elliot et al., 2011) has been used as an important theoretical foundation in understanding young people's achievement motivation, and has formed the basis for this thesis. The purpose of this thesis was to investigate students' context-specific approach goal adoption in PE. Furthermore, it was to determine the multiple goals pursued by students, the predictive nature of key antecedents, namely implicit theories of ability and basic psychological needs, and the consequences of these approach goal combinations.

Study one was a scoping review to provide a rich and comprehensive overview of the current approach-avoidance achievement goal profile literature within primary and secondary school education. The review identified 42 studies published between 2006 and 2022, with results indicating age and school subject differences, and that the type of measurement strongly influenced the profiles and the outcomes observed. Moreover, whilst longitudinal studies increased over the years, cross-sectional studies dominated the type of design approach when exploring students' achievement goal profiles. The review also revealed a lack of studies

conducted at primary school level despite evidence that these students can hold multiple goals and obtain the benefits of adaptive profiles (e.g., Schwinger and Wild, 2012; Schwinger et al., 2016; Hornstra et al., 2017). Overall, the review highlighted that exploration of younger students' achievement goal profile adoption in primary school and across the transfer into secondary school was warranted.

Study two employed a cross-sectional design and examined the combined associations of mastery-task and mastery-self goals, and performance-competition and performance-appearance goals in PE, and their simultaneous effects on student-reported and teacher-reported outcomes. Based on previous literature (e.g., Hulleman et al., 2010; Elliot et al., 2011; Warburton and Spray, 2014; Senko and Dawson, 2017), more nuanced achievement approach goals (task, self, appearance, and competition) were explored whilst utilising latent profile analysis. Analyses revealed five profiles; *High Mastery, High All, High Performance, Indifferent,* and *Low All*. Profiles showed that early adolescent students could differentiate and pursue mastery and performance goals, however, reported similar levels of the task and self aspects of mastery goals, and the appearance and competition components of performance goals. Students that simultaneously pursued high levels of mastery-approach and performance-approach goals reported very similar optimal outcomes to students that just endorsed high mastery-approach goals. In contrast, students adopting high performance-approach goals was just as maladaptive as students reporting low levels of both approach goals. The study also identified several significant sex and year group differences across the five achievement goal profiles. Female students were more likely to adopt a high performance profile than male students, contradicting many previous studies and meta-reviews (e.g., Shim et al., 2008; Jaitner et al., 2019; Lochbaum et al., 2020). Younger primary-aged students were more prevalent in the *High All* and *Indifferent* profiles, supporting previous literature that younger students are more likely to strongly endorse multiple goals than older students (e.g., Schwinger and Wild, 2012; Schwinger et al., 2016; Linnenbrink-Garcia et al., 2018).

Study three investigated achievement goal profiles at the individual-level and explored the degree in which the four approach-based goals remained stable over a key transition (Year 5 to Year 6) and transfer (Year 6 to Year 7) in PE. Ipsative continuity analyses revealed both within-person change and stability in students' achievement goal profile. The configuration of the goals within a student remained fairly stable over the transfer into secondary school, despite students experiencing significant environmental changes during this time. However, some change in a students' achievement goal configuration was observed especially between Year 5 and Year 7. Implicit theories of ability were found to be a strong predictor of goal configuration, with entity beliefs negatively predicting profile consistency, and incremental beliefs positively predicting stability in goal profiles. Moreover, the satisfaction of the needs for autonomy and relatedness were associated with stability in goal configuration. Whilst frustration of the need for relatedness predicted high instability of the configuration. The outcomes associated with these stable and changeable goal configurations were also explored. Students with increasing profile consistency reported decreasing levels of maladaptive outcomes, whilst those with increasing profile dispersion positively reported higher levels of maladaptive outcomes.

Study four explored the prevalence and stability of students' achievement goal profiles based on the four approach goals within primary (Year 6) and secondary school (Year 7 to Year 10), and identified key predictors of these changes. Latent profile and latent transition analyses revealed three stable profiles across all year groups, *High Mastery, High All,* and *Low All* profiles. On average, the differentiated goals were pursued in similar strengths, however, within the Year 6 cohort, students pursuing a *High Mastery* profile had higher scores for task-focused mastery goals than self-focused ones. Similarly, Year 7 students endorsed stronger

appearance-focused performance goals, however this decreased in Year 8 where competition-focused performance goals became the main goal for students. Results also identified that only 31% of Year 6 students held the same profile over the transfer into Year 7. The largest maladaptive movement occurred during this time, where 45% of Year 6 students moved from a *High Mastery* profile to an *Indifferent* profile. This was followed by the Year 8 cohort where between Year 8 and Year 9, 34% of students moved from a *High All* profile to an *Indifferent* profile. Within this study, female students primarily displayed a *High Mastery* profile, whereas male students were more likely to hold a *High Performance* or a *High All* profile. Incremental students were significantly more likely to adopt a *High Mastery* profile compared to other profiles, whilst entity students had a higher probability of adopting *High Performance* profile. Logistic regressions also revealed that high or increasing levels of autonomy and relatedness satisfaction predicted the adoption of a *High Mastery* profile. Correspondingly, high or increasing levels of competence satisfaction significantly predicted the adoption of a *High Performance* profile. In comparison, high or increasing levels of need frustration significantly predicted maladaptive profiles.

The findings from these four studies provide an insight into the multiple approach goals pursued by primary and secondary school students in PE. Students' approach goal profile adoption seems to become less adaptive as they transfer into secondary school and progress through their secondary school education. Implicit theories of ability and basic psychological needs appear to play significant roles in predicting and influencing adaptive goal profiles. However, future research should continue to explore and measure more nuance achievement goals and explore other key predictors of these achievement goals through longitudinal research. This research would help educators understand what motivational elements to incorporate in their teaching styles to promote adaptive motivational profiles within the PE setting and encourage positive experiences of school PE for young people.

Acknowledgements

I would like to thank my supervisors Dr Victoria Warburton and Dr Lee Beaumont for their support, guidance, and advice throughout the research process. For sharing their knowledge, wisdom and expertise with me across these four challenging years.

I must also thank the staff and students at the schools who participated in the research, for giving their time and support to the projects and for their patience in this process especially during the pandemic.

Thank you to my friends and family for their love and continued support and for encouraging me through the long and sometimes difficult times. Especially to Mum and Dad for igniting my interest and passion for sport from a young age which has shaped my adult life and this PhD. This thesis is dedicated to Keith Bishop.

Planned Publications

Journal Articles

Study One: Approach and Avoidance Goals in Education: A Scoping Review of Students' Achievement Goal Profile in review with Educational Research Review.

Study Two: Multiple Goal Pursuit in PE: The Prevalence and Consequences of Approach Goal Profiles in Adolescent Students in preparation for submission to Contemporary Educational Psychology.

Study Three: Individual-Level Change and Stability in Approach Goal Configurations in PE in preparation for submission to Learning and Individual Differences.

Study Four: The Prevalence, Stability, and Antecedents of Approach Goal Profiles Across Primary and Secondary School PE in preparation for submission to Psychology of Sport and Exercise or Journal of Sport and Exercise Psychology.

Table of Contents

List of Tables

List of Figures

List of Appendices

Glossary and Operational Definitions

Adolescence – The phase between childhood and adulthood, aged between 10 and 19 years old (World Health Organisation, 2022).

Early Adolescence – The age between 10 and 13 years old (WHO, 2022).

Mid-Adolescence – The age between 14 and 17 years old (WHO, 2022).

Transfer – The movement from one school to another (Galton et al., 1999).

Transition – The movement from one year to another within a school (Galton et al., 1999).

Physical Education (PE). Physical education is the planned progressive learning that takes place in school curriculum timetabled time and which is delivered to all students. This involves both 'learning to move' (i.e., becoming more physically competent) and 'moving to learn' (e.g., learning through movement, a range of skills, and understandings beyond physical activity, such as co-operating with others, Association for Physical Education, 2015).

Achievement Goal Theory (AGT). A psychological theory of achievement motivation that explores the purpose for engaging in competence-relevant behaviour (Elliot and Hulleman, 2017).

Implicit Theories of Ability (ITA). A theory that represents peoples' beliefs about the nature of their own capabilities as either malleable or fixed (Chen and Tutwiler, 2017).

Basic Psychological Needs Theory (BPNT). Basic psychological needs are defined as critical resources underlying individuals' natural inclination to move towards increasing self-organisation, adjustment, and flourishing (Ryan, 1995).

Chapter 1

Introduction

Achievement motivation is the energisation and direction of competence-relevant behaviour and a key focus in exploring human behaviour especially in challenging situations. This has been a popular topic area in understanding why and how individuals strive towards competence (success) and away from incompetence (failure) within the educational setting (e.g., Wigfield et al., 2015; Steinmayr et al., 2019). Researchers have sought to understand what predicts pursuing different achievement strivings and the consequences arising from them. Many take a social-cognitive approach to motivation, with this viewpoint emphasising the significant role of individuals' beliefs and interpretations, and the role of the achievement context for motivational dynamics (see Weiner, 1992; Pintrich et al., 1993; Wigfield and Cambria, 2010). Social cognitive models of achievement motivation encompass a variety of constructs that can be split into two main categories: individuals' beliefs about their capability to perform tasks, and individuals' motivational beliefs about their reasons for choosing a task.

Achievement goal theory (AGT) is situated in this social-cognitive view of motivation, and for many decades has been at the forefront when studying achievement motivation, with achievement goals reflecting the purpose of peoples' achievement pursuits (e.g., Nicholls, 1984; Dweck and Leggett, 1988; Maehr, 1989). The theory has been conceptualised in many models and constructs throughout the years, but despite the ever-evolving frameworks, it is largely agreed that competence is central to the theory (Maehr and Zusho, 2009). Competence is viewed as the ability to do a task successfully and is widely considered a basic psychological need that all individuals require for physical and psychological well-being to occur (Deci and Ryan, 1985). This need is satisfied through participating in achievement situations where the individual experiences mastery or effectance in what they are doing. An achievement situation can be characterised by inherently challenging tasks, which provide opportunities for skill acquisition or evaluation of performances, competition with one's self or with others, and as a result a standard of competence is imposed (Maehr, 1974). When in these achievement situations, an individual's behaviour is driven by either demonstrating their competence or avoid demonstrating incompetence (Nicholls, 1984, 1989; Dweck, 1986). These standards of excellence individuals use to judge their competence are critical in the school environment where evaluative standards are frequently used to assess students' progress and achievement (e.g., Ames and Archer, 1988; Eccles and Midgley, 1989; Nicholls, 1989; Ames, 1992). These achievement goals are posited to have an important and direct impact on the way individuals engage in achievement settings and the consequences they experience. They are viewed as concrete, situation-specific variables that are used to explain the specific aim or direction of competence pursuits. Antecedents explain why individuals orient towards different definitions and valences of competence, and why they adopt different achievement goals. These antecedents have an indirect influence on achievement outcomes through prompting achievement goals, that, in turn, produces a direct influence on achievement outcomes.

AGT has served as an important lens for analysing students' achievement motivation in the school setting. One particular school context which provides a unique setting to investigate students' achievement motivation is physical education (PE). PE is a distinctive achievement setting that combines aspects of educational and physical achievement situations. The PE environment is underpinned by learning and improvement, with a strong emphasis on hard work and effort equating to success, however it also involves physical activities that are naturally competitive. In addition, unlike other school subjects where students can hide their intelligence during a lesson, within PE, students' physical competence is salient, and can be easily evaluated and compared with their peers (Warburton, 2008). Furthermore, unlike other physical settings, PE is the only physical environment that can play a significant role in encapsulating every child up to the age of 16 from all backgrounds and characteristics. Numerous studies have shown that experiences in PE plays an essential part in influencing attitudes towards physical activity and participation beyond school (Biddle, 2001; Hagger et al., 2003; Polet et al., 2019; Coulter et al., 2020). Yet, concerns continue to be expressed about the sedentary lifestyles of a large majority of contemporary children and adolescents (e.g., Carr, 2006; Wu et al., 2017; Park et al., 2020), with particular concern that physical inactivity can have ramifications for the health status of young people (Carr, 2006; Kumar et al., 2015; WHO, 2022). Consequently, researchers have identified that PE can hold the potential to reinforce a physically active lifestyle for children. However, despite this, a large percentage of children lose interest in PE and participation levels decrease especially during early adolescence (Van Wersch et al., 1992; Pate et al., 2005; Carr, 2006; Shen et al., 2009). This is especially evident in secondary school where students increase their focus on social comparison when determining their competence, this normative awareness of competence can then influence the activities that they engage in and the effort they put in during PE lessons (Nicholls, 1989; Garn and Sun, 2009). Early adolescence can also be a difficult time period that consists of dynamic changes in their physical, psychological, and social characteristics (Garn and Sun, 2009). In turn, these changes can have significant implications on their achievement motivation and school achievement. Duda (1996) argued that in order to combat such negative trends, researchers must understand why children and adolescents engage and invest in PE and advocated the importance of exploring the achievement goals that students hold in PE contexts. Considering the concern over continuous declining physical activity levels, rising sedentary behaviours, and obesity levels, the importance of understanding the motivational processes that direct adolescences' behaviour has become increasingly warranted (Tremblay and Willms, 2003; Department of Health and Social Care, 2019; Park et al., 2020).

Finally, recent theoretical developments have increased the number of goals that an individual can adopt, resulting in new and continued interest in achievement motivation within the school setting (e.g., Elliot, 1999, 2005; Elliot et al., 2011). These more distinct goals have provided new focuses and avenues for researchers to explore. However, when conceptualising and testing these models, Elliot conducted his research using university-aged students, raising questions whether these goals and their effects are unique to age and educational context (e.g., Midgley et al., 1989, 1993, 2001; Hulleman and Senko, 2010). Furthermore, in contrast to approach goals, some researchers have found that avoidance goals are less relevant to younger students in achievement settings (e.g., Lochbaum and Gottardy, 2015; Lochbaum et al., 2017, 2020). Within the educational setting, studies have found that younger students are less likely to adequately distinguish between approach and avoidance goals, especially between the mastery distinction (e.g., Bong, 2001, 2009; Ross et al., 2002; Carr and Marzouq, 2012; Putwain et al., 2018). Karakus (2016) discovered that compared to adults, children struggle to understand mastery-avoidance goals and as a result are less likely to adopt them. Consequently, the purpose of the research in this thesis was to explore these recent achievement goal developments and see if these more nuanced goals are applicable to younger students in compulsory education. This thesis provided an in-depth investigation of mastery-approach and performance-approach goals in the PE context through examining multiple goal endorsement, key predictors, and consequences of these approach goals over primary and secondary school.

Chapter 2

Review of the Literature

The Development of the Achievement Goal Construct

In original works (e.g., Lewin et al., 1944; McClelland et al., 1953; Atkinson, 1957) achievement motivation was seen as a stable personality trait that originated from either a striving towards success (need for achievement) or striving away from failure (fear of failure). It was hypothesised that the strength of these motives influenced a person's behaviour in achievement situations. However, this perspective of achievement motivation was criticised for not taking into account cultural or situational factors in predicting motivated behaviour (Maehr, 1974). The achievement goal framework was developed through the combined works of Maehr (1983, 1984), Ames (1984), Nicholls (1984, 1989), and Dweck (1986, 1990) to address these limitations. This framework viewed achievement motivation as situation-specific, process-oriented variables (achievement goals) rather than the previous interpretation of being global motive dispositions. Since its conception, Dweck and Nicholls proceeded to create distinct achievement goal conceptualisations, which has greatly influenced the construct since.

Dweck's ideology arose from her research on children's helplessness and attribution patterns in achievement settings. Throughout the 1970's and early 1980's, Dweck et al. (Dweck and Reppucci, 1973; Dweck, 1975; Diener and Dweck, 1978, 1980) established that children who had equal ability, responded differently to failure on achievement tasks. They found some children displayed an adaptive *mastery* response, characterised by attributing failure to insufficient effort, positive affect and expectancies, persistence, and pursuit of challenges. In contrast, other children demonstrated a maladaptive *helpless* response, characterised by attributing failure to insufficient ability, negative affect and expectancies, decreased persistence and performance, and avoiding challenges. These findings led Dweck et al. (Dweck and Elliot, 1983; Dweck, 1986) to the achievement goal framework to help explain the deviations in responses to failure. Dweck and Leggett (1988) identified two achievement goals which represented individual's purpose for engaging in behaviour in achievement situations. The first was *learning* goals, where the individual focused on developing their competence and mastery of tasks, and the second, *performance* goals, where the individual focused on the demonstration of competence or avoiding demonstrating incompetence. Dweck believed that children would adopt different goals leading to different patterns of affects, behaviours, and cognitions. When faced with failures or setbacks, individuals adopting *learning* goals viewed failure as helpful feedback information for developing competence or mastering tasks. On the other hand, individuals adopting a *performance* goal displayed a helpless response, with failure meaning they lacked normative ability. Dweck also highlighted the role confidence in one's ability had in predicting achievement-relevant outcomes. When accompanied with high confidence in ability, *performance* goals would lead to a mastery response pattern, whilst low confidence in ability would result in a helpless response. In comparison, *learning* goals led to a mastery pattern of responses regardless of confidence level.

In comparison, Nicholls' achievement goal framework (1984, 1989) emerged from his work on the development of the conceptions of ability in children. Nicholls described the theory as complex and dynamic concepts that assume individuals are rational, intentional, and goal-directed, and strive to demonstrate competence or to avoid the demonstration of incompetence in achievement settings. From his research with children, Nicholls hypothesised that individuals assess their competence through two different conceptions of ability. According to Nicholls (1976, 1978, 1980), children initially possess an *undifferentiated* conception of ability, in which they do not distinguish between ability and effort. During this time, high ability is equated with learning and improvement through effort; the more effort applied by the individual the more learning and improvement takes place. Individuals with an *undifferentiated* conception of ability are likely to participate in tasks that have low social evaluation, little emphasis on competition, and value the learning process (Biddle, Wang, Chatzisarantis et al., 2003). Nicholls identified that by approximately 12 years of age, children acquire a *differentiated* conception of ability, in which they can distinguish between effort and ability, interpreting ability as a fixed capacity. At this point, controlling effort expenditure and monitoring of others' effort expenditure is important for inferences of high ability. High ability is inferred when outperforming others while expending equal effort, or performing equally to others whilst expending less effort. Individuals with a *differentiated* conception of ability participate in tasks that are competitive in nature, compare abilities, and want to outperform others with minimal effort. Nicholls wanted to amalgamate these findings on the two conceptions of ability with pre-existing theories of adolescent and adult achievement motivation which led him to articulate his achievement goal construct.

Consequently, Nicholls perceived an achievement goal as the purpose of achievement behaviour, and that purpose was to develop or demonstrate high ability (or to avoid demonstrating low ability). For individuals who were past the age where the differentiation develops, they were capable of using both the undifferentiated and differentiated conceptions of ability (Jagacinski and Nicholls, 1984). The type of conception of ability selected by an individual in an achievement situation is dependent on their goal and how they define their success for that situation. If an individual sought to demonstrate competence in the undifferentiated sense (e.g., developing skills by learning or mastering tasks) this was referred to as *task involvement.* In comparison, if an individual sought to demonstrate competence in the differentiated sense (e.g., outperforming others) this was referred to as *ego involvement.* Both goals were believed to lead to different patterns of achievement-relevant outcomes. *Task involvement* was seen as an intrinsic motivated state that would lead to positive affect, behaviour, and cognition, whilst *ego involvement* was seen as evaluative, self-conscious state that would lead to negative consequences. However, if *ego involvement* was accompanied with high ability, this would lead to positive outcomes. Nicholls' model also focused on how achievement goals may manifest as either dispositional preferences (orientations) or situationally specific states (involvements). Dispositional goal preferences were perceived to predict situationally specific goal states, these goal states were interpreted as cognitively based intentions. When articulating their views on achievement goals, both Dweck and Nicholls described the two types of goals as relative to each other, with Dweck in particular suggesting that individuals could only pursue one type of goal or the other. Both viewed learning/task and performance/ego as opposite poles on a single continuum. Similarly, both dichotomous models only focused on approach achievement behaviour (i.e., developing or demonstrating competence), rather than making the distinction between approach and avoidance motivation, despite some indications of this in their early work (see Dweck and Elliot, 1983; Nicholls, 1984). [1]

Introduction of the Approach and Avoidance Distinction

The Trichotomous Model

Although the initial dichotomous model of mastery and performance goals was successful in finding support for the adaptive role of mastery goals, there was mixed support for performance goals within the education and sport literature (e.g., Spray, Wang et al., 2006; Dewar and Kavussanu, 2012; Gonçalves et al., 2017; Senko, 2019). As the dichotomous perspective only focused on the demonstration or development of competence in the two goals, it was argued that the disregard for achievement behaviour to avoid incompetence accounted

[1] From this point onwards, the terms mastery and performance will be used throughout this review as they are consistent with the terminology of Elliot's work which forms the theoretical basis of this thesis.

for the ambiguous findings. Elliot et al. (Elliot, 1994, 1999; Elliot and Harackiewicz, 1996; Elliot and Church, 1997) conducted a range of laboratory experiments and field studies with university students, where they manipulated performance goals which allowed them to distinguish between possible positive outcomes (approach motivation) and negative outcomes (avoidance motivation) for their participants. This led to the recommendation that the dichotomous model should be revised to create a trichotomous framework (Elliot, 1994; Elliot and Harackiewicz, 1996). Performance goals were bifurcated into independent approach and avoidance goals, and combined with the mastery goal to create three achievement goals.

Furthermore, in addition to encompassing the approach-avoidance distinction for performance goals, Elliot sought to establish competence as the conceptual core of achievement goals, providing a strong foundation where goals could be clearly conceptualised and different types of goals could be easily be derived (Elliot, 2005). Elliot suggested that within a motivational context, achievement goals could be differentiated along two dimensions of competence, its *definition* and *valence* (Elliot, 1999; Elliot and McGregor, 2001). Competence was *defined* by the standard or referent that was used in evaluating it. Three different standards were identified: *absolute* standard (the requirements of the task itself), *intrapersonal* standard (one's past attainment), and *normative* standard (performance of others). In other words, competence could be defined and evaluated according to mastery of a task (*absolute*), personal trajectory (*intrapersonal*), and attainment relative to others (*interpersonal*). Originally, *absolute* and *intrapersonal* were considered together rather than separately due to shared conceptual and empirical similarities. As such, mastery and performance goals were delineated according to the standards, with mastery goals committing to the *absolute/intrapersonal* standard, and performance goals committing to the *interpersonal* standard (Dweck and Elliot, 1983; Maehr, 1983; Ames, 1984; Nicholls, 1984). Elliot also explained that competence could be *positive valance* (approaching success) which would show a behaviour that is initiated by a desirable/positive event, or a *negative valence* (avoiding failure) which would indicate a behaviour which is initiated by an undesirable/negative event. As a result, individuals adopting mastery-approach goals focus on the development of competence or mastery of tasks; performance-approach goals focus on the attainment of normative competence; and performance-avoidance goals focus on the avoidance of normative incompetence. Elliot argued that both *definition* and *valence* were essential to the concept of competence in motivational settings, and were predicted to present all forms of achievement goals.

The 2x2 Model

In further developments, Elliot (1999) later incorporated the approach-avoidance distinction within both mastery and performance goals when it was argued that achievement goals should consider both the definition of competence (mastery and performance) and the valence of the striving (approaching competence and avoiding incompetence), resulting in the model becoming a 2x2 achievement goal framework (Figure 1). In addition to the three goals,

		Definition	
		Absolute/ intrapersonal (mastery)	Normative (performance)
Valence	Positive (approaching success)	Mastery-approach goal	Performance-approach goal
	Negative (avoiding failure)	Mastery-avoidance goal	Performance-avoidance goal

Figure 1. The 2 x 2 achievement framework (Elliot and McGregor, 2001).

the focus of mastery-avoidance goals were to avoid *absolute-based* or *intrapersonal-based* incompetence. Individuals that endorsed this goal strived to avoid losing their ability, avoid forgetting what they had learnt, or avoid leaving a task incomplete. Mastery-avoidance goals were expected to produce less optimal consequences than mastery-approach goals, but less deleterious outcomes than performance-avoidance goals (Elliot, 1999; Elliot and McGregor, 2001). Despite the bifurcation of mastery goals, questions were raised whether further separation between the goals was warranted as mastery goals were explicitly defined with two different standards of evaluation (*absolute-based* and *intrapersonal-based* competence and incompetence).

The 3x2 Model

Consequently, through subsequent research, Elliot et al. (2011) further expanded the model with research recognising that individuals may focus on mastery of a task separately from personal improvement (Mascret et al., 2015). The model identified three *standards* of defining competence with the two ways competence would be valenced, the 3x2 framework was created (Figure 2). The model was composed of a *task-approach* goal focused on attaining task-based competence (e.g., doing the task correctly), a *task-avoidance* goal focused on

		Definition		
		Absolute (task)	Intrapersonal (self)	Interpersonal (other)
Valence	Positive (approaching success)	Task-approach goal	Self-approach goal	Other-approach goal
	Negative (avoiding failure)	Task-avoidance goal	Self-avoidance goal	Other-avoidance goal

Figure 2. The 3 x 2 achievement goal framework (Elliot, 2011).

avoiding task-based incompetence (e.g., avoiding doing a task incorrectly), a *self-approach* goal focused on attaining self-competence (e.g., doing better than a previous performance), a *self-avoidance* goal focused on avoiding self-based incompetence (e.g., avoiding doing worse than previous performance), an *other-approach* goal focused on attaining other-based competence (e.g., doing better than others), and an *other-avoidance* goal focused on avoiding other-based incompetence (e.g., avoiding doing worse than others). Mascret et al. (2015) concluded that the distinction of *absolute* and *intrapersonal* standards of evaluation within mastery goals enhanced the precision of the model, allowing for greater understanding of the construct.

The 2x2 Standpoints Model

More recently, however, it has been recognised that the model focused exclusively on the standards of competence and did not include the standpoints (Korn and Elliot, 2016). Whilst not explicitly acknowledged during its development, the initial dichotomous model contained two distinct subcomponents of achievement goals, *standards of competence* and *standpoints on competence* (Elliot, 1999; Urdan, 2000). The *standpoints* of competence were described as the standpoint of either developing or demonstrating competence. When accompanied with the standards of competence (Figure 3), resulted in mastery goals representing a focus on developing competence and using a task-based or self-based standard of competence. Whilst, performance goals represented a focus on demonstrating competence and using an other-based standard of competence. Throughout the decades, conceptually, theorists have either explored these concepts separately or collapsed the two subcomponents together, despite both being equally fundamental to the conceptualisation of achievement goals (Korn and Elliot, 2016).

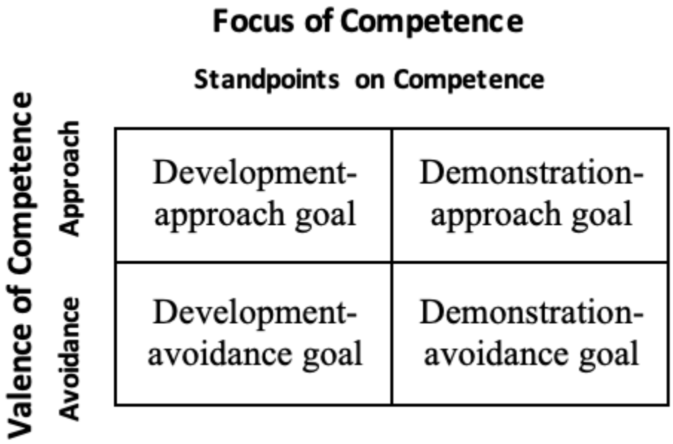

Figure 3. The 2x2 standpoints model of achievement goals (Korn and Elliot, 2016).

Previously, within the academic literature, researchers have explored the demonstration element of the standpoints of competence crossed with the valence of competence (e.g., Elliot, 1999; Urdan, 2000; Grant and Dweck, 2003; Urdan and Mestas, 2006; Warburton and Spray, 2014). Urdan and Mestas (2006) found evidence of students pursuing performance goals for different reasons, including appearance-approach and appearance-avoidance reasons (akin to demonstration-approach and demonstration-avoidance goals). Whilst others suggested that performance goals contain two different elements (demonstration and a normative standard) that could be separated (Elliot, 1999; Urdan, 2000). Despite these findings, the literature only focused on portions of the 2x2 standpoints model. Accordingly, Korn and Elliot (2016) proposed a 2x2 standpoints model of achievement goals, grounded in the development-demonstration and approach-avoidance distinctions. They argued that differentiating standpoints from the standards of competence and integrating the standpoints with the approach-avoidance distinction was warranted for a full picture and coverage of the achievement goal construct. The model was empirically tested and found that development-approach and development-avoidance goals positively predicted intrinsic motivation, demonstration-avoidance goals negatively predicted of intrinsic motivation and exam performance, whilst demonstration-approach goals positively predicted exam performance (Korn and Elliot, 2016). Korn and Elliot (2016) recommended that additional research on demonstration-approach goals were needed, given its composed of undesirable competence (demonstration) and desirable competence (approach), and the mixed findings it has previously produced (e.g., Grant and Dweck, 2003; Hulleman et al., 2010; Warburton and Spray, 2014; Senko and Tropiano, 2016). In conclusion, Korn and Elliot (2016) argued that these more differentiated models (e.g., 2x2 standpoints and 3x2 model), and the distinctions of development-demonstration and task/self-other along with the approach-avoidance distinction, yields more conceptual rigor and understanding of the achievement goal construct.

The Definition and Operationalisation of Performance-Approach Goals

Performance-approach goals have seen much change and debate since their initial conceptualisation compared to its mastery counterpart (Wirthwein and Steinmayr, 2020). Whilst the initial dichotomous model identified the beneficial effects of mastery goals, the effects of performance goals on affect, behaviour, and cognitions were more ambiguous (Elliot, 1999, 2005; Biddle, Wang, Kavussanu et al., 2003). The introduction of the approach-avoidance distinction was used to clarify these inconsistent findings, with Elliot (1999, 2005) defining performance-approach goals as representing an individual's normative aims (e.g., trying to do better than others), that could be energised by a variety of reasons (e.g., wanting to look better than others). However, despite Elliot's bifurcation (Rawsthorne and Elliot, 1999; Elliot, 2005), several meta-analytic reviews investigated achievement goal measures within the academic settings, and identified irregularities in the adaptiveness of performance-approach goals (Hulleman et al., 2010; Senko and Dawson, 2017). The reviews found that when creating measurements to quantify performance-approach goals, researchers often focused on different components of the goal. Dweck's (1986) early performance goals definition focused on the demonstration of competence to gain favourable judgements of competence. This demonstration of high ability was a central element to Midgley et al. (2000) Patterns of Adaptive Learning Survey (PALS). Examples of these questions included 'I'd like to show my teacher that I'm smarter than the other students in my class' and 'I would feel really good if I were the only one who could answer the teacher's questions in class'. In contrast, Nicholls (1984) focused on a social comparison aspect of performance-approach goals (i.e., outperforming others) and included corresponding items in the Motivation Orientation Scales (MOS by Duda and Nicholls, 1992). However, Elliot et al. (Elliot and Trash, 2001; Elliot, 2005; Elliot and Murayama, 2008) argued that normative competence was a core component to performance goals, whilst the demonstration of competence was seen as a self-presentational goal not an achievement goal. Consequently, the Achievement Goal Questionnaire/Revised (AGQ by Elliot and McGregor, 2001; AGQ-R by Elliot and Murayama, 2008) consisted of items with a normative comparison (i.e., my aim is to perform well relative to other students).

Hulleman et al. (2010) found that these different definitions and operationalisations of performance-approach goals were the cause of the inconsistent outcomes. The reviews found that achievement goal measurements needed to differentiate between a competition (normative) component and an appearance component rather than just ignored or confound these elements (Hulleman et al., 2010; Senko and Dawson, 2017). This was supported by a qualitative study conducted by Urdan and Mestas (2006), who found that students' reasons for pursuing performance goals were categorised according to approach-avoidance and appearance-competition distinctions. Research has also shown that the appearance-competition component produced different effects on motivation and behaviour in achievement situations (e.g., Hulleman et al., 2010; Warburton and Spray, 2014; Senko and Dawson, 2017). For example, performance-approach goals assessed using competition-focused items had a positive association with performance (Hulleman et al., 2010; Warburton and Spray, 2014). It was found that individuals pursuing the competition element of performance-approach goals, focused on wanting to be better than others, and as a result could be favourable to their performance and motivation. To satisfy this goal striving, individuals may be encouraged to exert effort and persistence, and as a consequence produce higher levels of achievement and competence. In comparison, performance-approach goals assessed using appearance-focused items reported a negative relationship with performance (Hulleman et al., 2010; Warburton and Spray, 2014). Due to wanting to appear competent to others, these individuals would have little interest or concern for performance outcomes (Hulleman et al., 2010). However, these behaviours can be detrimental to individuals' motivation and performance, and distract from the learning process (Elliot, 1999; Urdan, 2000).

Antecedents of Achievement Goals

Elliot (1999) created the Hierarchical Model of Approach and Avoidance Achievement Motivation (HMAM) to illustrate the role of achievement goals in the motivational process. Elliot proposed three distinct components; antecedents of achievement goal adoption, achievement goals, and achievement-relevant processes and outcomes. Within the framework (Figure 4), Elliot explained that the achievement goals mediated the effects of antecedents on achievement-relevant processes and outcomes. Elliot believed that antecedents and achievement goals performed complementary roles, with antecedents explaining why

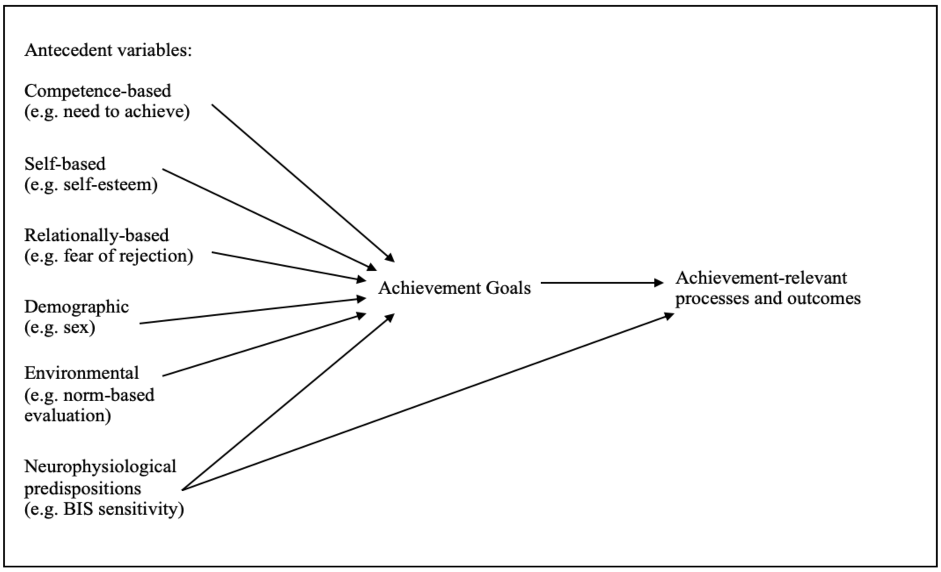

Figure 4. Hierarchical model of approach and avoidance achievement motivation (Elliot, 1999).

individuals engage in an achievement situation, while achievement goals explain how they engage. One antecedent that has strong theoretical and empirical evidence in the adoption of achievement goals is Dweck's Implicit Theories of Ability.

Implicit Theories of Ability

Dweck's (1989, 1999) Implicit Theories of Ability (ITA) have been a prominent antecedent of achievement goal adoption that has been explored in both the educational and physical settings (e.g., Biddle, Wang, Kavussanu et al., 2003; Blackwell et al., 2007; Burnette et al., 2013; Liu, 2021). After her educational research identified that students' achievement goals explained why they exhibited different responses in achievement situations, Dweck et al. focused on understanding why students would adopt different achievement goals when in the same setting. Dweck hypothesised that people develop beliefs about themselves (known as self-theories) which influenced their affective, behavioural, and cognitive responses in an achievement situation. These self-theories created distinct frameworks for understanding achievement, analysing, and interpreting human actions. An *implicit theory* was formed from these self-theories, which were the beliefs about the stability or malleability of their intelligence, ability, attributes, and behaviours. From their research they established how students viewed the stability or malleability of their intelligence affected their motivation, achievement, learning, and behaviour (Dweck and Elliot, 1983; Dweck, 1986, 1999; Elliot and Dweck, 1988).

Two implicit theories were identified; an *entity theory of ability* and an *incremental theory of ability*. Dweck (1986, 1999) described *entity theorists* as individuals that view their attributes as fixed stable quantities which cannot be changed through effort. These individuals' main emphasis was to display their ability or outperform others, but they required easy success and avoided challenges that threatened their self-esteem (Dweck, 1999). In contrast, *incremental theorists* viewed their attributes and behaviours as malleable, controllable qualities that could be developed through effort and learning. Unlike entity theorists, incremental theorists sacrifice opportunities to learn something new or for self-improvement (Bandura and Dweck, 1985; Dweck, 1999, 2002). It was theorised that the endorsement of one implicit theory over the other can have important consequences for the individual, as they are seen as different ways of constructing meaning. Each implicit theory generates an individual framework which is used to understand, interpret, judge, and react to events and action (Warburton and Spray, 2008). However, it is widely accepted that individuals can hold both implicit theories to different degrees, although one is likely to be dominant (Dweck et al., 1995). Consequently, through underpinning the goals that individuals adopt, implicit theories can influence what an individual values, how they approach tasks and challenges, and how they respond to outcomes of tasks (Elliot and Dweck, 1988).

Dweck et al. (Dweck and Elliot, 1983; Dweck and Leggett, 1988) believed that the two implicit theories would lead an individual towards the adoption of a particular achievement goal orientation. The Achievement Motivation Model (AMM) (shown in Figure 5) illustrates the relationship between implicit theories of ability, achievement goal adoption, and subsequent behavioural patterns. The endorsement of an entity belief is proposed to lead to the adoption of performance goals due to heightened evaluative concerns about performance and

Theory of Intelligence	Goal Orientation	Perceived Present Ability	Behaviour Pattern
Entity (intelligence is fixed)	Performance (gain is to gain positive judgments/avoid negative judgments of competence)	High	Mastery oriented (seek challenge; high persistence)
		Low	Helpless (avoid challenge; low persistence)
Incremental (intelligence is malleable)	Learning (Goal is to increase competence)	High or Low	Mastery oriented (Seek challenge that fosters learning; high persistence)

Figure 5. The achievement motivation model (Dweck and Leggett, 1988).

a focus on proving their ability. In contrast, the endorsement of an incremental belief is suggested to lead to the adoption of mastery goals due to seeking out opportunities to improve and develop ability. Dweck (1999) predicted that when faced with setbacks or failures, greater differences in the motivational outcomes would be observed when endorsing the different beliefs and adopting associated goals. As shown in the AMM, more negative outcomes are associated with the endorsement of entity beliefs compared to the endorsement of incremental beliefs. Individuals that endorse entity beliefs combined with the adoption of performance goals are likely to perceive their ability as an important and permanent attribute, and that when faced with failure use it as an indicator of their future ability being inadequate. This would result in them doubting their ability and leading to negative outcomes. In comparison, individuals that endorse incremental beliefs combined with the adoption of mastery goals, view failure as an indication that their current ability level as inadequate. They have the belief that their ability would improve, thus leading to positive motivational consequences.

When incorporating implicit theories of ability within the approach-avoidance dimensions, Elliot (1999, 2005) proposed that it was the definition of competence (mastery and performance) rather than the valence of competence (positive or negative) that was key in the association between implicit theories of ability and achievement goals. Elliot (1999, 2005) suggested that incremental beliefs were linked with mastery-approach goal and mastery-avoidance goal adoption, whilst entity beliefs were associated with performance-approach and performance-avoidance adoption. Elliot explained that individuals that endorsed entity beliefs promoted the pursuit of performance goals where the individual strived to demonstrate normative competence (performance-approach) or to avoid normative incompetence (performance-avoidance). In comparison, individuals that endorsed incremental beliefs promoted the pursuit of mastery goals where individuals strived to develop self-referenced and task-referenced competence (mastery-approach) or avoid self-referenced and task-referenced incompetence (mastery-avoidance). The theoretical relationship between implicit theories of ability and approach-avoidance goal adoption has been supported empirically in both education and physical settings (e.g., Dweck and Leggett, 1988; Sarrazin et al., 1996; Cury et al., 2002; Costa and Faria, 2018; Liu, 2021). In contrast, to this well-established relationship, other antecedents that share similar facets to achievement goals (i.e., competence) should be explored. One such avenue that differentiates based on the valence of competence rather than the definition, and that has had limited exploration is the satisfaction and frustration of basic psychological needs.

Basic Psychological Needs Theory

The Self-Determination Theory (SDT, Deci and Ryan, 1985) is described as a macro-theory that explores the social conditions that facilitate or hinder human flourishing (Ryan and Deci, 2017). Central to this theory is the Basic Psychological Needs Theory (BPNT, Deci and Ryan, 2000) which elucidates how an individual's motivation is affected by the satisfaction or frustration of their basic psychological needs. According to BPNT, people possess three basic needs; *autonomy*, *competence,* and *relatedness*, that if satisfied will lead to optimal functioning and development, however if frustrated can lead to severe costs for an individual's health and well-being. In order to satisfy the *need for autonomy*, individuals need to feel volitional and responsible for their own behaviour and have the need for an inner endorsement of one's actions (Ryan, 1995). When satisfied, individuals experience a sense of integrity as one's feelings, thoughts, and actions are authentic and self-endorsed. However, if frustrated individuals experience a sense of pressure and often conflict, such as feeling pushed in an unwanted direction (Vansteenkiste et al., 2020). The *need for competence* is described as the degree to which individuals need to feel a sense of mastery through effectively interacting with the social environment and experience opportunities in which to express their capabilities

(Ryan and Deci, 2002). This need becomes satisfied as one capably engages in activities and experiences opportunities for using and improving skills and expertise. However, this need is frequently frustrated when challenges are too difficult, feelings of mastery are diminished, or when negative feedback is pervasive (Ryan and Deci, 2017). Lastly, the *need for relatedness* is the extent to which people need to feel a secure sense of connectedness and belonginess to others in their social environment (Ryan, 1995). To satisfy this need, an individual must want to belong or socially connect with significant others (Deci and Ryan, 2000). However, relatedness frustration occurs when an individual feels a sense of social alienation, exclusion, and loneliness. When these three psychological needs are satisfied positive affective, behavioural, and cognitive outcomes are expected with individuals feeling self-determined, efficacious, and connected to others in their social environment (Deci and Ryan, 2000).

However, the theory also recognised that individuals can exhibit affective, behavioural, and cognitive patterns that represent more undesirable forms of motivation and outcomes. Deci and Ryan (2000) believed that the deprivation of any of these needs would lead to severe costs for an individual's health and well-being. These negative outcomes are likely to occur when an individual perceives their psychological needs to be actively undermined (i.e., frustrated) in their current social environment (Deci and Ryan, 2000). Subsequent behaviours from need frustration are likely to be feeling controlled, having diminished functioning, and ill-being (Deci and Ryan. 2000). Originally, the frustration of needs were explored and evaluated through examining low levels of needs satisfaction. However, this resulted in ambivalent research findings between low need satisfaction and maladaptive outcomes, revealing weak or non-significant relationships (Adie et al., 2008; Quested and Duda, 2010). These findings led to the suggestion that the satisfaction of basic psychological needs were more influential for optimal functioning rather than non-optimal functioning. Researchers argued that low scores on the satisfaction of the needs did not strongly relate to maladaptive outcomes because the measures did not adequately capture the intensity of feelings characterised by experiences of need frustration (Bartholomew, Ntoumanis, Ryan, Bosch et al., 2011; Ryan et al., 2016). Vansteekiste and Ryan (2013) proposed that the two constructs should be viewed as asymmetrical; low levels of need satisfaction does not necessarily involve the frustration of needs, but frustrated needs does involve the experiences of low need satisfaction.

Research within the sports domain has provided support for the distinctiveness of need satisfaction and need frustration, which led to the development and validation of a range of measures for the frustration of needs (e.g., Psychological Need Thwarting Scale; Bartholomew, Ntoumanis, Ryan et al., 2011; Balanced Measurement of Psychological Needs Scale; Sheldon and Hilpert, 2012; Basic Psychological Need Satisfaction and Frustration Scale; Chen et al., 2015). These questionnaires have advanced our understanding of optimal and non-optimal functioning. However, little is known about how need satisfaction and frustration influence the adoption of approach-avoidance goals. Elliot's hierarchical model highlighted a plethora of antecedent categories in to which need satisfaction and need frustration can be integrated as an influence on the adoption of achievement goals, however, it is only in recent years that there has been an attempt to integrate these two models and explicate the relationships between achievement goals and basic psychological needs.

Proposed Integrated Model of Motivation. Drawing on the established literature from BPNT and Elliot's HMAM, Adie and Bartholomew (2013) proposed to integrate these two theories to enhance our understanding of motivation and to predict well-being and ill-being (Figure 6). The BPNT literature has revealed that need satisfaction only plays a partial mediating role in understanding the links of the environment to well-being and ill-being, indicating that other motivational processes are playing an important part in this proposed model (Reinboth and Duda, 2006; Adie et al., 2008; Bartholomew, Ntoumanis, Ryan, Bosch et al., 2011). The HMAM was identified as a complementary theory due to its emphasis on competence with Elliot et al. (2002, 2007) predicting that basic psychological needs may indirectly predict well-being and ill-being via achievement goal adoption. Adie and Bartholomew's (2013) integrated model assumed that the satisfaction of the psychological needs would lead to the adoption of mastery-approach goals, whereas frustration of the needs would predict mastery-avoidance and performance-avoidance goals, followed by achievement goals predicting well-being and ill-being. They were unsure of the relationship between the needs and performance-approach goals, and noted that the proposed model could be expanded in a number of ways. However, despite Adie and Bartholomew predicting the satisfaction and frustration of basic psychological needs as possible antecedents of achievement goals, this relationship or model has had limited exploration.

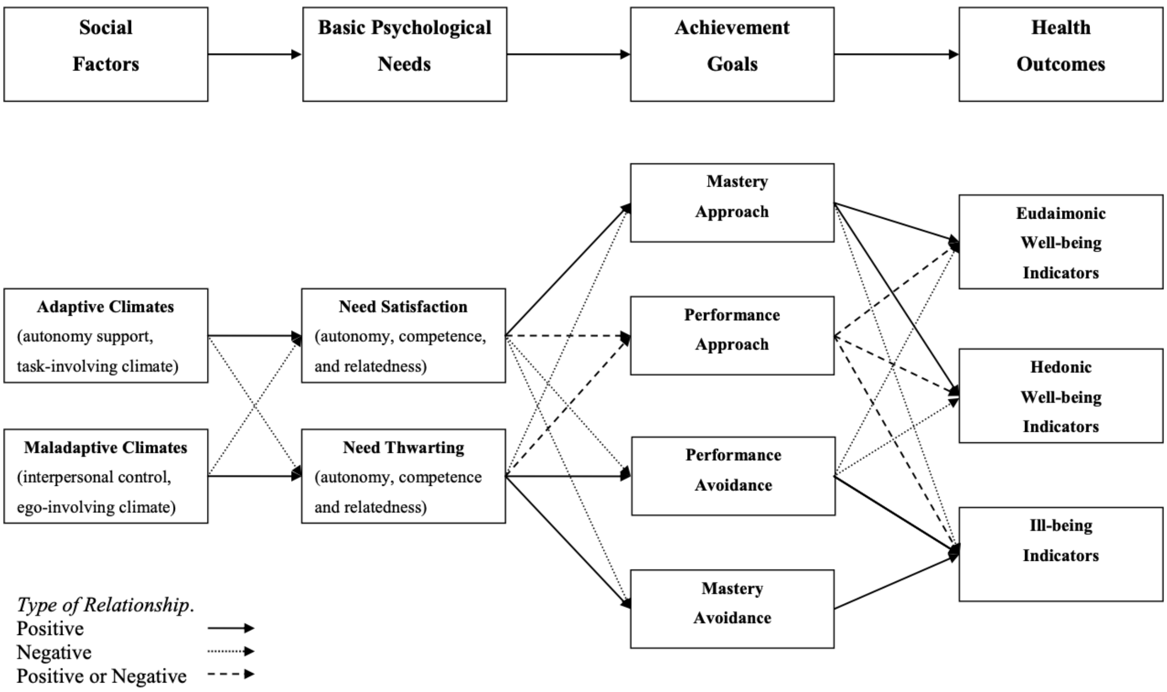

Figure 6. Proposed integrated model of motivation (Adie and Bartholomew, 2013).

Achievement-Relevant Processes and Consequences

The final part of Elliot's HMAM (Elliot, 1999) and Dweck's AMM (1988) constructs are the processes and consequences experienced by individuals in achievement settings. Elliot (1999) described achievement goals as the direct predictors of achievement consequences with each goal predicting different affective, behavioural, and cognitive processes and outcomes. From Dweck's perspective the consequences exhibited by an individual is dependent on perceptions of competence, in addition to the types of goals adopted and beliefs endorsed. The adoption of mastery goals leads to an adaptive behavioural patterns which include seeking challenges, high effort, persistence, and effective learning strategies (Dweck and Reppucci, 1973; Dweck, 1975, Diener and Dweck, 1978, 1980). In contrast, the consequences associated with performance goals are more complex with perceived competence moderating the effects of the goals on achievement-relevant processes and consequences. If an individual believes their perceived competence is high then the adoption of performance goals will lead to adaptive behaviour patterns, akin to mastery goal adoption. However, if the individual believes their perceived competence is low then the adoption of performance goals will display maladaptive helpless consequences, such as avoiding challenges, low effort, low persistence, and deteriorating performances when facing difficulties. In contrast, Elliot (1999, 2005) places achievement goals as the proximal predictors of achievement-relevant processes and outcomes. Perceived competence is considered as an antecedent of achievement goals and not a moderator of the effect of goals on the outcomes an individual experiences. Consequently, Elliot (1999, 2005) proposed that the adoption of mastery-approach goals leads to an abundance of positive outcomes due to its focus on developing competence. The adoption of performance-avoidance goals predicts largely negative patterns of consequences for individuals because of the focus on avoiding incompetence. The processes and consequences linked to mastery-avoidance goals are considered to be more negative than mastery-approach goals but more positive than the outcomes associated with performance-avoidance goals. While the outcomes associated with performance-approach goals are deemed the most complex due to multiple underlying motives. Performance-approach goals can be stimulated by a range of antecedents including the need to achieve and fear of failure which impacts the type of outcomes produced. If performance-approach goals are adopted with an approach focus such need satisfaction, then positive processes and consequences can occur for the individual. In comparison, Elliot (1999, 2005) described that if the goal is adopted with motives different to its approach focus, such as need frustration, then it is linked to more constrained positive consequences and some negative processes and outcomes.

Multiple Goal Pursuit: A Person-Centred Approach

During the initial creation and development of AGT, it was believed that individuals could only pursue one goal at a particular time and as an result researchers explored and measured them separately (Diener and Dweck, 1978, 1980). However, through work conducted by Nicholls (1989), it was acknowledged that individuals could hold varying degrees of both mastery and performance goals. Similarly, from Elliot's perspective, some argued that the mixed findings and inconsistencies associated with performance-approach goals were the result of individuals simultaneously endorsing performance-approach goals with other achievement goals (Pintrich, 2000c; Harackiewicz et al., 2002). Since then, although there is shared agreement of multiple goal pursuit, what combination of achievement goals that are most beneficial to an individual's optimal performance, motivation, and outcomes is still under debate. Supporters of the *mastery perspective* believe that only pursuing mastery-approach goals yields motivational benefits, and that the simultaneous pursuit of performance-approach goals will come at a cost to the individual, negatively impacting the adaptiveness associated with mastery-approach goals (Midgley et al., 2001; Kaplan et al., 2002). In contrast, advocates of the *multiple goal perspective* suggest that pursuing both approach goals will result in greater benefits and outcomes than if only pursuing one type of achievement goal (Barron and Harackiewicz, 2001; Harackiewicz et al., 2002). Harackiewicz and Sansone (1991) advocated that the additional pursuit of performance-approach goals can help individuals orient towards competence and promote important achievement outcomes. Some of the educational literature has supported this multiple goal perspective, indicating that individuals that displayed high levels of both approach goals had equally or more adaptive educational and motivational outcomes compared to individuals only pursuing mastery-approach goals (e.g., Pintrich, 2000c; Senko et al., 2011; Hornstra et al., 2017). Whilst others have provided evidence for the mastery perspective, identifying that individuals pursuing mastery-approach goals reported the most adaptive achievement and motivational patterns (Shen et al., 2009; Conley, 2012; Gonida et al., 2019). The increased attention and deliberation on multiple goal pursuit in the last 20 years has led to an increase of person-centred approaches as a means of exploration.

Traditionally, the large majority of the achievement goal literature has used a variable-centred approach when exploring how specific achievement-based variables relate with one another. Although this approach has the ability to investigate the relationships between achievement goals in isolation, combination, or interaction, these relationships are assumed to apply to the average individual within the sample, applying an artificial structure on the observed data (Morin and Wang, 2015; Wang, Morin, Ryan et al., 2016). In comparison, person-centred approaches have the ability to identify subgroups of individuals expressing distinct profiles, which has allowed researchers to explore questions about how these achievement goals interact, and the effects these interactions have on a variety of achievement-relevant processes and outcomes (Pastor et al., 2007; Gonçalves et al., 2017). Through analysing individuals' similarities and differences among achievement goals rather than just the relationships among them, it elevates our understanding of achievement goal theory (Morin and Wang, 2015). Person-centred approaches also allows researchers to gain a deeper insight into within-person combinations of achievement goals and individual-level change, thus also shedding light on individuals' achievement goal profiles and changes in an individual's goal configuration. Such profiles, configurations, and trajectories provide practical value as they offer a more overarching perspective on individuals' configuration of motivation-based functioning instead of dividing an individual into different motivation-relevant dimensions (Vansteenkiste et al., 2020). Profiling individuals' achievement goals allows for more tailored interventions targeting key characteristics from the profiles whilst longitudinal research allows research to chart individuals' motivational trajectories over time to examine the evolution of specific profiles. As individuals can hold varying degrees of achievement goals at one particular time, using a person-centred approach to identify the goal profiles and explore the stability and change of individual's configurations gives researchers a more holistic view on how these motivational constructs interact at an intrapersonal level.

Transfer and Transitions in School

A student's adolescent years (10-19 years, World Health Organisation, 2022) has become a psychologically intriguing stage of development for researchers due to the many changes they experience during this time; maturation changes, new educational expectations, shifting societal demands, conflicting role demands, and social relations (Blackwell et al., 2007). These intense changes have shown to be a challenging time for students and have been deemed a critical point in development by researchers and practitioners. The process of transitioning and transferring from one stage of schooling to another are key periods in a student's school career that effects their motivation, achievement, and experiences. Whilst these terms (i.e., transfer and transition) can be used interchangeably, drawing on the terminology used within the educational literature (e.g., Galton et al., 1999, 2003) throughout the thesis the word *transfer* will refer to the move from one school to another and the word *transition* to refer to the move from one year to another within a school.

Since the 1960s, large scale studies have shown particular interest to the cross-institutional transfer being a critical point in students' development (Blackwell et al., 2007; Evans et al., 2018). Within the United Kingdom (UK) the transfer from primary to secondary school is a normative occasion for most children which typically occurs during early adolescence (11 years old). It is also during this time, students experience significant individual development, social development, and environmental changes (Zeedyk et al., 2003). Throughout the decades, researchers have examined the disorientation students can experience when transferring to secondary school, focusing on personal, social, and emotional aspects of transfer (e.g., Murdoch, 1982; Measor and Woods, 1984; Beyon, 1985). A large five year longitudinal study conducted by Galton et al. (see Galton and Willcocks, 1983; Delamont and Galton, 1986) followed a cohort of students in a range of UK feeder schools and investigated students' achievement, motivation, and enjoyment across the transfer from primary to secondary school. The study known as ORACLE (Observation Research and Classroom Learning Evaluation) found 40% of students failed to make the expected progress in the year immediately after the transfer in reading, language skills, and mathematics. Furthermore, although students' motivation and enjoyment increased during the first term after the transfer, by the end of the year both motivation and enjoyment levels had fallen below those sustained in the final term of primary school. A replication of the ORACLE project by Hargreaves and Galton (1999) found similar patterns of results. This study led many researchers to investigate why many students experience such a negative impact after the transfer into secondary school education. Hargreaves (1996) identified three main areas in which transferring to secondary school results in many potential problems for students: student anxiety about transferring, adjustment to a new school and its implications on commitment, achievement and motivation, and the continuity and discontinuity in the curriculum. Contextually, Wigfield et al. (1991) argued that the larger, more competitive secondary school environment accompanied with uncertainty of their abilities relative to others, results in decreases in self-esteem and increases in disengagement. Literature has also identified difficulties to adjusting to the new environment, making friends, and anxiety meeting school demands can negatively impact on students' motivation, enjoyment, and achievement (Youngman, 1978; Delamont and Galton, 1986; Hargreaves and Galton, 1999; Akos et al., 2015; Schaffhuser et al., 2016; Evans et al., 2018). Moreover, the stage-environment fit perspective suggests decline in students' motivation across the transfer is the result of a mismatch between students' needs and the school environment not facilitating positive development (Eccles and Roeser, 2009). For example, students' need for adopting mastery goals as they enter secondary school, wanting to learn, and development new and current skills. These are countered by, the school environment's increased focus on grouping by ability, and greater emphasis on demonstrating normative ability during a time where a student is becoming increasingly more self-conscious (e.g., Eccles and Midgley, 1989; Eccles et al., 1993; Meece et al., 2006).

From an achievement goal perspective, the transfer into secondary school coincides with Nicholls' notion of children's understanding of the concepts of effort and ability. At around the age of 12, children start to incorporate social comparison when evaluating their own competence and perceive that higher ability is when the same level of performance is achieved but with less effort (Bong, 2009). The secondary school environment likely facilitates this differentiated conception of ability with the increased emphasis on competition and social comparison. During a time when students become more self-conscious, skill-based subjects such as PE, where students are physically on display throughout the lesson, and are more aware of their peers' level of competence in comparison to themselves, can as a result impede positive development (e.g., Ntoumanis et al., 2009; Spray et al., 2013). Subsequently, the shift from mastering and developing skills in primary education to normative achievement standards in secondary education, makes it more likely for students to adopt an achievement goal that focuses on normative comparisons.

In comparison to the transfer into secondary school education, research on students' within-school transition experiences is far more limited despite being a time where decreases in achievement and motivation are most likely to occur. Ruddock et al. (1998) conducted a five year longitudinal study where they followed students from Year 7 to the end of Year 11. They identified a decline in commitment to learning and loss of motivation towards the end of Year 7 and into Year 8, and a lack of identity of Year 8 students compared to other year groups. Ruddock et al. (1998) longitudinal study also found that students' engagement with learning weakened towards the end of Year 7 and 8, resulting in slower academic progress. Several reasons were put forward by teachers and researchers to explain the drop in motivation and academic performance during this period; focusing on aspects of school organisation as well as the perceptions and experiences of students (see Ruddock et al., 1998, Galton et al., 1999). Some accounted possible loss of momentum once the novelty of the move to the 'big school' starts to wear off. Once students feel settled in secondary school, if they are not excited and challenged by lessons then relationships with peers can become the dominant interest, and anti-work cultures can quickly develop which capture students who are bored and restless (Day, 1996). In contrast, Ruddock et al. (1998) discussed that Year 8 students have a low profile in most schools due to their lack of distinctive identify and are seen by students and often by teachers as less important than other years. A greater priority is needed for these students transitioning into secondary school to help sustain their commitment to learning during difficult periods (Galton et al., 1999). How students negotiate these academic changes (both transfer and transition) can have implications for their academic futures. Some students struggle in the face of such challenges whilst others are resilient and flourish during these times (Dweck and

Sorich, 1999; Eccles et al., 1991; Wigfield and Eccles, 2002). Examining students achievement goals across the transfer from primary to secondary school and over key transitions can help identify and address the educational motivational problems so prevalent in adolescence.

Review of Research Evidence

Achievement Goals

Since Elliot et al. (1996, 1997, 1999) proposal of the approach-avoidance distinction as an advancement to the dichotomous model, empirical evidence has supported the 2x2 framework and has displayed its practicality within settings such as education and sport (e.g., Harackiewicz et al., 2008; Cecchini Estrada et al., 2011; Hsu et al., 2017; Lochbaum et al., 2020). In general, literature within these settings has revealed mastery-approach goals have been consistently associated with adaptive processes and outcomes including effort, persistence, self-efficacy, intrinsic motivation, interest, and physical activity intentions (e.g., Grant and Dweck, 2003; Harackiewicz et al., 2008; Liem et al., 2008; Lochbaum et al., 2020). Hulleman and Senko (2010) described mastery-approach goals' only imperfection was its weak and inconsistent relationship with achievement. In contrast, the research on mastery-avoidance goals has been more limited (Senko and Freund, 2015). Mastery-avoidance goals are typically less endorsed than other achievement goals especially within student populations, with younger students struggling to understand the focus of 'not losing competence' (Senko and Freund, 2015; Karakus, 2016). However, studies that have explored mastery-avoidance goals, indicated that the goal is associated with more negative patterns of motivational processes and outcomes compared to mastery-approach goals and often similar to performance-avoidance goals (Moller and Elliot, 2006; Hulleman et al., 2010; Senko and Freund, 2015). For example, mastery-avoidance goals have been correlated with anxiety, poor achievement, low task interest, and ineffective task strategies (e.g., Elliot and McGregor, 2001; Howell and Watson, 2007; Putwain and Daniels, 2010; Corrion et al., 2010; Wang, Morin, Ryan et al., 2016).

In comparison to mastery goals, early work on performance goals produced mixed empirical patterns, however, the approach-avoidance distinction revealed that the majority of negative outcomes were associated with performance-avoidance goals (e.g., Dweck and Leggett, 1988; Ames, 1992; Rawsthorne and Elliot, 1999; Hulleman et al., 2010). Such maladaptive consequences included high anxiety, help avoidance, self-handicapping, low achievement or performance, and low interest (e.g., Elliot and McGregor, 2001; Midgley and Urdan, 2001; Elliot and Moller, 2003; Hulleman and Senko, 2010; Lochbaum and Gottardy, 2015). Whilst, performance-approach goals have displayed positive correlations with outcomes such as performance, effort, persistence and achievement within the classroom, however, the same goals were also associated with anxiety, cheating, and self-handicapping (e.g., Kavussanu and Roberts, 2001; Harackiewicz et al., 2002; Elliot and Moller, 2003; Ommundsen, 2004; 2006; Darnon et al., 2007; Morris and Kavussanu, 2009; Lochbaum et al., 2020). Evidence shows that despite the clarification afforded by the approach-avoidance distinction, some discrepancies in the empirical pattern remain. This was highlighted by a meta-analytic review of the measurement and conceptualisation of achievement goals (Hulleman et al., 2010), that found the measurement and manipulation of the performance approach-avoidance distinction did not distinguish between competition and appearance components.

Despite the theoretical work on the competition and appearance distinction, there has been limited exploration of this in either the sport and education domains. Two reviews (Hulleman et al., 2010; Senko and Dawson, 2017) compared the effects of appearance and competition performance-approach goals on a range on achievement outcomes within the educational setting. Hulleman et al. (2010) found that appearance-focused goals (e.g., looking good to others) negatively predicted achievement, while competition-focused goals (outperforming others) positively predicted achievement. Senko and Dawson (2017) also tested performance goal effects on numerous educational outcomes and found similar emerging patterns. The endorsement of appearance-based performance goals were found to have null or undesirable effects such as help-avoidance, self-handicapping, and anxiety. In comparison, the endorsement of competition-based performance goals produced null or desirable effects such as positive affect, self-efficacy, and effective self-regulation. These patterns have been confirmed by studies of both school and college students (Grant and Dweck, 2003; Edwards, 2014; Warburton and Spray, 2014; Senko and Tropiano, 2016; Chung et al., 2020). Within the PE setting, Warburton and Spray (2014) found support for the appearance-competition distinction as students as young as eleven years old were able to distinguish between the approach-avoidance and appearance-competition elements in PE lessons. They recommended that future research should seek to identify whether multiple performance goals are pursued within sport and educational settings, as well as the independent and interactive effects of pursuing combined performance goals.

More recently, this distinction was experimentally manipulated and compared their effects on interest, performance, and anxiety in early adolescents and college students (Chung et al., 2020). Across the three studies conducted, Chung et al. (2020) found that students assigned to the appearance-focused condition displayed significantly higher anxiety and lower interest compared to students in the competition-focused and mastery-approach goal conditions. Findings suggested that students wanting to prove their ability to others (appearance goal) while under challenging situations, were more vulnerable to negative outcomes compared to students wanting to perform better than others (competition goal) or improve their competence (mastery-approach goal). Although students that strived to outperform others reported performance benefits, students that focused on developing their competence and learning new skills exhibited the highest level of persistence and positive outcomes. Highlighting the importance of creating a learning environment which focuses on learning and performing well, without students worrying about the evaluation of their ability (Chung et al., 2020). Evidence from these studies suggests the need to examine appearance and competition performance goals separately if researchers are to make informed predictions regarding the nature and function of performance goals in achievement contexts.

Since its development, the 3x2 framework (Elliot et al., 2011) has yielded interest from researchers and the exploration of relationship patterns between the 3x2 goals and motivational outcomes (e.g., Elliot et al., 2011; Mascret et al., 2015; Méndez-Giménez, 2014, 2017) . Within education, Elliot et al. (2011) found that task-approach goals were consistently adaptive for intrinsic motivation and affect learning, whilst self-approach and other-approach goals produced moderate adaptive associations with energy levels in class, test performance, and affective learning. In contrast, self-avoidance and other-avoidance goals were correlated with maladaptive outcomes (e.g., low absorption/energy in class, low test performance levels, and high test concerns). Subsequent research within the educational domain have supported the adaptive nature of task-approach goals, and the maladaptive nature of avoidance goals (task, self, and other), however, questions remain over the adaptiveness of self-approach and other-approach goals (Brondino et al., 2014; Diseth, 2015; Méndez-Giménez et al., 2017). Both goals produced inconsistent patterns with positive educational outcomes (e.g., positive emotions, learning strategies, self-efficacy, self-determined motivation, and life satisfaction), and requires further investigation on how adaptive these achievement goals are for students (Diseth, 2015).

Conceptually, the task-based, self-based, and other-based approach differentiation is relevance to the sports domain as individuals may focus on completing a task, how they are doing relative to past success, or doing better than others (Mascret et al., 2015). When exploring the 3x2 model within the sports setting, Mascret et al. (2015) study indicated that students' goals were separable with regards to the definition (task, self, or other) and valence (positive versus negative) components of competence. They found that task-based and self-based goals exhibited a similar nomological network but interestingly discovered that perceived competence was positively correlated with task goals but unrelated with self-goals. This suggested that within sporting settings, individuals with high perceived competence gravitate towards striving for successful completing of an activity or task. These mixed effects of perceived competence on the dynamics of achievement goal adoption has been found previously in the PE setting with the 2x2 model (e.g., Warburton and Spray, 2008, 2009, 2013). They found that perceived competence was more influential in specific activities, whereas at a contextual level, perceived competence had little effect on achievement goal adoption. These findings may be the result of the approach goals not differentiating between task, self, and other standards of competence. Evidence from these two studies emphasise the need to explore these standards to competence separately and examine the similarities and differences in the nomological network of task-based and self-based approach goals especially.

Similar to the findings in the educational setting, there has been inconsistencies regarding the adaptiveness of self-based approach goals within the PE context. Méndez-Giménez et al. (2014) established that task-based approach goals produced the most adaptive patterns followed by other-approach goals. Self-based approach goals were only found to be positively correlated with some adaptive patterns. In contrast, Mascret et al. (2015) found that self-based approach goals were more adaptive than other-approach goals. Gender and age differences have also been established, with younger students scoring higher on task-based and self-based approach goals compared to other-approach goals, whilst male students scored higher on task-approach, other-approach, and other-avoidance goals compared to females (Méndez-Giménez et al., 2018). Supporting the notion that male students are more oriented to doing better or avoid doing worse than their peers than female students in both the general academic context and in PE (e.g., Moreno et al., 2008; Schwinger and Wild, 2012; Wu, 2012; Dekker et al., 2013). Whilst these studies have provided support for the expansion of the achievement goal model through separating task-based and self-based approach goals, research on these more complexed conceptualisations of achievement goals remains limited. Research needs to explore the temporal patterns of these goals and how these goals interaction within an achievement setting.

In the HMAM, Elliot (1999) suggested that demographic variables such as sex were an antecedent of achievement goal adoption. Yet, research exploring sex differences on achievement goals has been ambiguous. A review conducted by Meece et al. (2006) in the educational domain concluded no clear patterns of sex differences in students' achievement goals. However, when sex differences were observed, female students were more likely to adopt mastery goals whilst male students were more likely to adopt performance goals (e.g., Anderman and Young, 1994; Ryan et al., 1997; Anderman and Midgley, 1997; Elliot and McGregor, 2001). Support for these empirical patterns have also been found in the physical domain. Reviews conducted in PE and sport (e.g., Jaitner et al., 2019; Lochbaum et al., 2020) found female students scored significantly higher for mastery-approach and mastery-avoidance goals (e.g., Digelidis and Papaioannou, 1999; Cecchini Estrada et al., 2011; Barić et al. 2014), whilst male students scored higher in performance goals (e.g., Walling and Duda, 1995; Carr and Weigand, 2001; Flores et al., 2008; Cecchini Estrada et al., 2011; Moreno-Murcia et al., 2011). Conversely, some PE-based studies found no significant sex differences (e.g., Tzetzis et al., 2002; Agbuga, 2010).

Similarly, age is another influential antecedent in predicting changes in achievement goal adoption. When conceptualising his theory, Elliot et al. (Elliot, 1994, 1999; Elliot and Harackiewicz, 1996; Elliot and Church, 1997) conducted their research using university students, whom have a differentiated concept of ability, are easily able to distinguish between definition and valance of competence, in an academic environment that's driven by grades and performance. Questions were raised if goal adoption and its effects were unique to age and educational context (e.g., Midgley et al., 1989, 1993, 2001; Hulleman and Senko, 2010). Subsequent cross-sectional studies exploring students in compulsory education found that younger students were more likely to endorse mastery goals. However, this adoption decreased as students became older (Digelidis and Papaioannou, 1999), with students becoming increasingly more performance goal focused (Anderman and Anderman, 1999; Jacobs et al., 2002; Theodosiou et al., 2008; Bong, 2009). While, longitudinal studies exploring the transfer to secondary school have found lower endorsement of mastery goals and greater adoption of performance goals in English and mathematics after the transfer (Anderman and Midgley, 1997; Anderman and Anderman, 1999; Warburton and Spray, 2008, 2009).

A PE-focused systematic review (Jaitner et al., 2019) identified that the majority of studies reported significant effects between age and achievement goals. However, results varied with some studies finding older students to be more inclined to endorse performance goals than younger students (e.g., Xiang and Lee, 2002; Theodosiou et al., 2008). Whereas, others found the opposite for performance-approach goals (Agbuga and Xiang, 2008). Moreover, Barić et al. (2014) found that older students were more mastery and performance oriented. In relation to the development and changes of students' achievement goals as they become older, Paulick et al. (2013) discussed two perspectives of theory and research; a developmental perspective and an educational perspective. From the developmental perspective, Nicholls (1984) argued that students' mastery goals decline and performance goals increase during adolescence as a consequence of cognitive development, for example, when their conception of ability becomes differentiated. In comparison, those in the educational perspective believe that the transfer from primary to secondary school is the main factor in decline of motivation during early adolescence with various studies confirming a decline in all achievement goals during this period (e.g., Shim et al., 2008; Bong, 2009). The literature has displayed the plethora of sex and age differences in achievement goal adoption, however, the majority of this research has been focused on the approach-avoidance distinction (i.e., 2x2 model). Although the 3x2 model and the appearance-competition distinction provides more clear and precise definitions of achievement goals, these nuances lack exploration compared to other achievement goal frameworks. These goals require attention and identify if similar sex and age differences are produced to the current literature patterns.

Antecedents of Achievement Goals

Implicit Theories of Ability

The physical and educational domain literatures have found that approach and avoidance achievement goals have been associated with a plethora of antecedents. In particular, the relationship between these goals and implicit theories of ability has been well documented throughout the achievement literature (e.g., Biddle, Wang, Chatzisarantis et al., 2003; Warburton and Spray, 2008, 2009, 2013; Burnette et al., 2013; Liu, 2021). In support of the pathway proposed in the AMM (Dweck and Leggett, 1988), research conducted in the educational and physical settings has found that the endorsement of incremental beliefs are associated with the adoption of mastery goals, whilst the endorsement of entity beliefs leads to the adoption of performance goals (e.g., Dweck and Leggett, 1988; Sarrazin et al., 1996; Biddle, Wang, Chatzisarantis et al., 2003; Warburton and Spray, 2008, 2009, 2013; Burnette et al., 2013; Liu, 2021).

A meta-analytic review (Burnette et al., 2013) revealed that within the academic domain, the negative associations between implicit theories and performance goals was stronger for performance-avoidance goals than performance-approach goals. In addition, positive correlations of implicit theories with mastery goals, found stronger links with mastery-approach goals than mastery-avoidance goals. While, within the sports literature, Spray, Warburton et al. (2006) through experimental manipulation, found entity beliefs led to performance goal adoption, and an incremental belief led to mastery goal adoption, before and after experiencing failure. However, they identified that manipulating implicit theories in the PE setting was more difficult than other education settings. They argued that students in PE were more likely to be predisposed to incremental beliefs, and that the type of physical activity influenced which implicit theory the students would endorse. For example, Spray and Warburton (2003) found that in gymnastics-based activities, students were more likely to hold entity beliefs, whereas, in games-based games (i.e., netball and football), students were more likely to hold incremental beliefs. Numerous studies within the sports domain have shown that entity beliefs were positively related to both performance-approach and avoidance goals (e.g., Cury et al., 2002; Stevenson and Lochbaum, 2008; Warburton and Spray, 2008, 2009, 2013; Moreno et al., 2010; Riou et al., 2012), whereas there has been mixed findings between the relationship for incremental beliefs and mastery-approach and avoidance goals. Although the relationship between incremental beliefs and mastery-approach goals has been well established (e.g., Stevenson and Lochbaum, 2008; Corrion et al., 2010; Moreno et al., 2010; Riou et al., 2012; Warburton and Spray, 2013; Stenling et al., 2014), there have been varied findings for the relationship between incremental beliefs and mastery-avoidance goals. Some studies have identified a positive correlation with mastery-avoidance goals (e.g., Wang et al., 2009; Corrion et al., 2010) whilst others have found no association (e.g., Stevenson and Lochbaum, 2008; Warburton and Spray, 2008).

In more recent years, literature has explored the relationship between implicit theories and the 3x2 framework within the sports context (Mascret et al., 2015). Mascret et al. (2015) reported that entity beliefs were positively related to other-based approach and avoidance goals, while incremental beliefs were positively associated with task-approach and self-approach goals. However, task-based and self-based avoidance goals did not produce any significant correlations with incremental beliefs. In contrast, despite the prevalence of the competition and appearance elements in educational research (e.g., Urdan and Mestas, 2006; Elliot and Murayama, 2008; Hulleman et al., 2010; Warburton and Spray, 2014), no research has examined this distinction's relationship with implicit theories. However, based the relationship between implicit theories and the 2x2 model, entity beliefs should predict both appearance-based and competition-based performance goals. Despite the introduction of the 3x2 model (Elliot et al., 2011) and the competition-appearance distinction for performance goals, there has been little research on the relationship between this model and implicit beliefs compared to other achievement goal constructs (i.e., dichotomous, trichotomous and 2x2 models). Future research should explore these associations especially in settings where different implicit beliefs can be held based on the type of activity (i.e., PE).

Basic Psychological Needs

Research investigating the satisfaction of the three basic needs has become fruitful in recent years, with studies showing that the satisfaction of all three needs have consistently predicted autonomous motivation, psychological and physical well-being (e.g., Reeve and Jang, 2006; Adie et al., 2008; Williams et al., 2011; Milyavskaya and Koestner, 2011; Mouratidis et al., 2011; Warburton et al., 2020). However, whilst the basic psychological needs have been proposed to be theoretically associated with achievement goals (Deci and Ryan, 2000; Kaplan and Maehr, 2007; Adie and Bartholomew, 2013), very few studies have examined the predictive nature of these needs with achievement goals. Across the educational literature, support has been found for a positive association between need satisfaction and mastery goals in undergraduate students (Ciani et al., 2011) and secondary school students (Diseth et al., 2012). It was also identified that need for competence and relatedness directly predicted mastery goals, while the need for autonomy indirectly predicted mastery goals through self-efficacy. Theis et al. (2020) found similar findings, with perceived fulfilment of the need satisfaction correlated significantly with mastery goals. In contrast, there has been mixed support for the relationship between need satisfaction and performance goals. A positive indirect relationship was found between need satisfaction and performance-approach goals in secondary school students (Diseth et al., 2012), however, with undergraduate students, no associations between need satisfaction and performance-approach or performance-avoidance goals were identified (Ciani et al., 2011).

Several studies have investigated the relationship between need satisfaction and achievement goals across the transfer into secondary school and university (Duchesne, Ratelle et al., 2017; Janke et al., 2022). Duchesne, Ratelle et al. (2017) found that the satisfaction of students' psychological needs predicted the adoption of mastery goals and the reduction of performance-avoidance goals across the primary to secondary school transfer. Two relational patterns emerged from their findings; the satisfaction of autonomy and competence predicted mastery goals through academic adaptation, while the satisfaction of autonomy and relatedness predicted lower adoption of performance-avoidance goals via their social adaptation. Their results provided the first evidence of the importance of psychological need satisfaction for predicting achievement goals across the transfer into secondary school. More recently, Janke et al. (2022) explored the associations between psychological needs and mastery goals across the transfer into university. They found students that felt autonomy and competence satisfaction during the first semester reported higher levels of mastery goals. The literature highlights the limited work on the relationship between need satisfaction and achievement goals, especially using recent developments of achievement goals (e.g., 3x2 model and the appearance-competition distinction) and with younger students. Whilst, consistent patterns have been shown between need satisfaction and mastery goals, further investigation over the relationship between need satisfaction and performance-approach goals is needed.

Whilst the literature exploring need satisfaction and achievement goals is beginning to develop, little to no focus has been made to the relationship between need frustration and achievement goals. With the exception of Janke et al. (2022), this is somewhat surprising given that there is consistent evidence showing a link between need frustration, controlled motivation, and a range of maladaptive outcomes such as exhaustion, burnout, negative affect, and disengagement (e.g., Stebbings et al., 2012; Bartholomew et al., 2014; Costa et al., 2014; Teixeria et al., 2018; Warburton et al., 2020). Moreover, researchers have also argued that the frustration of basic psychological needs plays a role in the decline of motivation at the beginning of adolescence (e.g., Eccles et al., 1993; Eccles and Roeser, 2011; Wang and Eccles, 2012; Paulick et al., 2013). However, in a recent study, Janke (2022) investigated the effect of the frustration of students' basic psychological needs on the development of their mastery goals. They anticipated that need frustration may not only just predict a negative trajectory of mastery goals, but also reduce the stability of mastery goals over time. Using latent growth curve modelling, results revealed that students' mastery goals declined over time, whilst simultaneously experiencing increasingly stronger autonomy frustration.

Collectively, the evidence for need frustration and achievement goals has been limited. Although Janke et al. (2022) study implied that increased autonomy frustration led to decreased mastery goal adoption, with limited evidence it is too early to conclude if need frustration may or may not facilitate goal striving. Janke et al. suggested that it is certainty possible for need frustration to facilitate less desirable goal striving such as performance-approach and performance-avoidance goals, thus deeper investigations into the associations between needs frustration and achievement goals are warranted.

Achievement Goals and Outcomes

Across both physical and education domains, researchers have investigated achievement goals and their affective, behavioural, and cognitive outcomes. Mastery-approach goals have been associated with a plethora of positive outcomes, such as intrinsic motivation, positive affect, effort, persistence, and interest (Harackiewicz et al., 2008; Liem et al., 2008; Lochbaum et al., 2017, 2020). Both mastery-avoidance and performance-avoidance goals have been linked with negative patterns of motivational outcomes such as anxiety, help-avoidance, self-handicapping, low achievement, and low interest (e.g., Elliot and McGregor, 2001; Midgely and Urdan, 2001; Elliot and Moller, 2003; Hulleman and Senko, 2010; Senko and Freund, 2015). In comparison, performance-approach goal effects have produced inconsistent findings including: achievement, pride, positive affect, high effort intensity, and challenge seeking, but also anxiety, negative affect, self-handicapping, and effort withdrawal (Midgley et al., 1996; Hulleman et al., 2010; Huang, 2011; Senko et al., 2013).

Cognitive Anxiety

Throughout their school career, students are faced with different kinds of tasks and evaluations which can induce cognitive anxiety (Putwain et al., 2010). The school setting can continuously produce testing situations which provide plentiful reasons for students to feel anxious: the transfer into secondary school, an environment which values and focuses on normative ability, uncertain outcomes, emphasis on competition, and social comparison (Putwain et al., 2010; Danthony et al., 2020). Cognitive anxiety refers to negative thoughts that arise during situations that may interfere with performance (Putwain et al., 2010). Certain aspects of cognitive anxiety such as worry and concentration disruption have been popular and important outcomes to explore within these environments (e.g., Jang and Liu, 2012; Shim and Finch, 2014; Paul et al., 2021; Danthony et al., 2020). Worry refers to self-doubts and concerns about performance failure and negative social evaluation. Whilst concentration disruption refers to the lack of concentration on a task and cognitions unrelated to competition (Morris and Kavussanu, 2009). A range of studies have shown that high levels of anxiety can impact a student's memory, academic performance, and their well-being (e.g., Steinmayr et al., 2016; Chin et al., 2017; Owens et al., 2012). Research examining the relationship between performance goals and anxiety found that performance-avoidance goals positively predicted anxiety, while performance-approach goals produced no significant correlations (Elliot and McGregor, 1999, 2001; McGregor and Elliot, 2002; Sideridis, 2008). Other researchers have identified that both mastery-avoidance and performance-avoidance goals positively predicted worry, whilst both approach-based goals were negatively associated with worry (Putwain et al., 2010; Putwain and Symes, 2012). In the academic setting, research has investigated the 3x2 framework and its associations with cognitive anxiety amongst university students (Flanagan et al., 2015). Other-avoidance goals were related to higher levels of worry, whereas task-approach goals were related to lower levels of cognitive anxiety (Flanagan et al., 2015).

Physical contexts such as PE involve both learning (cognitive element) and practicing (physical element) of physical skills in front of the teacher and peers (Barkoukis et al., 2005). This exposure to others can be particularly stressful during times of evaluation and assessments as results are immediately acquired by the individual and others, which can lead to social pressures (Barkoukis et al., 2005; Liukkonnen et al., 2010; Warburton, 2017). Across the PE literature, support has been found for the positive correlation between cognitive anxiety (i.e., worry and concentration disruption) and mastery-avoidance and performance-avoidance goals in secondary school PE (e.g., Cury et al., 2002; Morris and Kavussanu, 2009; Danthony et al., 2020). Moreover, both approach-based goals (mastery and performance) negatively predicted cognitive anxiety (e.g., Cury et al., 2002; Morris and Kavussanu, 2009; Danthony et al., 2020). More recently, Danthony et al. (2021) investigated the relationship between anxiety and the

3x2 framework within the PE setting. They identified that task-avoidance and self-avoidance goals positively predicted the four factors of anxiety while task-approach and self-approach goals negatively predicted them. However, the majority of the literature has been cross-sectional when exploring achievement goals and students' cognitive anxiety, studies should track students' goals and the impact on their anxiety through key academic transfers and transitions (e.g., primary to secondary school, and older students when academic demands increase).

The literature examining sex and age differences on students' anxiety have produced consistent pattern of results (e.g., Putwain, 2007; Putwain and Daly, 2014; Danthony et al., 2020, 2021). Studies within the education setting have found female students had higher anxiety scores than male students, especially on the emotionality element of anxiety (e.g., Putwain, 2007; Putwain and Daly, 2014; Torrano et al., 2020). In addition, a positive relationship has been found between anxiety and age, with younger students less likely to display cognitive anxiety, whilst older adolescent students are more likely to display higher levels of anxiety due to higher academic demands and social evaluation (e.g., Danthony et al., 2020; Torrano et al., 2020). Gender differences have often occurred within the PE domain, with sports or activities often gender typed and in a social evaluated setting (Danthony et al., 2021). During PE lessons, female students often experience more anxiety than boys, especially components such as worry and self-focus (e.g., Mouratidis et al., 2009; Putwain, 2007; Putwain and Daly, 2014; Danthony et al., 2020). Future studies using a longitudinal perspective would allow researcher to identify the temporal patterns of students' cognitive anxiety throughout their school career.

Physical Activity Levels

The health benefits for children to lead a physically active lifestyle have been well documented, with many large-scale reviews demonstrating the positive impact on children's physical, psychosocial, and intellectual development (Chalkley and Milton, 2021). Despite the substantial evidence, there continues to be a steep decline in physical activity involvement in early adolescents and children not meeting the World Health Organisation's physical activity guidelines of at least 60 minutes of daily moderate-to-vigorous physical activity (Pate et al., 2005; Shen et al., 2009; WHO, 2010). There continues to be increasing concern regarding the amount of early adolescents adopting a sedentary lifestyle despite the profound effects on their physical and mental health (e.g., Biddle et al., 1998, 2004; Standage et al., 2003; Wu et al., 2017; Park et al., 2020). On average, adolescent females seem to be the most at risk group of displaying declining physical activity levels. Mayo et al. (2020) conducted a large European study, which found that males aged between 9 and 15 years old, spent between 20% to 36% more time being physically active each day than their female counterparts.

One context in which health enhancement and physical activity are key concepts is PE (Sallis et al., 1992; Standage et al., 2003). Across all children and early adolescents, PE is the main avenue in promoting and building lifelong participation, skills, and motivations (Lochbaum et al., 2020). Thus it is important to explore what achievement goals students adopt within PE, and their associations with physical activity levels outside of PE lessons, then consequently their desire to participate in sporting interests beyond school. Previous studies in PE have found that mastery-approach and performance-approach goals reported the highest levels of physical activity participation (Wang, Morin, Liu et al., 2016; Lochbaum et al., 2020). Lochbaum et al. (2020) concluded that the correlations with physical activity highlights the importance mastery-approach goals play in reducing the physical inactivity in children (e.g., Aubert et al., 2018; Lera-López and Marco, 2018). Given the evidence showing the positive impact pursuing approach goals (especially mastery-based ones) has on physical activity levels and intentions, however, are there certain elements of these goals (i.e., task, self, competitive, or appearance) that play a more significant role in students' physical activity levels than other goals?

Physical Self-Worth

How an individual perceives their body can be one of the most influential factors that can impact their psychological well-being, particularly during adolescence (Fernández-Bustos et al., 2019). Physical self-worth represents perceptions of the self within the physical context and is the evaluation of one's own good or worth in their self-description (Whitehead, 1993; Kosmidou et al., 2013). Through their research, Fox and Corbin (1989) proposed that physical self-worth was a superordinate representation of the combination of sport competence, physical condition, physical strength, and body attractiveness; reflecting the overall feelings of self-respect, satisfaction, pride, and confidence in the physical self. Other research has indicated that physical appearance and body attractiveness were key sub-facets of physical self-worth (Marsh and Redmayne, 1994; Fox, 1990). The literature highlights that these presentation-related elements were essential components of physical self-worth, with high levels indicating adequacy with appearance, whilst low levels represented concerns with these aspects of the physical self. Lowering levels of physical self-worth have been attributed to pubertal changes, identity development, abstract thinking about one's self, and changing in roles and responsibilities (Haugen et al., 2011). Body dissatisfaction can be high within settings such as PE, when on physical display to their peers and teacher, resulting in students becoming more self-conscious (Fernández-Bustos et al., 2019). General patterns have shown that younger students have relatively high physical self-worth, however this gradually declines as they become older especially among females during adolescent years (Hagger et al., 2010;

Kantanista et al., 2015). Exercise and physical activity have been shown to have a positive effect on physical self-worth, with teenage athletes reporting stronger physical self-worth compared to other populations (Welk et al., 1995; Kosmidou et al., 2013).

The relationship between physical self-worth and motivational constructs such as achievement goals are important for teachers to understand what environment needs to be promoted that encourages positive feelings of competence and self-worth enhancement (Georgiadis et al., 2001). Literature has shown significant positive associations between physical self-worth and approach goals, and significant negative correlations between physical self-worth and avoidance goals (e.g., Elliot and Sheldon, 1997; Elliot and McGregor, 2001; Kavussanu, 2007; Hagger et al., 2011; Kosmidou et al., 2013). Research has also implied that the type of sport or activity can impact students' physical self-worth (Kosmidou et al., 2013). Students in team sports have reported higher levels of physical self-worth than individual-based sports (Slutzky and Simpkins, 2009). These findings suggest that the relationship between approach goals and physical self-worth can be further explored using the task-based and self-based standards of competence, and the competition-appearance elements of performance-approach goals. In addition, how longitudinally the temporal patterns of achievement goals and physical self-worth would change across primary and secondary school PE.

Teacher-Reported Behavioural Outcomes

Whilst the majority of studies have used self-reported measures when investigating the relationships between achievement goals and student outcomes, the addition of teacher-reported behavioural measures provides further evidence on students' goal adoption from a different perspective. Research from the American College of Training (ACT, 2013) concluded that having both teacher-reported and student-reported measures on students' motivation can provide significantly better predictions on outcomes than either perspective alone. Teachers' observations of their students' behaviour within lessons provides an essential source of input that is complementary to student self-reported measures. Measuring both perspectives can help clarify expectations, provide supplementary information to educators regarding students' strengths and weaknesses, and lead to more targeted instructions of students. ACT (2013) argued that along with traditional academic measures such as test scores and grades, it is important to examine behavioural aspects to better identify students that are flourishing and individuals that need further help and support.

The empirical associations between achievement goals and distinctive academic processes and consequences have been explored extensively over the years (for reviews see Maeher and Zusho, 2009; Anderman and Patrick, 2012; Senko, 2016). Amongst these studies, some have investigated students' effort, attainment, engagement, and disaffection in the classroom. Students' effort refers to the total amount of energy used in the process of learning (Zimmerman and Risemberg, 1997), whilst attainment is a measurement of students' achievement which compares them to a standardised expectation for their age level. Teachers will follow an attainment criteria to identify what elements each student has managed to complete or achieve. Boiche et al. (2008) suggested that teachers and particularly PE teachers have been shown to prefer hardworking students regardless of their level of ability. They also proposed that teachers take into account initial characteristics of their students such as effort, motivation, and performance to form expectations on their achievement, and impact on the attainment grade given at the end of the teaching cycle (e.g., Jussim and Eccles, 1992; Trouilloud et al., 2002). Engagement is defined as the initiation of motivated actions and the continuation of these actions when faced with difficulties and obstacles (Skinner et al., 2009).

There are two main dimensions of engagement that a student may exhibit simultaneously or in isolation, behavioural and emotional. The behavioural dimension involves effort, attention, and persistence during learning activities and class participation. This dimension is the most frequently measured for national indicators of student experience (Kuh, 2009; Zepke, 2014). Positive behavioural engagement is measured through observable academic performance including: attendance, effort on tasks, contribution, positive conduct, participation in class, involvement in activities, perseverance, and resiliency when faced with challenging tasks (Klem and Connell, 2004; Kahu et al., 2015). In contrast, emotional engagement reflects positive emotions such as enjoyment, interest, and enthusiasm experienced when learning. Students with high emotional engagement are able to identify the meaning and purpose of the tasks and social interactions (Schaufeli et al., 2002; Bowden et al., 2021). Students that are actively engaged in lessons is seen as a vital component for them to be adaptable, resilient, and successful in school (Skinner and Pitzer, 2012; Fredricks, 2015; Duchesne, Larose et al., 2017). The opposite to engagement is disaffection, which is the lack of engagement and is defined as the absence of effort and determination. In addition to this, disaffection involves no mental participation or attention when in lessons and includes emotional elements such as frustration, boredom, and anxiety (Skinner et al., 2009; Guvenc, 2015). These students are more likely to be withdraw from tasks, disruptive in lessons, and lower attendance (Furrer and Skinner, 2003; Duchesne, Larose et al., 2017).

Literature grounded in the achievement goal perspective suggests that students' behavioural process and outcomes within schools conforms to the achievement goals that they adopt (e.g., Elliot, 1999; Liem et al., 2008; Bong, 2009). Studies measuring students' approach goals (mastery and performance) have consistently found positive associations with engagement and effort in academic tasks and activities in schools (Miller et al., 1996; Elliot et al., 1999; Liem, 2016; Duchesne, Larose et al., 2017). Mastery-approach goals were also positively associated with behavioural engagement and effort in the classroom and negatively with disengagement from tasks (Ruzek et al., 2016; Grant and Dweck, 2003; Liem et al., 2008). The limited literature on avoidance goals (mastery and performance) has mainly shown a negative association with engagement, effort, and perseverance, whilst a positive relationship with disengagement (e.g., Elliot et al., 1999; Wolters et al., 2004; Gonida et al., 2009; Liem, 2016). In contrast, Duchesne, Larose et al. (2017) found that mastery-avoidance goals predicted a decrease in behavioural engagement longitudinally, whilst they identified a cross-sectional positive relationship between performance-avoidance goals and behavioural engagement. They elucidated that one possible explanation for these conflicting findings was that students endorsing performance-avoidance goals may be motivated by fear of poor results or failure, and as a result are more inclined to exert effort and persevere in their academic work to avoid these outcomes. Furthermore, a review conducted by Ruddock et al. (1998) found that students' engagement with learning can weaken towards the end of Year 7 and into Year 8 and as an result can slow academic progress. Several reasons have been put forward to explain these decreases in motivation and performance, with aspects focusing on school organisation, perceptions, and experiences of students (see Ruddock et al., 1998). Additionally, research exploring sex differences in secondary school education have found that females which were more mastery goal focused, reported higher levels of effort, perseverance, attainment, and engagement in their academic work compared to male students (e.g., Duchesne and Larose, 2007; Duchesne, Larose et al., 2017).

It is assumed that mastery-approach goals are the most adaptive goal for positive outcomes, however performance-approach goals are more reliably correlated with academic attainment than mastery-approach goals (see Harackiewicz et al., 1998; Hulleman et al., 2010; Senko, 2019). For example, mastery-approach goals have produced mixed findings with some studies identifying significant positive associations in experimental settings, whilst other research have found no significant links with attainment (Linnenbrink-Garcia et al., 2008; Lüftenegger et al., 2016). More recently, research exploring the 3x2 model has shown direct positive associations for task-approach and other-approach goals with performance attainment

(Elliot et al., 2011; Diseth, 2015; Lüftenegger et al., 2016) and negatively correlated to self-approach and other-avoidance goals (Elliot et al., 2011; Johnson and Kestler, 2012; Diseth, 2015). Likewise, studies have shown that appearance-based and competitive-based performance goals differed on behavioural outcomes. For example, competition-based performance-approach goals were found to predict high attainment compared to appearance-based performance-approach goals (e.g., Hulleman et al., 2010; Hackel et al., 2016; Senko and Tropiano, 2016; Senko and Dawson, 2017). Further support was found within the PE setting, with students that focused on outperforming others (competition-approach goals) reported higher performance attainment scores than students adopting appearance-based goals.

However, the majority of these studies have used a cross-sectional design using older students (e.g., Johnson and Kestler, 2012; Warburton and Spray, 2014; Diseth, 2015; Lüftenegger et al., 2016), implying that research needs to explore these achievement goals' relationship with behavioural outcomes from a longitudinal perspective, focusing on younger students, and subjects such as PE where students' behaviour is constantly on display for teachers and peers to witness.

Person-Centred Research

A systematic review conducted in 2003 revealed more than 80% of achievement goal research did not investigate the interactive nature of participants' achievement goals (Biddle, Wang, Kavussanu et al., 2003). Since then, evidence and acceptance that individuals can hold multiple goals at any one time has led to an increased exploration of the interactions between these goals at an interpersonal and individual level (e.g., Fryer and Elliot, 2007; Wang et al., 2008, 2016; Shim et al., 2014; Warburton and Spray, 2017; Warburton et al., 2020). However, there still remains questions over what types of goal profiles are displayed during adolescence, which combinations of goals are the most adaptive, and the stability of these goal configurations. This has led researchers implementing person-centred approaches (e.g., hierarchical cluster analysis, latent profile analysis, latent transition analysis, and ipsative continuity) to explore the array of achievement goal interactions expressed by students.

Across achievement contexts research on achievement goal profiles have found that high mastery-approach and high approach goal (mastery and performance) profiles yield many adaptive motivational outcomes such as motivation, achievement, cognitive strategy, enjoyment, grades, and competence (e.g., Liu et al., 2009; Shen et al., 2009, Conley, 2012; Gonçalves et al., 2017; Bae and DeBusk-Lane, 2018; Gonida et al., 2019). In contrast, profiles consisting of low all goals or high avoidance goals (mastery and performance) have produced a range of maladaptive outcomes such as anxiety, boredom, negative affect, disengagement, maladaptive learning strategies (e.g., Carr, 2006; Wang et al., 2007; Conley, 2012; Zhang et al., 2016; Ning, 2018; Liu et al., 2020). In addition, individual-level change analyses suggests that the configuration of these achievement goals remain fairly stable within an individual over time (e.g., Fryer and Elliot, 2007; Warburton and Spray, 2017).

Primary School (Aged Between 4 and 11 Years) Focused Person-Centred Studies

Across the achievement goal profile literature, the most prevalent profiles amongst primary school students were: a high mastery goal profile, a high levels of all goals (approach and avoidance) profile, and a moderate levels of all goals (approach and avoidance) profile (e.g., Schwinger and Wild, 2012; Schwinger, et al., 2016; Linnenbrink-Garcia, 2018). Unsurprisingly, the profile displaying high levels of mastery goals were exhibited by primary school focused studies (e.g., Tapola et al., 2013; Jansen in de Wal et al., 2015; Zhang et al., 2016; Hornstra et al., 2017). This supported Nicholls' (1984, 1989) notion of students having an undifferentiated conception of ability until the age of 12, therefore, primary-aged students would not evaluate their competence through social competence, resulting in more mastery-oriented profiles. Early literature has shown that there is a general focus on mastery within the primary school setting (Anderman and Midgley, 1997), and that early adolescent students frequently mention mastery goals as the main reason for studying (Lee and Bong, 2016). Moreover, female students are more likely to be highly represented within the high mastery profile at primary school (e.g., Schwinger et al., 2016; Zhang et al., 2016) and into secondary school (e.g., Luo et al., 2011; Tuominen-Soini et al., 2020; Mädamürk et al., 2021).

Research has also discovered a large percentage of primary school students displaying moderate levels of all achievement goals (e.g., Hornstra et al., 2017; Linnenbrink-Garcia et al., 2018; Ning, 2018). Students in this profile seek to do what is expected in school but with minimal effort at a time when they pursue both external demands and personal interests (Tuominen, Juntunen et al., 2020). Furthermore, studies have shown that female students are more likely to express average levels of all goals than males (e.g., Conley, 2012; Mädamürk et al., 2021). This profile has been the most prevalent profile (e.g., Schwinger and Wild, 2012; Jansen in de Wal et al., 2015; Hornstra et al., 2017; Tuominen, Juntunen et al., 2020), and the amount of students in this profile increases over primary school and into secondary school years (Tuominen, Niemivirta et al., 2020).

Finally, consistent with studies exploring young students (aged 11 and under), are a group of students emphasising both high levels of mastery and performance goals (e.g., Schwinger and Wild, 2012; Hornstra et al., 2017; Linnenbrink-Garcia et al., 2018; Ning, 2018). These students value absolute success (mastery of a task) and relative success (outperforming others) in addition to gaining new knowledge. At this age, students have shown to have comparatively high scores in both performance-approach and performance-avoidance goals (Lee et al., 2017), yet still report adaptive outcomes, suggesting that avoidance goals might not be as maladaptive for younger students (Ning, 2018). Some researchers have suggested that at this age, performance-approach and performance-avoidance goals are intertwined and highly intercorrelated in samples of younger students (Bong, 2009; Schwinger et al., 2016), implying that younger students may not be able to differentiate between performance-approach and performance-avoidance goals effectively. However, further inspection showed that these studies included students as young as seven years old, suggesting that older students (e.g., 10/11 years old) could have the capacity to differentiate between performance-approach and performance-avoidance goals.

Secondary School (Aged Between 11 and 16 Years) Focused Person-Centred Studies

Once students transfer into secondary school education (11+), they begin to develop a differentiated conception of ability, resulting in more varied goal profiles. For example, a high approach goal profile (mastery and performance), a high avoidance profile (mastery and/or performance), a low all profile (mastery and performance), and a high performance profile. Compared to younger students that exhibit high levels of all achievement goals (both approach and avoidance), older students begin to adopt the profile characterised by high mastery-approach and performance-approach goals. This profile is often associated with many positive outcomes with these students profiting from the benefits linked with mastery-approach goals (e.g., desire for learning and improvement) as well as performance-approach goals (e.g., desire to be the best or show their competence), therefore maximising adaptive learning outcomes (Harackiewicz et al., 2002). Research has shown that students displaying this profile (high approach goals) have equally or more adaptive motivational and educational outcomes compared to students pursuing only high mastery-approach goals (e.g., Pintrich, 2000c; Tuominen-Soini et al., 2008, 2011).

During secondary school, students begin to display more unfavourable motivational profiles, such as high avoidance goals (e.g., Tuominen-Soini et al., 2008, 2011; Jang and Liu, 2011; Ng, 2018) or low levels of all achievement goals (e.g., Wang, Morin, Ryan et al., 2016; Gonçalves et al., 2017; Lo et al., 2017; Méndez-Giménez et al., 2018). The main aim of these individuals putting very little effort into lessons, and displaying low mastery aspirations to tasks. This profile highlights the diversity of students' motivational aspirations in achievement-related contexts such as school, and recognises groups of students who primarily aim to avoid schoolwork. Similarly, students in the low all profile do not emphasise approach goals nor do they seek to avoid achievement situations. This is normally described as a disengaged group as these students lack the motives to engage and willingness to persist in school tasks (Yu and Mclellan, 2020). When examining the gender compositions of these profiles, female students are more likely to display these maladaptive goal combinations within PE (Wang et al., 2007), whilst there has been mixed findings in other subject areas (e.g., Levy-Tossman et al., 2007; Yu and Mclellan, 2020).

Finally, due to contextual differences between primary and secondary school education, students shift towards more competition-based and social comparison-based standards of competence (Eccles and Roeser, 2009). The mismatch between students' needs and the school environment, can result in students pursuing high performance goal profiles (Schwinger and Wild, 2012). These students focus on outperforming or getting better grades than their peers and on trying to avoid situations where they may fail, make mistakes, or appear incompetent (Tuominen-Soini et al., 2011). Whilst outcomes associated with this profile may not differ from other adaptive profiles (e.g., high mastery or high approach goals), under neutral task conditions, these students are far more vulnerable to potential failures and set-backs (Boekaerts and Niemivirta, 2000). During secondary school, male students are more represented in the high performance goal profile and stereotypically prefer social reference norms than female students (e.g., Levy-Tossman et al., 2007; Schwinger and Wild, 2012; Yu and Mclellan, 2020). Whilst the literature suggests increased performance-oriented profiles once students transfer into secondary school, it is unclear what aspects of these performance goals are more endorsed an others (e.g., outperforming others or looking good in front of others).

Individual-Level Change of Achievement Goal Configurations

The acknowledgement from researchers that individuals can hold varying degrees of mastery and performance goals has led to an increase in person-centred research (e.g., Tuominen-Soini et al., 2008, 2011; Wormington and Linnenbrink-Garcia, 2017). Whilst LPA and LTA can identify subgroups of individuals expressing distinct profiles and their trajectories, they are unable to explore changes in these achievement goals at an individual-level. Analyses such as ipsative continuity measures the magnitude exhibited by each individual, and has been utilised to explore the stability and change of individuals' achievement goal configurations (Mammadov and Hertzog, 2021). However, in contrast to LPA and LTA studies, research using this type of analysis has been less frequent. Researchers that have applied ipsative continuity analyses, explored achievement goal configuration on school (e.g., Warburton and Spray, 2017; Mammadov and Hertzog, 2021) and university students (e.g., Fryer and Elliot, 2007; Muis et al., 2009; Daumiller et al., 2021). Literature from the academic and sports settings found evidence of individual-level stability and change in individuals' achievement goal adoption (e.g., Fryer and Elliot, 2007; Muis et al., 2009; Warburton and Spray, 2017; Daumiller et al., 2021; Mammadov and Hertzog, 2021). Although these studies have shown the stability and change of achievement goals, some studies have either used small sized samples or measured change and stability over short periods of time (e.g., across weeks or months). There is currently no evidence of the change and stability of achievement goals from the 3x2 model (task, self, and other) or from further distinctions (i.e., appearance-competition).

Predictors and Consequences of Achievement Goal Profiles

Whilst many studies have focused on antecedents of a single achievement goal (e.g., Elliot and McGregor, 2001), very little research has been conducted on predictors of achievement goal profiles. In order to design suitable interventions and promotions for optimising students' achievement goal profiles, it is crucial to enhance our understanding of the most relevant predictors of such motivational patterns. However, there is a distinct lack of investigation of what influences these profiles in both the school and physical settings. To date, there have been only a handful of studies that have examined the influence of antecedents on achievement goals from a person-centred perspective (e.g., Fryer and Elliot, 2007; Schwinger et al., 2016; Warburton and Spray, 2017; Bae and DeBusk-Lane, 2018; Lee et al., 2020; Mammadov and Hertzog, 2021).

From a longitudinal perspective, these studies have explored variables such as classroom goal structure, ability self-concept, social interdependence attitudes, fear of failure, and implicit theories of ability (e.g., Fryer and Elliot, 2007; Schwinger et al., 2016; Warburton and Spray, 2017; Bae and DeBusk-Lane, 2018; Lee et al., 2020; Mammadov and Hertzog, 2021) predicting initial and the stability of profile membership along with the stability and change of achievement goal configurations over time. Individual-level analyses within the education domain (Warburton and Spray, 2017; Mammadov and Hertzog, 2021) have explored implicit theories of ability as an important predictor of achievement goal change and stability. Both studies found that incremental and entity beliefs were correlated with adaptive and maladaptive goal adoption. For example, the adoption of incremental beliefs resulted in higher levels of adaptive goal striving and goal configuration stability, whilst the adoption of entity beliefs resulted in lower levels of adaptive goal striving and goal configuration instability.

In contrast, LPA was used to observe the predictive nature of implicit theories on primary school-aged (7 to 11 years old) students' achievement goal profiles. Although traditionally the effects of incremental and entity beliefs were on the adoption of a single achievement goal, Dweck and Leggett (1988) noted that the two implicit theories of ability should be viewed on a continuum, with individuals able to empathise with both incremental and entity beliefs. Furthermore, incremental versus entity views do not produce the same outcomes regarding the possibility to endorse multiple achievement goals. Based upon this, Schwinger et al. (2016) argued that while the pursuit of mastery goals would not make sense for an entity theorist, they predicted that an incremental theorist would primarily focus on mastery goals but may also be interested in demonstrating their competence and therefore pursue performance goals as well. Therefore, they anticipated that students with an entity view were more likely to adopt a profile with a main focus on performance goals, while students with an incremental theory may adopt a mastery focused or multiple goals profile. Findings showed evidence of entity students preferred performance-focused profiles, but also an increased likelihood of adopting any kind of multiple goal profiles (e.g., high all, moderate all, and low all), contradicting their hypothesis. They argued that students could pursue the same achievement goals but for different reasons, for example, incremental students could pursue mastery goals to learn and develop their skills, while entity students could pursue mastery goals will the aim to improve their competence due to others. Limited research has shown the predictive nature of implicit theories of ability on achievement goal profiles, and the stability and change of goal configurations. However, further exploration is needed on the relationship between implicit theories and the pursuit of multiple goal profiles, with both implicit theories individually associated with multiple goal profiles (Schwinger et al., 2016). These findings were identified using a sample of young (7-10 years old) German students, and should be investigated with different students using a range of ages. In addition, the incorporation of the appearance-competition element of performance goals, and the task-self components of the 3x2 model into the profiles, may help us further understand the relationship between implicit theories and multiple goal pursuits.

To date, no study has examined need satisfaction and need frustration as an antecedent of achievement goal profiles. However, based on research on single achievement goal adoption (e.g., Ciani et al., 2011; Diseth et al., 2012; Theis et al., 2020; Duchesne, Ratelle et al., 2017; Janke et al., 2022), it is plausible that need satisfaction would predict mastery-focused profiles, and high mastery-approach and performance-approach goal profiles. Whilst frustration of the three needs would predict maladaptive profiles such as moderate or low levels of achievement goal profiles. Future research should also explore if any of the three needs (autonomy, competence, and relatedness) predict certain achievement goal profiles, and if these needs are important predictors of change and stability of achievement goal configurations.

In contrast to the research on antecedents, there has been an abundance of studies exploring the consequences of achievement goal profiles. Mastery goals have been strong predictors of proximal and distal learning and academic outcomes, whilst the relationships between performance-approach goals and the same outcomes has been more ambiguous (Bae and DeBusk-Lane, 2018). However, from a person-centred perspective, understanding the nature and adaptability of multiple goals can be differentially advantageous (Harackiewicz et al., 2002, Schwinger et al., 2016). The current person-centred achievement goal literature provides support for the adaptiveness of predominantly mastery and combined mastery and performance-approach goal profiles. Students endorsing mastery goals in the educational setting exhibit high levels of engagement and attainment (Tuominen-Soini et al., 2008, 2012; Jang and Liu, 2012; Shim and Finch, 2014; Tuominen, Juntunen et al., 2020), and low levels of disengagement, anxiety, and worry (Jang and Liu., 2012; Shim and Finch, 2014; Madjar et al., 2021).

Similarly, cross-sectional and longitudinal studies have shown students that simultaneously emphasise both mastery-approach and performance-approach goals produced high teacher-rated effort, engagement, and attainment (Luo et al., 2011; Hornstra et al., 2017; Goncalves et al., 2017; Lo et al., 2017). However, some studies have highlighted a concern that these students' strong focus on performance may increase their vulnerability to emotional distress such stress and anxiety (Daniel et al., 2008; Tuominen-Soini et al., 2008, 2011). When combined with performance-avoidance goals (and low mastery goals), the endorsement of performance-approach goals can result in unfavourable consequences such as low levels of effort and attainment (Tuominen-Soini et al., 2008; Luo et al., 2011). As evidently shown by Schwinger and Wild (2012) within the primary school setting, students that endorsed high multiple goals reported the lowest attainment grades. Further analysis found students that performed poorly in one school year were more likely to adopt a high multiple goals profile in the following academic year. This provided support for the mastery goal perspective and argued that the strong emphasis of both performance-approach and performance-avoidance goals would lead to these maladaptive outcomes, suggesting that performance goals may result in problems in the long run for students (Midgley et al., 2001). However, the same set of students reported the highest effort expenditure compared to the high mastery profile and moderate levels of achievement goals, with similar findings identified with secondary school students for effort and engagement (Liu et al., 2009; Shim and Finch, 2014), highlighting that it is not so clear cut regarding the adaptiveness of performance goals.

In contrast to the classroom setting, within the PE environment, Wang et al. (2007, 2016) identified that the high achievers' profile consisted of students that had high levels of all four achievement goals and reported the highest levels for effort and physical activity levels. Whilst previous PE studies have found that high mastery profile produced the highest scores for physical activity levels, none of these studies identified a high all profile in their analyses (Carr et al., 2006; Wang et al., 2008; Shen et al., 2009). Whilst the literature has shown certain profiles lead to adaptive or maladaptive outcomes, the majority of these studies were cross-sectional, measuring secondary school students approach and avoidance goal profiles. In addition, certain subjects (e.g., mathematics, science, English) have had more attention when exploring LPA and LTA compared to other subjects (e.g., PE, music, and drama) that provide a unique setting compared to the regular classroom setting. Lastly, despite the development of the 3x2 model and additional goal definition distinctions, the majority of studies have ignored these when conducting person-centred approaches. Future research should explore these goals both cross-sectionally and longitudinally across different school years and ages.

Summary

The literature review has shown the continued change and development of achievement goals throughout the last 30 plus years. The addition of more distinct achievement goals (task, self, appearance, and competition) in more recent years should further enhance researchers understanding of achievement motivation especially within the educational setting. It has also been widely accepted that individuals can hold and pursue multiple goals at any one particular time. However, despite continuous recommendations of person-centred approaches to explore multiple goal pursuit and using more defined goals, limited research has utilised this. From the literature review, several key research areas emerge for further investigation.

1. The majority of the literature has relied on the trichotomous and the 2x2 framework when investigating approach-avoidance achievement goals within the educational and physical domain. While this expansion of the achievement goal construct has added some clarify to empirical patterns, ambiguities still remain. Several reviews have called for improvements in the definition and measurement of mastery and performance goals to provide consistent, clear, and coherent results. Despite this, to date researchers have paid little attention to the task-self and appearance-competition distinctions of approach-avoidance goals. In addition, much of the empirical evidence on the conceptual bifurcations of the achievement goal construct (e.g., trichotomous, 2x2 model, 3x2 model, and 2x2 standpoints model) was conducted using university-aged students. Questions arise if these models are applicable to younger students and that these main aspects of goals need to be individually measured and

explored to determine their feasibility for younger students and for clarifying current ambiguities in the literature.

2. Despite support for the multiple goal pursuit (e.g., Harackiewicz et al., 1998, 2002; Pintrich, 2000b; Barron and Harackiewicz, 2001; Hulleman et al., 2010), there is limited evidence utilising longitudinal person-centred approaches to help determine how these goals interaction, particularly performance-appearance and performance-competition approach goals, what predicts these profiles, and the adaptive and maladaptive consequences associated with certain approach-goal endorsements.
3. Despite the importance of understanding students' achievement goals from a developmental perspective, many researchers have explored goal stability and change across a whole sample and not within an individual (e.g., Anderman and Anderman, 1999; Bong, 2005; Senko and Harackiewicz, 2005). Sample-level change and stability can be disparate to person-level change and stability (Fryer and Elliot, 2007). However, limited literature has explored whether the relative ordering of the different achievement goals changes within an individual, such that the different goals the individual is pursuing become more or less salient over time especially within compulsory education (e.g., Fryer and Elliot, 2007; Warburton and Spray, 2017; Mammadov and Hertzog, 2021). In addition, we know little about what predicts the changes or stability of the relative ordering of achievement goals within an individual over time (namely, implicit theories of ability, need satisfaction, and need frustration), and how stability or change in goal configurations leads to adaptive and maladaptive educational outcomes.
4. There is very limited research that examines students' achievement motivation across the transfer from primary to secondary school and subsequent transitions. A handful of studies have explored what types of profiles are expressed by students in primary school (e.g., Schwinger and Wild, 2012; Schwinger et al., 2016; Zhang et al., 2016; Hornstra et al.,

2017), and how the transfer can impact these achievement goal profiles (e.g., Jansen in de Wal et al., 2015; Tuominen et al., 2020). Literature also highlights the lack of research investigating predictors of initial achievement goal profiles and the stability of profile membership over a key developmental period for students (e.g., Schwinger et al., 2016; Bae and DeBusk-Lane et al., 2018).

5. Furthermore, while previous reviews have investigated the multiple goal pursuits of students in compulsory and higher education combined, there is limited review evidence exploring and evaluating the current literature on young peoples' achievement goal profiles in compulsory education only. This is despite evidence suggesting that age can influence achievement goal adoption (e.g., Anderman and Midgley, 1997; Bong, 2009; Hulleman and Senko, 2010). Consequently, a review solely focusing on students in compulsory education, and the types of achievement goal profiles displayed by these individuals across their school career is warranted.

The Programme of Research

Four studies were conducted to address the key areas described above. The research programme utilised the approach goals of the 2x2 model with the addition of the distinctions of task and self for mastery-approach goals (i.e., 3x2 model), and appearance-competition for performance-approach goals as its main theoretical framework.

Study one (Chapter 3) was a scoping review that collated and reviewed the current literature on achievement goal profiles displayed by students in compulsory education. The review explored the different types of profiles expressed by students based on age, school subject, and measurement. The relationship between the approach-avoidance goal profiles and educational outcomes was also investigated.

Study two (Chapter 4) involved students in both primary and secondary school (Year 5 to Year 8, aged 9 to 13 – year one column on Table 2.1). Cross-sectionally, this study established whether students of early adolescence could differentiate between the four approach goals, and how these goals combined to influence student-reported and teacher-reported outcomes in PE. This study also explored if younger students could pursue multiple goals, and if these profiles differed to older secondary school students.

Study three (Chapter 5) focused on individual-level stability and change of the relative ordering of students' approach goal configurations across the final years of primary school (aged 9 to 11) and across the transfer into secondary school (aged 11 to 12). During this age (row one on Table 2.1), these early adolescent students are most at risk of declining motivation in PE. This study also investigated implicit theories of ability, need satisfaction, and need frustration, and whether they predicted change or stability in individual goal configurations. The effect of stable or changing goal configurations on individuals' outcomes were also assessed.

Study four (Chapter 6) investigated students' distinct approach goal profiles and the stability of profile membership, i.e., which profile a student belongs to and the likelihood of staying in or moving from that profile, across primary (Year 6, aged 10 to 11) and secondary school (Year 7 to 10, aged 11 to 15). Profiles from these year groups (columns 2 and 3, and rows 2, 3, and 4 across all three years on Table 2.1) were measured at three consecutive academic years to explore the stability of these profiles over key school transfer and transitions. The antecedents of implicit theories, need satisfaction, and need frustration were used to predict the types of profiles students would adopt, and if changes in these antecedents predicted change or stability in profile membership.

	Year		
	1	**2**	**3**
Year Group	Year 5	Year 6	Year 7
	Year 6	Year 7	Year 8
	Year 7	Year 8	Year 9
	Year 8	Year 9	Year 10

Table 2.1. Studies data collection.

Chapter 3

Study One: Approach and Avoidance Goals in Education: A Scoping Review of Students' Achievement Goal Profile

Abstract

The study reviewed and synthesised research employing person-centred analyses to study approach and avoidance achievement goals in primary and secondary school education. Eleven profiles were identified across the studies and were compared based on sex, age, measurement, and school subject. Educational outcomes were identified before being coded and classified into ten higher order outcomes including: motivation and motivation-related behaviours; learning, engagement and performance strategies; attitudes and values; and environment influences and group dynamics. Results indicated age and school subject differences on the types of profiles being produced, and the type of measurement used influenced the profile composition. The review revealed that *High All* and *High Mastery* were the most frequent and adaptive profiles displayed by students. Whilst *Average All* profile was the most maladaptive profile and reported high association with negative outcomes. Study characteristics revealed a lack of exploration of more recent developments of achievement goals (e.g., 3x2 model, performance-approach distinctions), a scarcity of longitudinal studies especially across key transfers and transitions, and a shortage of exploration in certain school subjects.

Introduction

Research grounded in Achievement Goal Theory (AGT) continues to hold a prominent position in empirical research that seeks to understand students' motivation in educational settings. Since its inception, theoretical developments have expanded the number of goals from a two-goal mastery-performance dichotomy (Nicholls, 1984; Dweck, 1986) through to a six-goal conceptualisation as currently identified in the 3x2 achievement goal model (Elliot et al., 2011). However, despite this bifurcation of the achievement goal construct, primarily through the introduction of the approach and avoidance distinction by Elliot (1997, 1999), debates between researchers remain over which achievement goal or combination of goals are the most adaptive (Wormington and Linnenbrink-Garcia, 2017; Lee et al., 2017; Liu et al., 2020). Some authors argue for a mastery goal focus in which the adoption of a mastery goal alone is the most adaptive (Midgley et al., 2001; Kaplan et al., 2002), while others argue for a multiple goal pursuit perspective in which adopting mastery and performance goals in combination are likely to yield the most benefits for individuals (Barron and Harackiewicz, 2001; Harackiewicz et al., 2002). However, with the conceptual extensions of the achievement goal perspective (Elliot, 1997, 1999; Elliot et al., 2011) increasing the number of goals that a student can potentially adopt, it is unclear as to what are the most adaptive or maladaptive profiles and their consequences for students' motivation and achievement. Over the years, there have been a number of systematic reviews evaluating achievement goals in relation to performance or achievement (e.g., Hulleman et al., 2010; Huang, 2012; Van Yperen et al., 2014; Senko and Dawson, 2017). To date, only Wormington and Linnenbrink-Garcia (2017) have conducted a review that solely focuses on person-centred achievement goals. They concentrated on the labelling of profiles, then conducted ancillary analyses to investigate the prevalence and adaptiveness of these profiles in relation to four different academic outcome categories. However, their review included adults in higher education when defining the academic domain, and only included studies that profiled solely on achievement goals. Given that every child experiences school education up to the age of 16, it is important to identify what profiles are expressed by students at all stages of their school career, and the relationship these profiles have with a range of academic outcomes. This is especially important when the school environment can have such a focus on grades and academic achievement. It is, therefore, important and timely to review the extent, range, and nature of the evidence on multiple goal pursuit in education settings that has utilised approach-avoidance goals.

Bifurcation of Achievement Goals

Early work on achievement goals and their effects on students' responses to achievement challenges focused on a dichotomous mastery-performance achievement goal perspective (Nicholls, 1984; Dweck, 1986). Dweck (1986) and Nicholls (1984) believed that individuals that pursued mastery goals were oriented towards improving their ability, whilst individuals that adopted performance goals were concerned with proving their ability to others. Initially, it was presumed that students primarily adopted one goal, and that mastery goals promoted greater educational benefits than performance goals (Nicholls 1984; Dweck, 1986). Although the dichotomous model found support for the adaptive role of mastery goals, there was mixed support for performance goals in the educational literature (Elliot and Church, 1997; Elliot and McGregor, 1999; Hulleman et al., 2010; Senko and Dawson, 2017). As the dichotomous perspective only focused on the development or demonstration of competence in the two goals, it was argued that the disregard for avoiding incompetence as a part of achievement behaviour accounted for the ambiguous findings. As a result, Elliot et al. (Elliot, 1994; Elliot and Harackiewicz, 1996) proposed the trichotomous achievement goal framework, which distinguished performance goals into independent approach and avoidance goals, and combined them with a mastery goal. The mastery goal focused on the development of competence or mastery of tasks; the performance-approach goal focused on the attainment of normative competence; and the performance-avoidance goal focused on the avoidance of normative incompetence. This initial bifurcation of the performance goal provided some clarification to the ambiguous empirical pattern exhibited by performance goals in the extant literature (Rawsthorne and Elliot, 1999; Elliot, 2005). Furthermore, Elliot moved from a dispositional achievement goal construct described in the original works (i.e., Nicholls, 1984; Dweck, 1986) to more context-specific achievement goals (Elliot, 2005).

Further work on the bifurcation of achievement goals occurred with the full crossing of both the definition of competence (mastery and performance) with the valence of the striving (approaching competence and avoiding incompetence), resulting in a 2x2 achievement goal framework (Elliot and McGregor, 2001). This led to the proposal of a mastery-avoidance goal which focused on avoiding task-based or self-based incompetence. In comparison to the mastery-approach goal where individuals strive to develop their skill/ability, learn, and master tasks, individuals endorsing a mastery-avoidance goal strive to avoid losing their skill/ability, to avoid forgetting what they have learnt, or leaving a task incomplete. Further developments to the model have been made, including the 3x2 achievement goal framework (Elliot et al., 2011) after questions were raised whether further separation of mastery-based goals was needed because of the two different standards of evaluation, task and self, that were inherent in the definition of mastery-based competence. Elliot et al. (2011) expanded the achievement goal construct to recognise that individuals may focus on mastery of a task separately from personal improvement. The 3x2 framework defined competence based on absolute (task-based) or intrapersonal (self-based) for mastery goals, and interpersonal (other-based) for performance goals (performance-approach and performance-avoidance). They argued that the distinction of absolute and intrapersonal standards of evaluation within mastery goals enhanced the precision of the model, allowing for greater understanding of the construct. More recently, Korn et al.

(Korn and Elliot, 2016; Korn et al., 2019) drew on Elliot's original work and investigated the 2x2 standpoints and standards achievement goal model.

These developments have led to a plethora of literature in the educational context exploring the relationship patterns between achievement goals and motivational outcomes (e.g., Conroy and Elliot, 2004; Linnenbrink, 2005; Warburton and Spray, 2008, 2009, 2013; Liu et al., 2009; Wang et al., 2009, 2010, 2016; Lo et al., 2017). Research examining the 2x2 model has shown a wide array of benefits associated with mastery-approach goals. Students that adopted these goals expressed positive emotions, high interest, help-seeking, cooperativeness, and elaborative learning strategies (Wang et al., 2007; Senko et al., 2011; Senko and Dawson, 2017). In contrast, students that have endorsed avoidance goals (mastery-avoidance and performance-avoidance) have consistently displayed maladaptive and detrimental outcomes, which include negative emotions, cheating, unwillingness to seek help, and poor learning strategies (Morris and Kavussanu, 2009; Hulleman et al., 2010; Van Yperen et al., 2014, 2015; Lochbaum and Gottardy, 2015). In comparison to the previous goals, students that adopt performance-approach goals have reported some inconsistent and contradictory effects. For example, some studies have found strong correlations with anxiety, negative affect, effort-withdrawal, and self-handicapping, whilst others have identified positive associations with positive affect, pride, challenge seeking, learning strategies, and high effort intensity (Roeser et al., 1996; Huang, 2011; Senko et al., 2013). However, performance-approach goals have been a consistent positive predictor of academic achievement (Hulleman et al., 2010).

More recent studies investigating the 3x2 model in the education setting found task-based (mastery-approach) goals were consistently associated with adaptive outcomes, e.g., intrinsic motivation, learning effectiveness, positive emotions, perceived competence, physical self-concept, and friendship goals (Elliot et al., 2011; Brondino et al., 2014; Mendez-Gimenez et al., 2014). Evidence has also shown that other-based (performance-approach) goals were also related to more functional aspects of motivational variables including self-efficacy, learning strategies, test performance, satisfaction, ability, and physical self-concept (Elliot et al., 2011; Diseth, 2015; Mendez-Gimenez et al., 2017). There have been mixed findings for self-based (mastery-approach) goals, with some studies revealing positive associations with energy in class, positive emotions, self-determination, and satisfaction (Elliot et al., 2011; Brondino et al., 2014; Mendez-Gimenez et al., 2017), whilst others have found an inverse relationship pattern compared to task-approach and other-approach goals, e.g., less academic achievement or learning strategies (Diseth, 2015). In contrast, avoidance goals (task, self, and other) have been linked with maladaptive outcomes and have negative relationships with absorption, test performance, intrinsic motivation, positive emotions, and satisfaction (Elliot et al., 2011; Brondino et al., 2014; Mendez-Gimenez et al., 2017).

Multiple Goal Pursuit

Initially, researchers explored the achievement goals separately and believed individuals could only pursue one goal at a particular time (Diener and Dweck., 1978, 1980). However, work by Nicholls (1989) recognised that individuals rarely adopt just one goal, and instead have varying degrees of both mastery and performance goals. His research showed that some students exhibited a high-high profile (high mastery, high performance), while others exhibited a high-low profile (high mastery, low performance). Although Nicholls' research led to a shared agreement that an individual can hold multiple goals, what combination of goals are the most beneficial is still to be determined. Researchers from the mastery goal or 'dampening' perspective (Pintrich, 2000c), believe that only mastery goals yield educational benefits as the pursuit of performance goals is likely to be maladaptive and come at a cost. From this perspective, the simultaneous pursuit of performance goals can diminish the benefits associated with pursuing mastery goals (Midgely et al., 2001; Kaplan et al., 2002), resulting in less adaptive outcomes than if pursuing a high-low profile. Research has provided some support for this perspective, identifying that students with a high-low profile had the most adaptive patterns of achievement, cognitive strategy, and motivation (Shen et al., 2009; Conley, 2012; Bae and DeBusk-Lane, 2018; Gonida et al., 2019). In contrast, advocates of the multiple goal perspective consider that pursuing both mastery and performance-approach goals will result in greater benefits than only pursuing mastery goals (Barron and Harackiewicz, 2001; Harackiewicz et al., 2002). There has been support for the overall enhanced effect of the high-high profile with studies finding the profile exhibiting the highest levels of motivation, achievement, grades, enjoyment, and competence (Liu et al., 2009; Jang and Liu, 2012; Gonçalves et al., 2017; Linnenbrink-Garcia et al., 2018).

In support of this multiple goal perspective, the use of person-centred approaches have increased in research over the last 20 years, due to it being particularly suited for revealing typical goal combinations expressed by students, the effects of these multiple goals, and predicting different motivational outcomes (Gonçalves et al., 2017). Although a variable-centred approach can investigate the relationships between achievement goals in isolation, in combination, or in interaction, these relationships are assumed to apply to the average individual in the sample (Morin and Wang, 2016; Wang, Morin, Liu et al., 2016). In contrast, a person-centred approach allows researchers to explore questions about how different achievement goals combine through identifying specific subgroups of individuals expressing distinct profiles with different patterns of relationships to motivational variables. This approach focuses on the individual similarities and differences of achievement goals rather than just the relationships among them, thus, enriching our understanding of AGT. Some have argued that the variable-centred approach imposes an artificial structure on the observed data, consequently, not reflecting the true reality since all goals can vary within the same individual

(Wang, Morin, Liu et al., 2016). A person-centred approach, therefore, furthers our understanding of students' achievement goal adoption and their relationships with other motivational constructs in educational settings. Moreover, given that much of the empirical research on which Elliot et al. (Elliot & Harackiewicz, 1996; Elliot 1997, 1999; Elliot & McGregor, 2001; Elliot et al., 2011) supported the conceptual bifurcation of the achievement goal construct was conducted on adults (e.g., university-aged students), it is important to review the literature on multiple goal pursuit in children. However, despite an increase in person-centred studies exploring multiple goal pursuits in younger students in compulsory education, there is no review that solely investigates the types of approach and avoidance achievement goal profiles expressed by these young students within a range of school subjects.

Aim and Purpose of Review

The primary aim of this scoping review is to provide a clear and comprehensive overview of current literature investigating the approach-avoidance achievement goal profiles displayed by students in primary and secondary school education. This review will determine: a) the types of profiles being displayed by students in primary or secondary school education; b) the types of profiles exhibited, based on age, school subject, and achievement goal questionnaire measure; c) the types and frequencies of methodological design; and d) the relationship between profiles and educational outcomes.

Method

Key Search Terms and Search Strategy

A broad search was completed to identify relevant studies of achievement goal profiles in education in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) statement guidelines (Moher et al., 2009; Tricco et al., 2018). In line with these guidelines, the search strategy for identifying articles was divided into two phases. Phase one consisted of searching five electronic databases (Web of Science, Scopus, ERIC, PsychInfo, and SportDiscus) in the time period of January 1997-July 2022. Studies were identified using the following search terms to screen for title and abstract of the articles identified: "achievement goals OR achievement orientations OR 2x2 achievement goals OR motivational profiles OR multiple goal perspective OR multiple goal profiles OR performance AND mastery OR approach AND avoidance goals" AND "profile OR cluster OR latent profile analysis OR latent class analysis OR latent class cluster analysis OR latent transition analysis OR cluster analysis OR person-centred approach" AND "primary school students OR secondary school students OR elementary school students OR high school students". Phase two consisted of a secondary search of external sources such as reference lists of articles found in phase one.

Inclusion and Exclusion Criteria

To be included in the scoping review, studies had to meet the following criteria:

1. Published in a peer-reviewed journal.
2. Measure achievement goals in the academic domain.
3. In full-time primary or secondary school education, e.g., aged 4 – 18 years in the UK.
4. Approach-avoidance achievement goals were part of the basis for forming the profiles using person-centred analyses.
5. Written in English.

Identification of Relevant Studies

After the two-phased search strategy, the articles were saved in Endnote 20 and duplicates were removed. From this, a more intensive assessment took place using the abstracts and full-text versions of the articles. Titles and abstracts of articles were screened, and if abstracts were unavailable or provided limited information, the entire article was retrieved and screened for its suitability. Articles that were unavailable through open access were retrieved through university library subscriptions and email requests to authors, in order that full-text versions could be acquired. All relevant information was extracted from the final sample and inserted onto a Microsoft Excel (Version 16) spreadsheet. Screening of titles, abstracts, and full texts was undertaken by the thesis author; any articles that were classed as unsure were discussed and reviewed with the research team.

Data Extraction

Once the final sample was obtained, each article was evaluated for the following data: (1) author(s) name, year of publication, country, subject; (2) study design; (3) achievement goal framework; (4) scale measurement; (5) data analysis; (6) sample group age; (7) school; (8) age mean; (9) sample size; (10) number of male participants; (11) number of female participants; (12) number of profiles identified; (13) type of profile; (14) profile description; (15) sample size of profile; (16) profile membership stability (if longitudinal); (17) achievement goal mean scores/z scores; (18) antecedents mean scores/z scores; (19) other profiled variable mean scores/z scores; (20) outcome mean scores; (21) reported sex differences; and (22) reported age differences. All outcomes were also coded and then classified into ten higher order outcome categories: motivation and motivation-related behaviours; achievement; learning, engagement, and performance strategies; hedonic and eudaimonic ill-being; self-perception; attitudes and values; hedonic and eudaimonic ill-being; environment influences and group dynamics; physical activity; and beliefs about the purpose of education.

Results

Study Selection

As shown in Figure 7, the initial literature search resulted in 810 studies. After deleting duplicates and screening titles and abstracts, 59 studies were included in the full text audit. Forty-two studies fulfilled all the inclusion criteria (appendix 1, p.283).

Study Characteristics

The dates of the publications ranged from 2006 to 2022, with an increase in studies within the last ten years (79% of studies conducted between 2011-2022). Studies were conducted in 13 different countries located in Europe, North America, and Asia, with the countries of Finland (*n* = 9) and North America (*n* = 6) conducting the most research. In total, 31,350 participants were included and represented 49 independent samples (sample size range: 140 to 4387), with 15,209 being female (48.5%; one study did not report sex). A range of ages were explored when investigating students' achievement goal profiles, ranging from 8 to 18 years old. Students aged between 11 and 18 (*n* = 33; 78%) constituted a large majority of participants in these person-centred studies compared to students under the age of 11 (*n* = 7; 17%) and studies examining the transfer of schools that occurs at age 11 to 12 (*n* = 2; 5%). An array of school subject areas were selected when exploring students' achievement goal profiles. General academia was the most frequent investigated school subject area (*n* = 15; 34%), followed by mathematics and science (*n* = 14; 32%), physical education (PE) (*n* = 8; 18%), and humanities (*n* = 7; 16%).

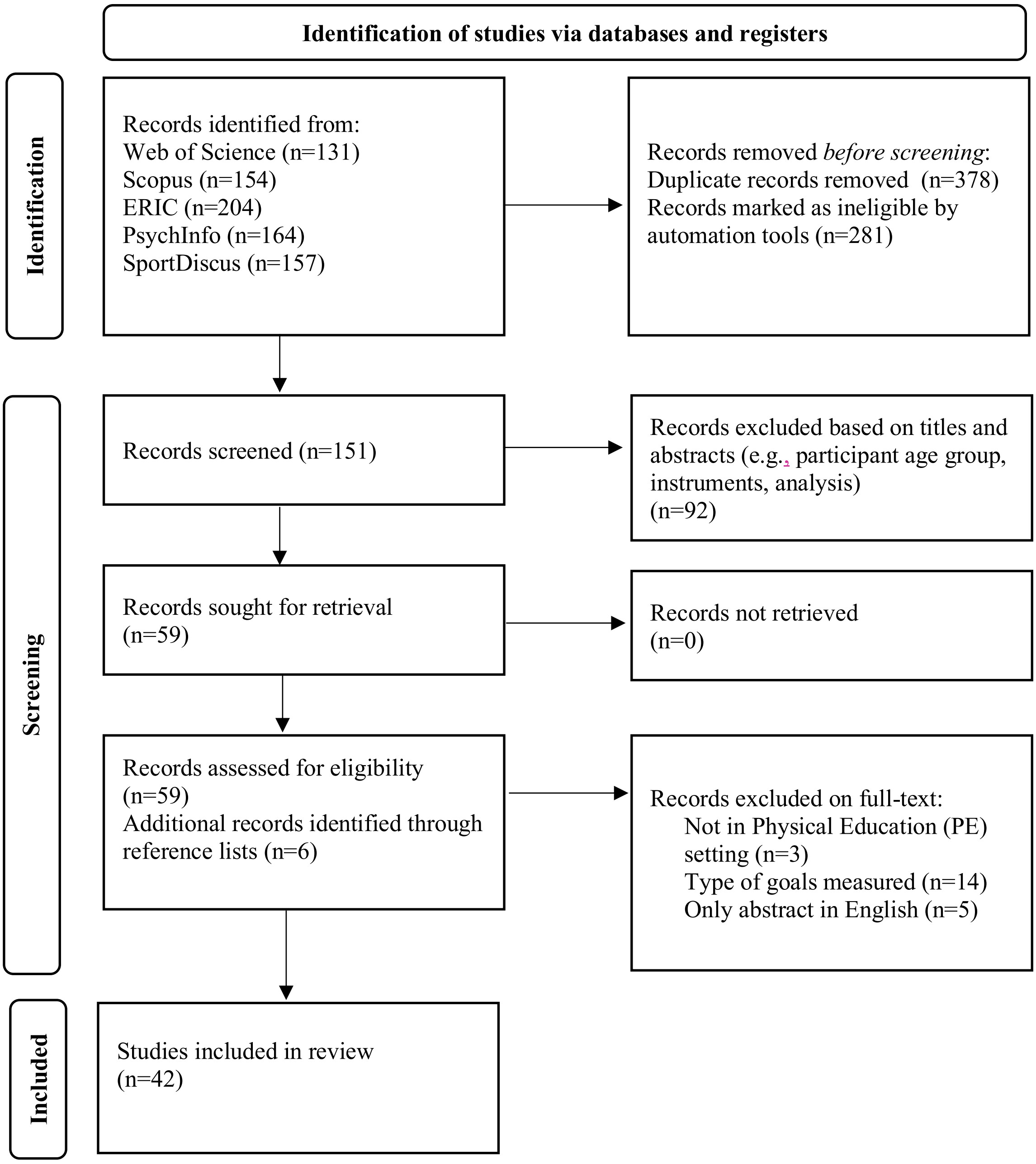

Figure 7. PRISMA diagram of study search and selection process.

Twenty-eight studies (67%) explored achievement goal profiles using a cross-sectional design, while 14 (33%) studies investigated profiles from a longitudinal perspective. Cluster analysis was the most frequent analytic technique used (*n* = 16; 38%), followed by latent profile analysis (*n* = 13; 31%). Most studies based their research on the trichotomous framework (mastery, performance-approach, and performance-avoidance) of AGT (*n* = 23; 55%), followed by the 2x2 (mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance) achievement goal framework (*n* = 11; 26%), and then the 2x2 with the addition of a work-avoidance goal (*n* = 8; 19%).

Midgley et al.'s (2000) Pattern of Adaptive Learning Scale (PALS) was the most frequently used questionnaire to identify students' achievement goal profiles from a trichotomous perspective, with 16 studies (38%) selecting this form of measurement. The majority of studies used this measure when conducting cross-sectional research (*n* = 13; 81%), cluster analysis (*n* = 8; 50%), or with secondary school students (*n* = 15; 94%). In comparison, Elliot et al.'s (Elliot, 1999; Elliot and McGregor, 2001; Elliot and Murayama, 2008) Achievement Goal Questionnaire (AGQ) and its subsequent developments and adaptions was the second most chosen measurement for the 2x2 model with 12 studies (29%). Similarly to the PALS instrument, the majority of studies used this questionnaire when conducting cross-sectional research (*n* = 10, 83%), cluster analysis (*n* = 7; 58%), or latent profile analysis (*n* = 5; 42%) or using secondary school students (*n* = 11; 92%). Lastly, Niemivirta's work avoidance scale (2002, 2019) was the third most selected scale to measure for the 2x2 model with the additional work-avoidance goal (*n* = 8; 19%). Contrasting to the previous measures, the majority of studies used this scale when conducting longitudinal research (*n* = 5; 63%), latent profile analysis (*n* = 7; 88%), latent transition analysis (*n* = 3; 38%), or when using secondary school students (*n* = 6; 75%). The number of profiles produced ranged from three to eight, with

28 studies profiling just on achievement goals, and 14 studies including profiles of achievement goals and other motivational variables.

Goal Profiles Endorsed by Students in Education

Using Wormington and Linnenbrink-Garcia's (2017) review as a guide, profiles were labelled based on their z scores. For example, a high score for a goal was a z score of 0.5 or above. An average score was a z score between .49 and -.49, whilst a low score was a z score -.50 or below. Out of the 49 samples, 11 profiles were identified; seven characterised by high adoption of one or more goals (high all, high mastery, high performance, high approach, high avoidance, high performance-approach, and high performance/high mastery-approach), three characterised by low adoption of one or more goals (low all, low mastery, and low performance) and one characterised by average adoption of all goals (average all goals).

The most frequent profile was the *High All* with 38 out of 49 samples (78%) identifying students strongly endorsing all achievement goals, including avoidance goals. The second most common profile was *High Mastery*, which 36 samples (73%) found using person-centred approaches. This profile was comprised of students who strongly endorsed mastery-approach goals, with average or low endorsement of performance and/or work-avoidance goals. *Average All* was the third most recurring profile with 35 samples (71%) producing this profile. Students within this profile reported average endorsement across all goals, with no goals meeting the criteria to be classed as high or low.

Among the profiles characterised by low goal adoption, *Low All* profile was the most common. Twenty-two samples (45%) reported this profile, which consisted of students reporting low endorsement of all types of achievement goals. This was followed by a *Low Mastery* profile, which was identified in six samples (12%), with students reporting low endorsement of mastery goals, coupled with average endorsement of performance goals and work-avoidance goals (if measured). A *Low Performance* profile was found in four samples (8%), with students reporting low endorsement of performance goals, whilst average levels of endorsement for mastery and work-avoidance goals (if measured).

Within the high adoption category, a *High Performance* was a common profile found by 16 samples (33%), which students produced high endorsement for performance-approach and performance-avoidance goals accompanied with average or low mastery goals and work-avoidance goals (if measured). A *High Avoidance* profile included students from 14 different samples (29%) that strongly endorsed high mastery-avoidance, high performance-avoidance or high work-avoidance goals, with average or low endorsement of approach goals. Fourteen samples also identified students displaying a *High Approach* profile, which was characterised by endorsing high mastery-approach and performance-approach goals, whilst average or low endorsement of avoidance goals. Only five samples (10%) identified students exhibiting a *High Performance-Approach* profile, which was characterised as high performance-approach goals, complemented with average or low levels of performance-avoidance, mastery and work-avoidance goals. Lastly, the least common profile displayed was a *High Performance and Mastery-Approach* profile, which was represented in just one sample. This profile consisted of students with high performance goals and mastery-approach goals, combined with average or low levels of mastery-avoidance and work-avoidance goals.

Sex and Age Differences in Profile Endorsement

Sixteen studies examined group differences of sex or age in students' achievement goal profiles. Of those 16 studies, 12 studies identified group differences. Female students were more likely to be in maladaptive profiles, with five studies finding higher female representation in *Average All* and *Low All* profiles (Levy-Tossman et al., 2007; Wang et al., 2007; Conley, 2012; Méndez-Giménez et al., 2014; Mädamürk et al., 2021). In contrast, six studies identified that female students were significantly more likely to adopt moderate or high levels of mastery goals than males (Luo et al., 2011; Schwinger et al., 2016; Zhang et al., 2016; Tuominen et al., 2020; Yu and Mclellan 2020; Mädamürk et al., 2021). Male students were more likely to be in more adaptive profiles, with seven studies finding more male representation in *High All* and *High Mastery* goal profiles (Levy-Tossman et al., 2007; Wang et al., 2007; Liu et al., 2009; Luo et al., 2011; Méndez-Giménez et al., 2014; Zhang et al., 2016; Yu and Mclellan, 2020). Only one study (Méndez-Giménez et al., 2018) identified age differences between the profiles, and found that younger students were highly represented in the *High All* or *High Mastery* profile.

Measurement, School Subject Area, and School Differences in Profile Endorsement

When comparing the types of profiles being produced from these achievement goal questionnaire measures, the high endorsement goal profiles of *High Mastery, High All,* and *High Performance* were the most prevalent profiles produced from the PALS questionnaire. In contrast, *Average All* and *Low All* were the most commonly reported profiles when using the AGQ followed by students displaying a *High All* profile.

The studies exploring general academia (N = 15) revealed that *High Mastery* (n = 15, 100%), *Average All* (n = 14, 93%), and *High All* (n = 12, 80%) were the most established profiles and were reported in nearly all these studies. Studies that examined goal profiles in mathematics and science (N = 16) revealed that students were mostly likely to display a *High All* (n = 13, 81%), *Average All* (n = 10, 63%), or *High Mastery* (n = 9, 56%) profile. In contrast, of the studies that investigated students' profiles in PE (N = 8), *Low All* (n = 7, 88%), *High Mastery* (n = 6, 75%), and *High All* (n = 6, 75%) were the most frequently exhibited profiles. The final school subject areas of humanities and languages (N = 7), which included English, history, and modern foreign languages, revealed that students were most likely to adopt *High All* (n = 5, 71%) or *Average All* (n = 4, 57%) profiles.

In the 38 samples that explored students over the age of 11, *High Mastery* (*n* = 30, 79%), *High All* (*n* = 29, 76%), and *Average All* (*n* = 26, 68%) were the most common profiles adopted in this age group. From the eight samples that examined profiles adopted by students aged 11 or below, *High All* (*n* = 8, 100%), *Average All* (*n* = 6, 75%), and *High Mastery* (*n* = 6, 75%) were the most frequently expressed profiles. Lastly, three samples explored the types of profiles adopted when transferring schools (e.g., from primary to secondary school in the UK), and found *Average All* (*n* = 3, 100%), *High All* (*n* = 3, 100%), and *High Approach* (*n* = 2, 67%) were the most common profiles shown by students during this transfer period.

Educational Outcomes

A total of 225 outcomes were explored in the 42 studies. These outcomes were coded and then classified into ten higher order outcomes: motivation and motivation-related behaviours; achievement; learning, engagement, and performance strategies; hedonic and eudaimonic well-being; self-perception; attitudes and values; hedonic and eudaimonic ill-being; environment influences and group dynamics; physical activity; and beliefs about the purpose of education. The four most frequently investigated higher order outcomes are discussed further in the following section, the remaining higher order categories are located in the appendix 2 (p.286).

Motivation and motivation-related behaviours was the most investigated outcome category with 41 different outcome variables being examined from 23 studies. Students in the *High All* profile reported the highest level of motivation and related behaviours for 46% of the 41 motivational outcome variables. They were more likely to score the highest in effort, interest, intrinsic motivation, and perceived competence, but also for maladaptive outcomes such as controlled motivation and fear of failure. Students in the *High Approach* and *High Mastery* profiles reported the second and third highest percentages with 15% and 13%. These students were more likely to report high mean scores for liking, confidence, ability, intention, and relative autonomy index. Students in the *High Performance, Average All,* and *Low All* profiles were more likely to report positive associations with more maladaptive motivational outcomes such as amotivation, maladaptive behaviours, external regulation, and effort costs.

Achievement was the second most investigated category with 20 studies exploring students general and subject-specific achievement, test scores, and school grades. Students in the *High All* profile produced the highest achievement scores for 44% of the achievement sample. These students scored high levels on subject achievement (e.g., mathematics, science, reading, English) and test performance. Students in the *High Mastery* profile also had high levels of achievement (33%) in general achievement, mathematics performance, and school grade. Students in *High Avoidance* and *Average All* profiles reported the lowest levels of achievement.

Nineteen studies examined outcomes from the higher order category of *learning, engagement, and performance strategies*. Students in the *High All* profile reported the highest average scores for 29% of the 19 studies. These students were more likely to score high in engagement, critical thinking, communication skills, organisation, and problem-solving skills. Students displaying *High Mastery* produced the highest mean scores for 19% of the category sample and were associated with high levels of adaptive help-seeking, emotional engagement, school engagement, and knowledge. Students in *High Approach* profile reported the highest levels for 12% of the category outcomes. These students were more likely to display high scores in cognitive engagement, homework engagement, time management, and metacognitive self-regulation. Students in the more maladaptive profiles such as the *Low Mastery* and *Average All* profiles, produced strong associations with maladaptive outcomes such as school impairment, disruptive engagement, help-seeking avoidance, and maladaptive learning strategies.

Hedonic and eudaimonic ill-being was the fourth most frequently explored category with 15 studies investigating the relationship between achievement goal profiles and ill-being. Seventeen different *ill-being* outcomes were examined, and studies found that students in the *High All* profile reported the highest scores for 37% of the measured *ill-being* outcomes. Students in this profile were more likely to display high levels of test anxiety, exhaustion burnout, depressive symptoms, and stress. Students displaying *Average All* levels of achievement goals produced the highest mean scores for 33% of the *ill-being* sample, which included emotional exhaustion, scepticism, worry, cynicism burnout, and inadequacy burnout. Students in the maladaptive profiles of *Low All* and *High Avoidance* produced high scores in 26% of the *ill-being* sample. These profiles were correlated with high levels of negative affect, cynicism, inadequacy, and boredom. In contrast, students in the *High Mastery* profile reported strong negative associations with maladaptive outcomes such as, negative affect, anxiety, boredom, and worry.

Discussion

The aim of this scoping review was to explore the types of approach-avoidance achievement goal profiles exhibited by students in primary and secondary school education (aged 4 to 18 years old). This study systematically reviewed 42 studies comprising of 31,350 participants published from 2006 to 2022, and investigated age and school subject differences, methodological differences in the measurement of achievement goals, and examined the relationship between profiles and educational outcomes. Results indicated that age and school subject differences do exist and that the type of measurement used had an influence on the profiles produced and thus had an impact on the association with outcomes. This synthesis provides an insight into the current methods conducted, the variety of profiles adopted by students of a range of ages and school subjects, and their relationship with educational outcomes, and implications to future research.

Study Characteristics

The review indicated that cross-sectional research has been dominant in the design of studies that seek to explore students' achievement goal profiles. Longitudinal research designs have become more popular, with increases in these designs over the last 10 years. The cross-sectional focus of research in this area has led to different profiles being identified, described, and associated with a range of positive and negative outcomes. However, these studies can only conclude about the short-term adaptiveness of achievement goal profiles and are unable to investigate the sustained benefits associated with profile membership stability or change. Future research should embrace the emerging trend for longitudinal designs in this area as profile membership stability allows researchers to identify key periods in students' school careers where they could be most vulnerable to adopting maladaptive profiles. Moreover, this longitudinal research should endeavour to explore achievement goal adoption in a range of different subject areas. Our findings suggest that current longitudinal work is limited to the areas of general academia, English, mathematics, science, and languages with a lack of evidence emerging in areas such as PE, geography, and art. If we are to fully understand and explore students' motivation in education settings, we should examine a range of subject areas to ensure positive motivational experiences across the school curriculum.

It was also established that most studies analysed achievement goal profiles in students aged between 11 to 18 years old. Although this gives a comprehensive insight into the profiles displayed by older students, researchers have less of an understanding about the types of profiles endorsed by younger students, and if their profile preferences change throughout their school careers. The small number of studies that have investigated students aged 11 and below (e.g., Schwinger et al., 2016; Hornstra et al., 2017; Ning, 2018) have shown that younger students are capable of endorsing multiple goals and can reap the benefits of the more adaptive profiles. Therefore, further research investigating younger students' achievement goal adoption in their early school career (e.g., primary or elementary school) and over the transfer to high school is warranted.

It was identified that most of the studies explored achievement goal profiles using the trichotomous model. This is likely a result of the selection of the PALS questionnaire which only measures mastery, performance-approach, and performance-avoidance goals. Selection of this perspective ignores Elliot's more recent developments (i.e., Korn and Elliot, 2016; Korn et al., 2019) of the standpoints on competence and standards of competence evaluation, and its integration with the approach-avoidance distinction. The 2x2 standpoints and standards model differentiates between competence development, self-referential and task-referential for mastery goals, and the distinguishment between competence demonstration and other-referential for performance goals. However, these aspects of achievement goals have largely been ignored when exploring students' achievement goal profiles in education.

Multiple Goal Adoption

This synthesis has provided an insight into the debate regarding the adaptiveness of adopting multiple goals in comparison to high mastery goal endorsement. This scoping review revealed that *High All* and *High Mastery* were the most frequently occurring profiles displayed by this sample of young students, illustrating that they are highly likely to endorse high levels of both approach and avoidance goals. This differed to Wormington and Linnenbrink-Garcia's (2017) findings that *Mastery High* and *Approach High* were the most prevalent and associated with the most positive educational outcomes in older students. They reported that the two profiles did not differ significantly on any outcomes investigated, suggesting that both were adaptive and commonly endorsed by students. In contrast, when exploring the relationships between the most prevalent profiles and outcomes, this review found that although the *High All* profile was associated with many positive outcomes, students situated in this profile were also more likely to report experiences of maladaptive outcomes as well. These strong associations with negative outcomes are most likely the result of the high levels of performance-avoidance goals when accompanying the high performance-approach goal. Findings also revealed that 83% of the sample reported profiles where performance-approach and performance-avoidance goals produced similar levels, compared to just 17% where goals were independently pursued. This supports previous claims that performance-approach goals co-occur with, or gives rise to performance-avoidance goals (Midgley et al., 2001; Linnenbrink-Garcia et al., 2012). Although this review shows that endorsing high performance goals may add to already highly positive outcomes through the endorsement of mastery goals, the addition of high avoidance goals leads to high levels of some negative outcomes. To understand the nature of performance-approach goals and their adaptability with mastery goals, research needs to explore this goal without the influence of performance-avoidance goals.

Identifying the Most Maladaptive Profile

Interestingly, the data showed that the *Average All* profile may be the most maladaptive profile and when coupled with its popularity as the third most prevalent profile in the studies reviewed provides a worrying motivational picture for students. Students in this profile reported experiencing the highest scores for nearly 30% of all negative outcomes and was more than the students in the *Low All* or *High Performance* profiles, which one might expect to be associated with the most negative outcomes and, therefore, be the most maladaptive profiles. Findings are consistent with the previous review of Wormington and Linnenbrink-Garcia's (2017), which identified the *Average All* profile as one of the least adaptive profiles across all outcomes. However, the age of the sample reviewed appears to have influenced the prevalence of this maladaptive profile; our findings contrast with those of Wormington and Linnenbrink-Garcia's review which identified the *Average All* profile as the most prevalent in the studies they reviewed. Collectively, these findings, in addition to the data produced by Wormington and Linnenbrink-Garcia, highlights that motivational profiles for education may move towards an average/moderate level over time which given their association with negative outcomes is worrisome. Future studies should focus their attention and efforts on these students expressing the *Average All profile,* and explore reasons why average goal adoption can be so detrimental, what factors are associated with movement between profiles to the *Average All* profile over time, and if this profile remains stable throughout key transitions and transfers in education.

Measurement Influence

This review also highlighted that the number of goals measured and the instrument used can strongly influence the type of profiles reported by students. Studies that conducted research using the PALS measurement (3 goals) were more likely to produce adaptive profiles including, *High Mastery* and *High All* profiles, compared to studies that used the AGQ or its variations (4 goals) in which less adaptive profiles, such as *Average All* and *Low All* profiles were more likely. Several studies and reviews have investigated the comparability of these two achievement goal measurements (e.g., Hulleman et al., 2010; Senko et al., 2011; Hackel and Mueller, 2016). Collectively, this evidence suggests that the AGQ and PALS offer similar conceptions for mastery goals, however, the two instruments vary in their theoretical and operational definitions of performance goals. The PALS measures appearance-based performance goals or exhibiting competence to others. In contrast, the AGQ assesses normative performance goals, which focuses on outperforming others. Moreover, the AGQ and PALS did not predict similar educational outcomes which could be due to the variations in the operationalisation of achievement goals during measurement. The inconsistencies in measurement focus can impact the type of profiles formed and whether they are likely to be considered adaptive or maladaptive (e.g., Hulleman et al., 2010; Hackel and Mueller, 2016; Senko and Dawson, 2017), which is reflected in the findings of this review. For example, the PE-focused studies in this review were more likely to select a measure based on the AGQ which lacks the appearance-based element of performance goals within a subject where self-presentation can be highly important to the individual. Despite studies and meta-analytic reviews calling for an appearance-competition distinction (e.g., Urdan and Mestas, 2006; Hulleman et al., 2010), limited exploration has been made especially in PE where both elements play significant roles in students' motivation (e.g., Warburton and Spray, 2014). It is suggested that future measurements should consider the integration of the competition and appearance distinction to fully understand the effects performance goals have on educational outcomes.

Sex and Age Differences

Despite the motivational literature highlighting the role that sex and age can have on a student's motivation in education (Meece et al., 2006; Bugler et al., 2015), there has been limited exploration of their effects when conducting person-centred research. This review revealed that only 38% of the studies investigated sex or age differences within and between the achievement goal profiles. Of those 16 studies that explored these differences, 75% identified significant differences in the achievement goal profiles. Previously, researchers have been encouraged to devote greater attention to female students in motivation studies (e.g., Wang and Liu, 2007; Rodríguez et al., 2020; Heyder et al., 2021); findings supported this notion with high female representation in the maladaptive profiles of *Average All* and *Low All*. In contrast, male students had high representation in the *High Performance* and *High All* profiles. However, there were varied findings regarding mastery goal adoption, with some studies finding that female students were more likely to adopt moderate or high levels of mastery goal profiles than males, while others found that male students reported high levels of mastery goal adoption. Although, there were some discrepancies concerning sex differences, it does support the belief that female students are highly represented in more maladaptive profiles in education.

This scoping review also investigated school-level age differences in students' achievement goal profiles and identified a lack of research with students aged between 4 and 11 years old. Studies that had explored this age group examined in subjects such as English, mathematics, and science but lacked exploration of other key areas such as PE, which provides a unique setting compared to other subjects where their physical ability is continuously on display in front of their teacher and peers (Fernandez-Bustos et al., 2019), and has an essential role in future attitudes and behaviours towards physical activity (Biddle, 2001; Duda, 2001; Hagger et al., 2003; Polet et al., 2019; Coulter et al., 2020). The current review showed that younger students were more likely to adopt the *High All* or *Average All* profiles than any other goal profile, implying that these students were not able to distinguish between the goals. Previous research reported that younger students were more likely to pursue both approach and avoidance goals together, and as they get older become more differentiated (Bong, 2009; Wormington and Linnenbrink-Garcia, 2017). However, some samples did produce the *High Mastery, High Approach,* and *High Avoidance* profiles suggesting that some students in this age range do have the ability to distinguish between approach and avoidance goals. This aspect needs further exploration to see whether primary-aged students are able to differentiate and endorse different achievement goals.

Implications to Future Research

The aim of this scoping review was to present the current literature on person-centred achievement goal studies in primary and secondary school education, by identifying combinations of achievement goals, the adaptiveness of these profiles on academic outcomes, and group differences. Although results highlighted the considerable growth in person-centred studies over the last decade, there was clear evidence of imbalance in where the research efforts have been focused. Most importantly was the lack of longitudinal studies when investigating students' achievement goal profile membership. The overabundance of cross-sectional data only provides us with a snapshot of these profile memberships at a single time point and restricts our conclusions concerning the stability and adaptiveness of these profiles. A focus on conducting longitudinal studies would not only allow for a better understanding of the nature of achievement goal profiles, but also address current theoretical debates surrounding the goals. For example, the adaptiveness of performance goals over long periods of time in comparison to mastery goals. It can also inform and advise educators in the creation of interventions targeted at students in the maladaptive profiles.

A second limitation of the existing literature is the scarcity of research exploring primary aged students' achievement goal profiles. The majority of research over the last 15 years has primarily concentrated on older students' or young adults' adoption of achievement goals. Contrary to some theoretical viewpoints (i.e., Nicholls, 1984; 1989), the studies in this review that examined younger students (aged 4-11 years) established that they are able to endorse multiple achievement goals in the school setting. However, due to the limited number of studies in this age range, it is unclear if they are pursuing multiple goals because they are unable to distinguish between mastery-performance and/or approach-avoidance goals. It is recommended that future research should employ cross-sectional and longitudinal designs to further explore young students' adoption of achievement goals and how the stability and adaptiveness compare to older students.

Moreover, since the conception of AGT (Nicholls, 1984; Dweck, 1986; Elliot 1999), there has been a range of conceptual developments emerge (e.g., Korn et al., 2019). In particular, the development of performance-approach and performance-avoidance goals, with the further definition distinguishment between normative, appearance, and evaluative aspects (Elliot, 2005; Urdan and Mestas, 2006; Hulleman, et al., 2010; Warburton and Spray, 2014; Senko and Dawson, 2017). However, it seems that current instruments only measure certain aspects of these goals which can influence the type of profiles being produced. This review found that school subjects such as mathematics, science, and English were more likely to conduct their research using the PALS measurement, which emphasises appearance-based performance and displaying competence to peers, and were more likely to produce more adaptive profiles, such as the *High All* and *High Mastery* profiles. In contrast, school subjects where students' abilities are on display, such as PE, which had a preference for using the AGQ measurement, and assessed normative performance goals, resulted in more maladaptive profiles, such as the *Low All* and *Average All* profiles. Recent reviews have shown that these inconsistencies in the measurement have resulted in a mixed empirical pattern being reported (Hulleman et al., 2010; Senko and Dawson, 2017). Despite these recommendations to differentiate and measure both appearance and competition elements of performance goals, there continues to be a lack of instruments measuring these aspects of performance goals, which would provide a greater understanding of students' motivational processes than just the approach-avoidance distinction (Warburton and Spray, 2014). However, what is also important is whether students themselves can differentiate between appearance and competition goals when they are presented together in a measure. Furthermore, future research may want to consider the following questions: i) What are the similarities and differences in goal endorsement by students at primary and secondary educational stages? ii) What are the effects of student profile adoption over key academic transfers and transitions?; and iii) What predicts changes in student profile endorsement?

Conclusion

In conclusion, this scoping review provides a comprehensive evaluation of the current person-centred achievement goal literature in school education. It provides important insights into the continuing debate regarding the adaptiveness of performance goals and multiple goal endorsement. Results highlight the vulnerability of students exhibiting maladaptive outcomes when endorsing average levels of all goals. However, in general, research in this field is overrepresented by cross-sectional data conducted at secondary school level. This scoping review suggests several important areas for future work in order to understand the complexity of achievement goal profiles and multiple goal adoption. Future research would benefit from longitudinal designs across key educational transitions and transfers, in other key school subjects beyond English, mathematics, and science to enhance our understanding of the nature of multiple goal endorsement and the long-term impact these profiles have on educational outcomes. A focus on the developmental perspective of achievement goals would allow researchers and educators to further their knowledge on the goals adopted by younger students, and if the endorsements result in the same outcomes as older students. Finally, further attention is needed on the appearance-competition elements of performance goals, especially in school subjects such as PE where competition and appearance elements play such key roles in a student’s motivation, and whether these elements can be incorporated into students’ multiple goal pursuits and their effects on educational outcomes. While this scoping review provides insight into the current achievement goal profile literature in primary and secondary school education, future research may wish to extend these findings by including studies not considered in this current review. This synthesis was limited to primary and secondary school education achievement goal studies that have been peer-reviewed, written in the English language, and have measured at least three achievement goals. Future reviews may wish to measure achievement goals in different achievement domains (e.g., sport and physical activity, employment, higher education), or include studies that were exempt from the search such as non-English written studies.

Chapter 4

Study Two: Multiple Goal Pursuit in PE: The Identification and Consequences of Approach Goal Profiles in Adolescent Students

Abstract

The study explored early adolescents' adoption of more nuanced approach goals to see if they could differentiate between these goals, adopt distinctive achievement goal profiles, and their association with adaptive and maladaptive educational outcomes. Preliminary analyses revealed that students (Year 5 to Year 8) could distinctly differentiate between mastery-task, mastery-self, performance-competition, and performance-appearance goals. Latent profile analysis presented five profiles; *High Mastery, High All, High Performance, Indifferent,* and *Low All*. Students in the *High All* profile reported similar optimal outcomes (e.g., high physical self-worth, physical activity levels, effort, and attainment) to students in the *High Mastery* profile. In contrast, students in the *High Performance* profile reported similar maladaptive outcomes (e.g., cognitive anxiety, low effort, attainment, and engagement) to students in the *Low All* profile. However, across the profiles students reported similar levels of task-based and self-based goals, likewise competition-based and appearance-based goals, implying that younger students struggle to differentiate between mastery-task and mastery-self, and performance-competition and performance-appearance goals. Future research should examine these nuanced goals longitudinally to see if the 3x2 model and theoretical developments are applicable to students across their school career.

Introduction

Initial research on achievement goal theory (Nicholls, 1984; Dweck, 1986) focused on two primary goals: mastery goals, which emphasised developing's one competence, and performance goals, which focused on demonstrating one's competence compared to others. Originally the adoption of mastery goals was seen as more beneficial to a student's learning and achievement than performance goals (Dweck and Leggett, 1988; Ames, 1992). However, the bifurcation of the goals to include the approach and avoidance distinction, led researchers to identify the adaptiveness of performance-approach goals (Elliot and Church, 1997; Elliot, 1999). Subsequently, a growing body of research has explored the benefits of endorsing both mastery and performance-approach goals on students' motivation and achievement (e.g., Pintrich, 2000b; Barron and Harackiewicz, 2001). This multiple goal perspective has led studies to investigate the effects of endorsing multiple goals compared to one dominant goal especially within education (e.g., Schwinger and Wild, 2012; Jansen in de Wal et al., 2015; Hornstra et al., 2017). However, recent reviews have highlighted the differences in the measurement and conceptualisation of performance-approach goals, producing inconsistent empirical patterns (e.g., Hulleman et al., 2010; Senko and Dawson, 2017). Despite recommendations of further distinctions between competition and appearance aspects of performance-approach goals, little exploration of this avenue has been made. Furthermore, the additional bifurcation of mastery goals into self and task components also requires examination. Nonetheless, there is limited evidence of whether students in early adolescence can differentiate these goals and if they can pursue these goals in combination within the school setting.

Approach-Focused Achievement Goals

Achievement goal theory (Nicholls, 1984; Dweck, 1986; Elliot, 1999) and its research has undergone several major changes over the years from its conception. In the initial dichotomous model proposed by Nicholls (1984) and Dweck (1986), researchers differentiated between two types of goals that varied on the focus of competence: mastery goals, which focused on the development of competence, and performance goals, which focused on the demonstration competence and outperforming others. Elliot (1999) and Urdan (2000) suggested that the original model consisted of two subcomponents that could be explored separately. The first subcomponent distinguished between different *standpoints of competence*, which proposed that competence could be developed or demonstrated. The second subcomponent distinguished between different *standards of competence*, which evaluated competence by task/self-based or other-based standards. As a result, mastery goals denoted an emphasis on developing competence using a task/self-based standard of evaluation, and performance goals represented demonstrating competence using an other-based standard of evaluation. Elliot and Harackiewicz (1996) also included the subcomponent of the *valence of competence,* which distinguished between goals focused on approaching success or goals focused on avoiding failure. However, despite these proposed subcomponents of achievement goals, the trichotomous model, and the 2x2 model only considered the *standards of competence* and the *valence of competence.* Within these models, mastery-approach goals focused on attaining success relative to the absolute demands of the task or one's own past performance. Elliot et al. (2011) expanded the achievement goal model further through factorial separation, with research recognising that individuals could focus on mastery of a task separately from personal improvement (Mascret et al., 2015). The model included the three different standards to evaluate competence (task, self, and other), accompanied with the approach and avoidance distinction, producing a 3x2 achievement goal model. In many narrative reviews of the achievement goal literature, there is a consensus concerning the conceptualisation and outcomes of mastery-approach goals compared to performance approach goals (Hulleman et al., 2010). Research has consistently shown that mastery-approach goals are associated with a plethora of adaptive outcomes and motivational processes, such as effort, interest, intrinsic motivation, and persistence (Grant and Dweck, 2003; Harackiewicz et al., 2008; Liem et al., 2008; Vrugt and Oort, 2008).

In contrast to mastery-approach goals, performance-approach goals have changed and varied from their initial development (Wirthwein and Steinmayr, 2020). Originally, performance-approach goals focused on the demonstration of competence and 'towards the attainment of favourable judgments of competence' (Elliot and Church, 1997, p.218). Since then, researchers creating measurements for performance-approach goals have concentrated on different aspects of the goal. When developing the Patterns of Adaptive Learning Survey (PALS), Midgley et al. (2000) focused on the demonstration of high ability/competence. Nicholls (1984) added a social comparison element to the Motivation Orientation Scale (MOS, Duda and Nicholls, 1992), whilst Elliot and Murayama (2008) only focused on normative comparison in their Achievement Goal Questionnaire-Revised (AGQ-R). These differences in measurement focus have led to disagreements on the adaptiveness of performance-approach goals, suggesting that the approach-avoidance bifurcation does not fully explain the nature and effects of performance-approach goals (Hulleman et al., 2010). Meta-analytic reviews of the achievement goal measures in the educational domain revealed that when performance-approach goals were associated with maladaptive outcomes, the measures used did not differentiate between a competition (normative) element and an appearance element (Hulleman et al., 2010; Senko and Dawson, 2017). This notion was supported by Urdan and Mestas (2006), who's qualitative study found that students' reasons for performance goal endorsement were categorised into approach-avoidance and appearance-competition distinctions (e.g., wanting to look smart, and wanting to do better than others).

These two main components of performance-approach goals have been mentioned throughout the literature, including in the original works of Dweck and Elliot (1983), Nicholls (1984), and Elliot (1999, 2005). They described these goals as trying to look good to others (appearance) and trying to do better than others (competition). It has also been argued that these goals have distinct effects on motivation and behaviour in achievement settings, especially under challenging conditions (Hulleman et al., 2010; Warburton and Spray, 2014; Daumiller et al., 2019). However, there are very few studies that have explicitly addressed these two key components of performance-approach goals empirically or investigated their relationships with motivational outcomes. In their meta-analysis, Hulleman et al. (2010) found that research using measures comprised of competition-focused items reported a positive relationship with performance, whilst research using measures that focused on the appearance aspect of performance goals, were negatively correlated with performance. Furthermore, educational literature found that competition goals produced higher positive associations with academic achievement, competence and perceptions, and self-regulation than appearance goals (e.g., Hulleman et al., 2010; Wirthwein et al., 2013). Within the PE setting, Lee and Bong (2021) established that the appearance goal arose as an adaptive predictor of behavioural, cognitive, and emotional learning outcomes. This contradicted previous PE literature that found competition-approach goals as the positive predictor for learning and performance, whilst appearance-approach goals negatively predicted these outcomes (Warburton and Spray, 2014). Lee and Bong (2021) concluded that mastery-approach goals play a more essential role in students' cognitions, whereas performance-approach goals are more associated with behavioural and emotional elements of learning.

Multiple Goal Perspective

Whilst some researchers believe it is how the performance goals are defined and measured, others propose that the inconsistent associations with performance goals are dependent on which other goals are simultaneously adopted (Pintrich, 2000b; Harackiewicz et al., 2002). Various educational and sports domain studies have supported this view that students can pursue multiple goals simultaneously through analyses such as goal profiling (e.g., Pastor et al., 2007; Luo et al., 2011; Jansen in de Wal et al., 2015; Wang, Morin, Ryan et al., 2016). However, questions arise as to which combinations of goals are the most beneficial to students' optimal performance and motivation, and the process involved (Harackiewicz et al., 1998). Some researchers believe that only pursuing mastery goals yields motivational benefits (Midgley et al., 2001; Kaplin et al., 2002), arguing that the additional endorsement of performance-approach goals would be costly and impact the adaptiveness of the outcomes associated with mastery goals.

In contrast, from the multiple goal perspective, students that adopt both mastery-approach and performance-approach goals concurrently, experience greater benefits and outcomes compared to students that only pursue one type of goal (Barron and Harackiewicz, 2001; Harackiewicz et al., 2002). Senko et al. (2011) also reported that students that endorsed both types of approach goals reaped the benefits associated with each individual goal. Others have suggested that performance-approach goals can promote important achievement outcomes as they can help students orient towards competence (Harackiewicz and Sansone, 1991). Some educational literature has indicated students that display high approach goals have equally or more adaptive educational and motivational outcomes compared to students that only adopt high mastery goals (e.g., Pintrich, 2000c; Tuominen-Soini et al., 2008; Hornstra et al., 2013; Hornstra et al., 2017), whilst some are inconclusive regarding this notion (Schwinger and Wild, 2012).

The increasing interest and debate surrounding the multiple goal perspective has led to an increase in the use of person-centred approaches in the last 20 years. The ability to identify subgroups of individuals expressing distinct profiles, have allowed researchers to explore questions regarding how these goals interact and the effects they have on a variety of motivational outcomes (Pastor et al., 2007; Gonçalves et al., 2017). Although the traditional variable-centred approach can investigate relationships between goals, some have argued that this approach applies an artificial structure on the observed data, therefore not reflecting that goals can vary within the same individual (Wang, Morin, Ryan et al., 2016). Person-centred approaches concentrate on the individual's similarities and differences of achievement goals, rather than just the relationships among them, thus improving researchers understanding of achievement goal theory (Morin et al., 2016). The identification of individuals' profiles and trajectories can provide practical value as they offer a more overarching perspective of individuals' configuration of motivation-based functioning instead of dividing an individual into different motivation-relevant dimensions (Vansteenkiste et al., 2020). As students can hold varying degrees of achievement goals at one particular time, using a person-centred approach to identify approach goal profiles, gives researchers a more holistic view on how these motivational constructs interact at an intrapersonal level.

Multiple Goal Profiles within Children and Adolescence

Despite the increased interest in multiple goal pursuit in the last decade, it is still not clear which combinations of goals may be exhibited by younger students due to the lack of studies investigating primary school students' achievement goals (Schwinger and Wild, 2012; Hornstra et al., 2013). The majority of the existing literature that has explored multiple goal pursuit has been on university or secondary school samples in an environment that arguably becomes more performance-focused the older the students become (Midgley et al., 1989, 1993, 2001). Developmental research has shown that younger students' goals are less clearly differentiated and strongly correlated with one another compared to older students (Bong, 2001, 2009). This is consistent with Nicholls' (1984, 1989) perspective that at around the age of 12, children start to obtain a *differentiated* conception of ability in which they can distinguish between effort and ability. They begin to infer higher ability when the same level of performance is achieved with less effort, and children start to incorporate social comparison when evaluating their own competence (Bong, 2009). Once a differentiated conception develops, children are capable of using both the undifferentiated or differentiated conceptions of ability, therefore, the ability to adopt both mastery and performance goals. However, despite Nicholls' initial work on goal differentiation, a plethora of developmental studies have found that primary school children have the capability to pursue multiple goals at the same time (e.g., Schwinger and Wild, 2012; Hornstra et al., 2017; Ning, 2018). Yet, it is unclear if this is because these younger students are unable to differentiate between mastery and performance goals, and as a result endorse the goals at similar degrees of strength. Research demonstrated that younger students would have stronger endorsements for approach goals, especially mastery-approach goals, as they are more likely to perceive an achievement situation as task and improvement focused and evaluate their competence as absolute (Eccles et al., 1993; Harter, 1998).

The literature continues to highlight the mixed findings of the adaptiveness of a high multiple goal pursuit in school children. Within the general educational settings, some cross-sectional and longitudinal studies have found that the profile displays high levels for effort, engagement, enjoyment, positive affect, positive attitudes, and levels of extra-curricular school sport (Carr, 2006; Liu et al., 2009; Luo et al., 2011; Gonçalves et al., 2017; Ng, 2018), whilst others found the highest scores for anxiety, negative affect, and burnout (Luo et al., 2011; Liu et al., 2020; Tuominen et al., 2020). Although, the majority of these studies have included high performance-avoidance goals when they identify a high goal pursuit and is most likely to cause for the more maladaptive findings associated with high goal pursuit. Therefore, the approach goals need to be explored without the influence of avoidance goals to fully understand the adaptive nature of performance-approach goals.

Consequences of Multiple Goal Pursuit

When investigating students' achievement goal profiles, teacher-reported measures have been a valuable tool used by studies to investigate students' grades, attainment, and behaviours within the classroom (e.g., Hornstra et al., 2017). Yielding multiple perspectives creates more accurate and actionable information regarding the student, thus having positive implications for the classroom, school practice, and policy (ACT, 2013). Currently, students displaying high pursuit of all goals have reported the highest levels for effort (Liu et al., 2009; Schwinger and Wild, 2012) and engagement (Gonçalves et al., 2017; Shim and Finch, 2014). Cross-sectional and longitudinal data has shown students adopting high approach goals have been associated with high effort (Hornstra et al., 2017) and attainment (Luo et al., 2011; Lo et al., 2017). In contrast, other researchers have found that the endorsement of high mastery goals leads to high levels of engagement (Tuominen-Soini et al., 2008, 2012; Shen et al., 2009; Tuominen et al., 2020) and attainment (Jang and Liu, 2012). In terms of disruptive behaviours, research have identified that students in high performance goal profiles or average goal pursuit are more likely to display disruptive behaviours in lessons (Shim and Finch, 2014; Ng, 2018; Madjar et al., 2021).

Cognitive anxiety such as worry and concentration disruption have been popular outcomes to measure in the school environment, where assessments and evaluation situations frequently occur (e.g., Jang and Liu, 2012; Shim and Finch, 2014; Paul et al., 2021). High levels of anxiety can impact a student's memory, academic performance, and their well-being (e.g., Owens et al., 2012; Steinmayr et al., 2016; Chin et al., 2017). Person-centred studies have shown that students that pursue high levels of performance goals accompanied with low high of mastery goals are most likely to display high levels of anxiety in the classroom (Luo et al., 2011; Liu et al., 2020), however, anxiety has yet to be explored in PE person-centred studies.

Despite research highlighting that physical activity can provide physiological and psychological benefits (Brown et al., 2013), how students perceive their body is one of the most influential factors impacting their psychological well-being, particularly during adolescence (Fernández-Bustos et al., 2019). Physical self-worth is the evaluation of one's own good or worth in their self-description (Whitehead, 1993; Kosmidou et al., 2013). Younger students have relatively high physical self-worth which gradually declines over the years especially among females (Kantanista et al., 2015). Body dissatisfaction can be high during a time when students are more self-conscious about their bodies and increased social comparison in a physical setting such as PE, where students are physically on display in front of their teacher and peers (Fernández-Bustos et al., 2019). However, although the impact students' body image can have on their mental health, there is limited exploration of how achievement goal profiles can influence students' physical self-worth (Kavussanu, 2007).

While there is strong evidence that physical activity has a positive influence on young peoples' physical and psychological health (Wang et al., 2008), there continues to be a steep decline in physical activity involvement in early adolescent years (Pate et al., 2005; Shen et al., 2009). Thus it is important to explore of the types of achievement goals students adopt, as it impacts on their physical activity levels outside of PE lessons, then consequently, their desire to pursue their sporting interests beyond compulsory PE. Previous studies in PE have shown that a high mastery profile produced the highest levels of physical activity levels, however none of these studies identified a high all profile in their analyses (Carr, 2006; Wang et al., 2008;

Shen et al., 2009). Only Wang, Morin, Liu et al. (2016) identified a high achievement goal profile that produced the highest levels of intention and participation of physical activities.

The Present Study

The purpose of the present study was to explore if goal developments proposed by Elliot et al. (2011; Korn and Elliot, 2016) and identified within the literature (e.g., Hulleman et al., 2010; Warburton and Spray, 2014; Senko and Dawson, 2017), are applicable to younger students. Specifically, if primary and secondary school students could differentiate between these more nuanced context-specific approach goals (mastery-task and mastery-self, and performance-competition and performance-appearance goals), and how these goals combined to influence student-reported physical self-worth, worry, concentration disruption, physical activity levels, and teacher-reported effort, attainment, engagement, and disaffection.

This study also sought to address the following issues that have been underemphasised in the current multiple achievement goal literature. Firstly, although in more recent years the goals have been further differentiated and defined (Elliot et al., 2011), most of the educational and sports literature has used the goals from either the dichotomous (e.g., Wang, 2002; Wang and Liu, 2007), trichotomous (e.g., Levy-Tossman et al., 2007; Conley, 2012; Lee et al., 2020), or the approach-avoidance perspective (e.g., Liu et al., 2009; Lo et al., 2017; Ning, 2018) in forming goal profiles. While research has shown that mastery-approach goals contain two different standards of evaluation (task and self goals), and the differentiation between a competition and an appearance component of performance-approach goals, there has been a lack of exploration of these conceptually nuanced goals, especially from a person-centred approach.

Furthermore, most of the research that has examined multiple goal pursuit have relied on university and secondary school students (e.g., Ng, 2009; Berger, 2012, Jang and Liu, 2012).

Only a limited number of studies in the educational literature (e.g., Schwinger and Wild, 2012; Hornstra et al., 2013; 2017; Schwinger et al., 2016) have investigated these profiles at primary school ages, however, this has yet to be reciprocated in the physical domain. Therefore, the primary aims of this study were to examine if early adolescent students could differentiate between task-based and self-based mastery-approach goals, and between competition-based and appearance-based performance-approach goals. Identify latent subpopulations (i.e., profiles) of these primary and secondary school students based on these more nuanced approach goals. Explore any demographic differences within the profiles identified and examine the associations between these profiles and a range of student-reported and teacher-reported affective, behavioural, and cognitive outcomes.

Method

Participants

A total of 799 students (389 males; 410 females) from two primary schools (n = 282, male n = 129, female n = 153, age M = 10.85, SD = .58) and two secondary schools (n = 517, male n = 260, female n = 257, age M = 12.87, SD = .30) located in the East of England participated in this study. The students were aged between 9 to 13 years old (M = 11.83, SD = .60) and were in Year 5 (n = 140, male n = 64, female n = 76, age M = 10.34, SD = .28), Year 6 (n = 142, male n = 65, female n = 77, age M = 11.36, SD = .29), Year 7 (n = 274, male n = 136, female n = 138, age M = 12.34, SD = .29), and Year 8 (n = 243, male n = 124, female n = 119, age M = 13.40, SD = .30). Although ethnicity data was not formally recorded most students were white British. Primary school students were taught in mixed-sex and mixed ability classes for PE, whilst secondary school students were taught in single-sex and mixed ability classes for PE.

Procedure

All procedures followed the ethical guidelines of the British Psychological Society and British Educational Research Association and received ethical approval from the institution's school research ethics committee (appendix 3, p.287). Access to each school and consent was obtained from the head teachers of the primary and secondary schools (appendix 4, p.288). Once approval from a school was given, parental information statements and consent forms were given via paper form to the students and their parent or guardian two weeks prior to data collection (appendix 5, p.289). Students' informed assent was obtained in paper form prior to data collection (appendix 6, p.293). Teachers' informed consent was obtained electronically via school email. All participants were reminded of their right to withdraw at any point during the study and that questionnaire answers remained confidential at all times. Participants in both primary and secondary schools completed the questionnaire during form time at the start of the day with their form tutor and researcher present. The questionnaire took approximately 15 minutes to complete. Teachers completed one questionnaire for every student in their PE class.

Measures

Two separate questionnaires were used within this research: a student self-reported questionnaire (appendix 7, p.296) and a teacher-reported questionnaire (appendix 8, p.300). These were developed using previously established validated and reliable measures that required some minor adaptions to align the questionnaires more closely with the PE context, for example, the stem of the questionnaires became PE focused. The questionnaires selected have been previously used within cross-sectional and longitudinal research in education and sport (e.g., Grossbard et al., 2009; Garn et al., 2012; Thomas and Upton, 2014; Warburton and Spray, 2014; Mulvenna et al., 2020) and have been completed by children as young as eight years old (Midgley et al., 1998). Students' demographic information was collected on the cover sheet of the questionnaire.

Student-Reported Questionnaire

Personal Information. Data collected included; sex, date of birth, year group, and PE class.

Mastery-Approach Goals. Two types of mastery-approach goals (mastery-task and mastery-self) were assessed using six items developed/adapted from Hulleman et al.'s (2010) meta-analysis review on achievement goals and Mascret et al.'s (2015) 3x2 Achievement Goal Questionnaire-Sport (AGQ-S). The two subscales were measured using a five-point Likert scale ranging from not at all true (1) to strongly agree (5). Following the stem 'In my PE class', example items include 'It is important to me to understand how to do new techniques' (mastery-task); 'I want to gain a broader and deeper knowledge of the activities we do' (mastery-self). Mulvenna et al. (2020) and Mascret et al. (2015) reported high factor loadings and internal consistency for the two subscales.

Performance-Approach Goals. Two types of performance-approach goals were assessed using Warburton and Spray's (2014) scale for performance-competition and performance-appearance, and was adapted using Senko and Dawson's (2017) meta-analytic review on defining performance goals and Mascret et al.'s (2015) 3x2 AGQ-S. The six items were measured using a five-point Likert scale ranging from not at all true (1) to strongly agree (5). Following the stem 'In my PE class', example items include 'I try to perform better than most other students' (performance-competition); 'I want to show the teacher and my classmates that I am good at PE' (performance-appearance). Warburton and Spray (2014) found that all items exceeded .55 for factor regression coefficients, and internal consistency estimates exceeded .70.

Physical Self-Worth. Students' perceptions of physical self-worth were assessed using three items from the short-version of Marsh et al.'s (2010) Physical Self-Description Questionnaire (PSDQ). These items were measured using a six-point Likert scale using the anchor points of strongly disagree (1) to strongly agree (6). An example item includes 'Physically, I am happy with myself'. This version of the PSDQ has reported good reliability, factor structure, and test-retest stability over the short and long-term (Marsh et al., 2010).

Cognitive Anxiety. Students' perceptions of worry and concentration disruption were assessed using the subscales from Smith et al.'s (2006) Sport Anxiety Scale-2 (SAS-2). Ten items were used to assess the two subscales using a four-point Likert scale ranging from not at all (1) to very much (4). Following the stem 'In my PE class', examples include 'I worry that I won't perform well' (worry); 'It is hard to concentrate in the lesson' (concentration disruption). Smith et al.'s (2006) identified that the subscale reliability coefficients were .89 for worry and .84 for concentration disruption.

Physical Activity. Students' moderate and vigorous physical activity in the last seven days was assessed using Crocker et al.'s (1997) Physical Activity Questionnaire for Older Children (PAQ-C). Five items were used to indicate students' physical activity levels using a five-point Likert scale, with higher scores representing higher levels of activity. An example item includes 'On the last weekend, how many times did you do sports, dance, or play games in which you were very active?' Thomas and Upton (2014) reported that the PAQ-C had good internal reliability, factor structure, and construct validity.

Teacher-Reported Questionnaire

Personal Information. Data collected included teacher's name, student's name, and student's class.

Effort and Attainment. Teacher-reported students' effort and attainment levels in PE using a commonly used school report system, using the stem 'Please select one that best describes the student's effort and attainment in PE'. Effort was measured using five levels; 1 being 'always works hard in PE class making the best possible use of time and strives to do his/her best'; 2 being 'usually works well in PE class making good use of time and tries to do his/her best'; 3 being 'generally works well in PE class performing to a satisfactory standard'; 4 being 'works well some of the time but can often be distracted losing concentration and performing below his/her capabilities'; 5 being 'too often makes very little effort and is content with doing the minimum possible'. Attainment was also measured using five levels, ranging from above average, good average, average, low average, and below average.

Behavioural Engagement and Disaffection. Teachers reported on students' behavioural engagement and disaffection using Skinner and et al.'s (2009) engagement versus disaffection with learning scale. Teachers reported using a four-point Likert scale from not at all true (1) to very true (4). Behavioural engagement was measured using four items assessing students' effort, attention, and persistence while initiating and participating in learning activities. An example includes 'In my PE class, this student works as hard as he/she can'. Behavioural disaffection assessed students' lack of effort and withdrawal from learning activities in the classroom. An example item includes 'When faced with a difficult task, this student doesn't even try'. Skinner et al. (2009) reported good internal consistency scores.

Data Analysis

Preliminary Analyses

Prior to addressing the main aims of this study, data was screened for univariate and multivariate normality, and outliers using SPSS 25 (IBM Corp). The dataset was examined for missing data to determine whether associations were evident between missing data and the variables measured. Any missing data was handled via the Full Information Maximum Likelihood (FIML) procedure implemented in Mplus 8 (8.7, Muthén and Muthén). Items such as effort and attainment scores were recoded before any analyses. Means, standard deviations, and correlations were computed for all variables. A Confirmatory Factor Analysis (CFA) was conducted to assess the factorial validity of the achievement goal items using Mplus (8.6, Muthén and Muthén). The four-factor model (mastery-task, mastery-self, performance-competition, and performance-appearance) was compared to two alternative models: 1) A uni-dimensional model which did not distinguish between any of the goals; and 2) a two-factor model that distinguished between mastery and performance, but not self, task, competition, or appearance. As recommended by Hoyle and Panter (1995), several different indices were used to evaluate the fit of the model to the data including, the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Standardised Root Mean Square Residual (SRMR), Root Mean Square Error of Approximation (RMSEA), and Satorra-Bentler (SB) chi-squared differences test. The following criteria (Hu and Bentler, 1999) was used to evaluate the adequacy of the model fit: CFI≥.95 (excellent fit), ≥.90 (adequate fit), TLI≥.95 (excellent fit), ≥.90 (adequate fit), SRMR ≤.05 (excellent fit), ≤.08 (adequate fit), and RMSEA ≤.06 (excellent fit), ≤.08 (adequate fit).

Identification of the Multiple Achievement Goal Profiles

To explore the motivational profiles among students in primary and secondary schools, Latent Profile Analysis (LPA) was employed using Mplus (Version 8.6). This method of analysis is a latent mixture modelling technique used to identify groups of individuals that have similar values on the profiling variables, known as latent class indicators (Weller, 2020; Spurk, 2020). In the present study, the primary and secondary school samples were combined to create one sample, and the four latent indicators were mastery-task and mastery-self goals, performance-competition and performance-appearance goals. To uncover the number of latent profiles that emerged from the data, two to six profile solutions were tested. Mplus was instructed to use 1000 random sets of starting values. After 20 iterations, the 100 best sets of starting values that were identified by the highest likelihood values were then selected for final optimisation. Consistent with recommended practices among LPA researchers, (e.g., Lubke and Muthén, 2005; Pastor et al., 2007) solutions with varying numbers of latent classes were tested. Theory, past empirical evidence, characteristics of each profile (e.g. size), and interpretability were considered in deciding at a final solution. A range of tests were conducted to compare each profile solution and aid in selecting the final model, these included: Akaike's Information Criterion (AIC; Akaike, 1974; models with a smaller value favoured), Bayesian Information Criterion (BIC; Schwarz, 1978; models with a smaller value favoured), Likelihood Ratio Test (LRT; a significant p-value implies that the model with one extra class is favoured), and entropy (higher value favoured; Nyland et al., 2007). These tests were conducted on five models (2-class model to 6-class model), in addition, scree plots were created using AIC, BIC, and Adjusted BIC (ABIC) to identify the point after the slope flattens out (the elbow) to help indicate the optimal number of profiles. The optimal profile was decided based on fit indexes, interpretability, and theory.

Differences Between the Profiles

Once the final model was decided, the data was transferred to SPSS to examine the profile differences on the student-reported outcomes (physical self-worth, physical activity levels, concentration disruption, and worry) and the teacher-reported outcomes (effort, attainment, engagement, and disaffection) using Multivariate Analysis of Variance (MANOVA). Pillai's trace (V) and its associated effect size, eta square η^2 was used when reporting the MANOVA tests. An eta square of .01, .06, and .14 were interpreted as small, medium, and large effect sizes based on guidance from Green and Salkind (2003). If a MANOVA produced significant results, follow-up tests were conducted using post-hoc Bonferroni tests. To examine demographic differences (sex and year group) between the profiles, chi-square tests were conducted. The post-hoc test yields probability values for each combination of independent category levels and uses a Bonferroni correction to control for type 1 error.

Results

Preliminary Analyses

Factorial Validity of Achievement Goals. As displayed in appendix 11 (p.312), the CFA examined a four-dimensional model in relation to a two-dimensional and uni-dimensional models. The four-factor model met the criteria for an excellent/adequate fitting model and a SB chi-squared difference test also supported that this model was the best fit to the data. All standardised factor loadings were strong (ranging from .75 to .91), and each item loaded significantly only on its specified latent variable. All subsequent analyses therefore utilised a four-factor conceptualisation of approach-based mastery and performance goals. The CFA also showed positive correlations between the latent factors: for mastery-task with mastery-self (.89), performance-competition (.35) and performance-appearance (.40); for mastery-self with performance-competition (.38) and performance-appearance (.43); and for performance-competition with performance-appearance (.84).

Descriptives

Table 4.1, presents the means, standard deviations, internal consistency estimates, and bivariate correlations for all variables for the whole sample. On average the mean scores for the whole sample were above the scale mid-point for mastery-task goal, mastery-self goal, performance-competition goal, performance-appearance goal, physical self-worth, worry, effort, attainment, and engagement. All variables produced satisfactory Cronbach's alpha scores. The bivariate correlations for all variables in the whole sample were explored. As expected, mastery goals (task and self) were positively correlated with both types of performance goals, positive outcomes (e.g., physical self-worth, physical activity levels, effort,

Table 4.1. Means, standard deviations, internal consistencies and bivariate correlations for whole sample.

	M (SD)	Scale	∝	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Mast-Task	3.67 (.89)	1-5	.82	-											
2. Mast-Self	3.58 (.96)	1-5	.82	.811**	-										
3. Perf-Comp	3.03 (1.17)	1-5	.91	.311**	.324**	-									
4. Perf-App	3.27 (1.08)	1-5	.87	.347**	.359**	.746**	-								
5. Phys S-W	3.85 (1.51)	1-6	.96	.268**	.289**	.172**	.213**	-							
6. PA Levels	1.96 (.80)	0-4	.77	.337**	.390**	.289**	.298**	.326**	-						
7. Con Dis	1.99 (.84)	1-4	.92	-.289**	-.271**	-.079*	-.103**	-.358**	-.206**	-					
8. Worry	2.15 (.94)	1-4	.94	-.013	-.060	.052	.093**	-.384**	-.105**	.450*	-				
9. Effort	4.05 (.95)	1-5	-	.189**	.189**	.022	.047	.165**	.209**	-.370**	-.148**	-			
10. Attain	3.76 (.83)	1-5	-	.218**	.187**	.074*	.041	.151**	.189**	-.235**	-.116**	.775**	-		
11. Engage	3.41 (.70)	1-4	.94	.207**	.159**	.049	.054	.133**	.117**	-.348**	-.141**	.849**	.767**	-	
12. Disaffection	1.50 (.68)	1-4	.92	-.243**	-.194**	-.014	-.081*	-.160**	-.149**	.392**	.141**	-.844**	-.703**	-.892**	-

Mast-task=mastery-task, mast-self=mastery-self, perf-comp=performance-competition, perf-app=performance-appearance, phys s-w=physical self-worth, pa levels=physical activity levels, con dis=concentration disruption, attain=attainment, engage=engagement.
**. Correlation is significant at the 0.01 (2-tailed).
*. Correlation is significant at the 0.05 (2-tailed).

attainment, and engagement), and negatively correlated with negative outcomes (e.g., concentration disruption, worry, and disaffection). Performance goals (competition and appearance) were also positively correlated with both types of mastery goals, positive outcomes (e.g., physical self-worth, physical activity levels), negatively correlated with the negative outcome, concentration disruption. Performance-competition goal was positively correlated with attainment, whilst performance-appearance goal positively correlated with worry, and negatively correlated with disaffection. Within the whole sample, the correlations between the four approach goals constructs ranged from .31 to .81.

Identifying Students' Achievement Goal Profiles

Latent Profile Analyses. The results of the LPA are presented in appendix 12 (p.312). These results show that the LRT and entropy supported a 5-profile solution. Furthermore, the scree plot produced a noticeable elbow at the 5-profile solution, suggesting that the BIC did not significantly improve from the 5-profile solution to the 6-profile solution, which was confirmed by the LRT. Therefore, having considered the fit indexes, interpretability and theory as a guide, a 5-profile model was selected. A one-way MANOVA confirmed that the five profiles differed in the four achievement goals, F (16, 3176) = 108.761, p<.001, Pillai's Trace =1.416, partial η^2 =.354.

Characteristics of the Profiles. Table 4.2 shows the means, standard deviations, and z scores for the five identified profiles. The first profile labelled *High Mastery* group contained 132 students, with 40% Year 7 students and 53% male students. The students in this profile had very high mastery-task and high mastery-self goals, and moderately low performance-competition and performance-appearance goals. Students in this profile had moderately high physical self-worth, physical activity levels, effort, attainment, engagement, and moderate low concentration disruption, worry, and disaffection.

Table 4.2. Profile means, standard deviations, and z scores for the solution of the latent profile analysis.

Variables	Profile 1 'High Mastery Group'			Profile 2 'High All Group'			Profile 3 'High Performance Group'			Profile 4 'Indifferent Group'			Profile 5 'Low All Group'		
Profiling Dimensions	**Mean**	**SD**	**Z**	**Mean**	**SD**	**Z**	**Mean**	**SD**	**Z**	**Mean**	**SD**	**Z**	**Mean**	**SD**	**Z**
Mastery-Task Goal	4.59^{a}	.42	1.03	4.21^{b}	.53	.59	1.94^{c}	.70	-1.94	3.29^{d}	.50	-.43	2.37^{e}	.71	-1.46
Mastery-Self Goal	4.45^{a}	.47	.90	4.19^{b}	.60	.63	1.65^{c}	.57	-2.02	3.24^{d}	.54	-.36	2.02^{c}	.56	-1.64
Performance-Competition Goal	2.67^{a}	.77	-.31	4.21^{b}	.61	1.01	4.36^{b}	.67	1.14	2.50^{a}	.82	-.45	1.53^{d}	.69	-1.28
Performance-Appearance Goal	2.75^{a}	.60	-.48	4.38^{b}	.54	1.03	4.24^{b}	.54	.91	2.92^{a}	.72	-.32	1.58^{c}	.54	-1.57
Outcomes															
Physical Self-Worth	4.27^{a}	1.42	.28	4.28^{a}	1.53	.29	3.76^{ab}	1.59	-.06	4.07^{b}	1.24	-.21	3.02^{b}	1.42	-.55
Physical Activity Levels	2.03^{a}	.67	.08	2.35^{b}	.77	.48	1.61^{acd}	.82	-.44	1.81^{c}	.72	-.19	1.28^{d}	.81	-.84
Concentration Disruption	1.65^{a}	.70	-.41	1.87^{ab}	.83	-.14	2.22^{bc}	1.20	.28	2.11^{c}	.77	.15	2.40^{c}	.94	.50
Worry	1.97^{a}	.90	-.19	2.19^{ab}	1.01	.04	1.99^{ab}	1.03	-.17	2.24^{b}	.87	.10	1.96^{ab}	.93	-.20
Effort	4.14^{a}	.85	.09	4.15^{a}	.92	.10	3.50^{b}	1.41	-.59	4.05^{ab}	.90	.00	3.73^{b}	1.07	-.35
Attainment	3.88^{a}	.77	.14	3.89^{a}	.76	.16	3.32^{b}	1.25	-.53	3.69^{ab}	.82	-.08	3.52^{b}	.88	-.29
Engagement	3.47^{a}	.64	.08	3.50^{ab}	.62	.13	3.00^{bc}	1.07	-.59	3.38^{ac}	.72	-.05	3.27^{ac}	.77	-.20
Disaffection	1.38^{a}	.52	-.17	1.44^{ab}	.59	-.08	1.84^{bc}	1.13	.49	1.52^{ac}	.71	.03	1.72^{c}	.87	.32
Cluster Characteristics															
Cluster n	132			252			22			320			73		
Primary n (%)	51 (39%)			93 (37%)			3 (14%)			118 (37%)			17 (23%)		
Year 7 n (%)	53 (40%)			81 (32%)			15 (68%)			100 (31%)			25 (34%)		
Year 8 n (%)	28 (21%)			78 (31%)			4 (18%)			102 (32%)			31 (43%)		
Males n (%)	70 (53%)			150 (60%)			8 (36%)			124 (39%)			37 (51%)		
Females n (%)	62 (47%)			102 (40%)			14 (64%)			196 (61%)			36 (49%)		

Notes. Profile descriptions are relative to one another in the sample. Means in the same row that do not share superscripts differed at p <. 05 using Bonferroni post hoc tests.

The second profile had 252 students, this group had high mastery-task and mastery-self goals, and very high performance-competition and performance-appearance goals. This profile was labelled as the *High All* group and consisted of 37% primary school students and 60% male students. Individuals in this profile had moderately high z scores for physical self-worth, physical activity levels, worry, effort, attainment, and engagement. They also reported moderately low z scores for concentration disruption and disaffection.

The third profile was labelled as the *High Performance* group and consisted of 22 students with 68% Year 7 students and 64% female students. Students in this profile had very high levels of performance-competition and high performance-appearance goals, and very low mastery-task and mastery-self goals. Individuals in this profile had low levels of effort, attainment, and engagement, moderately low levels of physical self-worth, physical activity levels, worry, and disaffection, and moderately high levels of concentration disruption and disaffection.

The fourth profile consisted of 320 students, which displayed moderately low levels of all approach goals. This profile was labelled the *Indifferent* group and contained 37% primary school students and 61% female students. These students reported moderately low z scores for physical self-worth, physical activity levels, attainment, and engagement, moderate levels of effort, whilst moderately high z scores for concentration disruption, worry, and disaffection.

The final profile was labelled as the *Low All* group and consisted of 73 students with 43% Year 8 and 51% male. As the label suggests, this group of students had very low levels of all approach goals. Students in this profile had low z scores for physical self-worth and physical activity levels, moderately low levels for worry, effort, attainment, and engagement, a high z score for concentration disruption, and moderately a high score for disaffection.

Exploring Student-Reported Motivational Differences in Profiles. The results of a one-way MANOVA indicated that there was a significant multivariate effect among student-reported outcomes between the five profiles, F (16, 3176) = 13.961, p<.001, Pillai's Trace =.263, partial η^2 =.066. Follow-up analysis and Bonferroni post-hoc tests found significant differences for physical self-worth (p<.001), physical activity levels (p<.001), worry (p=.015), and concentration disruption (p<.001).

As shown in Table 4.2, there were significant differences involving four profiles for physical self-worth. Students in the *High Mastery* and the *High All* profiles had significantly higher physical self-worth than the *Indifferent* and the *Low All* profiles.

Whereas, for physical activity levels there were significant differences involving all profiles. Specifically, the *High All* group had significantly higher physical activity levels than all other profiles. While, students in the *Low All* profile had significantly lower physical activity levels than those in the *Indifferent* and *High Mastery* profiles.

For worry, there was a significant difference involving two profiles, students in the *Indifferent* group reporting significantly higher worry than students in the *High Mastery* group. While for concentration disruption, there were significant differences involving all the profiles. Specifically, students in the *High Mastery* group had significantly lower concentration disruption than students in the *Indifferent*, *Low All*, and *High Performance* groups. The *High All* profile also reported significantly lower concentration disruption than the *Indifferent* and *Low All* profiles.

Exploring Teacher-Reported Motivational Differences in Profiles. The results of a one-way MANOVA showed that there was a significant multivariate effect among teacher-reported outcomes between the five profiles, F (16, 3176) = 2.999, p<.001, Pillai's Trace =.060, partial η^2=.015. Follow-up analysis and Bonferroni post-hoc tests found significant differences for effort (p<.001), attainment (p<.001), engagement (p=.002), and disaffection (p=.001).

As shown in Table 4.2, there were significant differences involving four profiles for effort. Teachers reported that students in the *High Mastery* and *High All* profiles had significantly higher effort than students in the *Low All* and *High Performance* profiles. Whereas for attainment, there were significant differences involving all the profiles. Specifically, teachers reported that students in the *High All* profile had significantly higher attainment than those in the *Indifferent*, *Low All*, and *High Performance* profiles. While students in the *High Mastery* group also had significantly higher attainment than the *Low All* and *High Performance* profiles.

There were significant differences involving three profiles for engagement with teachers reporting that students in both the *High Mastery* and *High All* profiles had significantly higher engagement than the *High Performance* profile. Finally, there were significant involving four profiles for disaffection, with teachers reporting that students in the *High Mastery* profile had significantly lower disaffection than students in the *Low All* and *High Performance* profiles. In addition, those students in the *High All* profile also scored significantly lower for disaffection than those in the *Low All* profile.

Sex and Year Group Differences. Amongst the five profiles, a chi-squared test revealed that there were significant differences in the sex distribution χ^2 (4, n = 799) = 26.94, p<.001. As shown in Table 4.2, female students were more highly represented in profiles with moderate levels of all goals (*Indifferent*, 61%) or high levels of both types of performance-approach goals (*High Performance*, 64%), whilst male students were more highly represented in profiles with high levels of all goals (*High All,* 60%). For profiles in which all four goals were low (*Low All*), or profiles with high levels of both types of mastery-approach goals (*High Mastery*) there were similar percentages of female and male students.

A chi-squared test also revealed that there were significant differences in year group distribution χ^2 (8, n = 799) = 25.12, p=.001. Year 8 students were highly represented in the *Low All* profile (43%), but not in the *High Mastery* profile (21%). Year 7 students were more highly represented in profiles exhibiting high levels of both types of performance-approach goals (*High Performance*, 68%). All three year groups were similarly represented in the *Indifferent* and *High All* profiles. There were no significant differences in the representation of the primary year group in any of the profiles.

Discussion

The current study explored the combined relationships between more nuanced types of mastery-approach and performance-approach goals and their simultaneous associations with student-reported and teacher-reported motivational outcomes within primary and secondary school PE. Although there is growing literature across AGT of achievement goal profiles, this study provides an insight into the nature of adolescents' achievement goal adoption and whether they could differentiate between task-based and self-based mastery goals, and competition-based and appearance-based performance goals. While LPA revealed that students adopted similar levels of both types of mastery-approach goals, and both types of performance-approach goals, the combination of these four goals established unique associations with student-reported and teacher-reported educational outcomes. Moreover, this study extended the current literature as it explores the conceptual developments proposed by the achievement goal literature (e.g., Hulleman et al., 2010; Elliot et al., 2011; Warburton and Spray, 2014; Korn and Elliot, 2016; Senko and Dawson, 2017) to see if these nuanced goals apply to younger students through a person-centred approach.

Differentiating Between More Nuanced Approach Goals

Despite theoretical proposals and calls for further separation for mastery-approach and especially performance-approach goals from the achievement goal literature (e.g., Hulleman et al., 2010; Elliot et al., 2011; Senko and Dawson, 2017), evidence from the whole PE sample suggests that these young students struggled to separate between self-based and task-based mastery goals, and competition-based and appearance-based performance goals. Preliminary analyses showed that we can measure these goals in younger students and that the CFA supported a four-factor model (appendix 11, p.312). However, the bivariate and latent factor correlations indicated strong positive correlations between the two mastery goals and the two performance goals. Furthermore, latent profile analyses showed similar means and z scores for self-based and task-based mastery goals, and competition-based and appearance-based performance goals across the five profiles, which also supports the notion that these young students are unable to significantly differentiate between the more nuanced approach goals.

However, further exploration of the achievement goal means differentiated by sex and year group (see appendix 13, p.313), revealed that the female student sample and the primary school students sample differed on the performance-approach goals, with both samples scoring higher on the performance-appearance element of the goal (M = 3.14, M = 3.33) than the competition component (M = 2.79, M = 2.88). This implies that these students had a stronger desire to appear competent to their peers, rather than wanting to perform better than them. In contrast, the male student sample and secondary school sample (Year 7 and Year 8), reported similar high levels for both types of performance goals, presenting their desire to both look competent and to out-perform their peers. Whilst the mean scores suggest that all students may not differentiate between task-based and self-based mastery goals, it appears that certain students, including primary aged students are able to differentiate between the competition and appearance elements of performance goals, and strongly pursue one more than the other.

Interestingly, these goal developments that were initially proposed by Elliot et al. (2011) were tested on university students and not on younger samples. Current cross-sectional findings are mixed, with preliminary analyses and subset mean samples revealing some students differentiating between the performance-approach goals, whilst evidence from the whole sample and LPA suggesting that the nuanced goals may not apply to younger students within the PE setting. However, more testing on these goals is needed to examine whether the model and theoretical developments are applicable to students across their school career, and especially in a subject where students are learning and mastering tasks whilst also being continuously observed and evaluated (i.e., PE).

This study found evidence that primary school aged students (age 9-11), were able to differentiate between mastery and performance goals, as shown in table 4.2, these students had representation in both the *High Mastery* and *High Performance* profiles. However, there were far more of these students in the *High Mastery* profile (*n* = 53), compared to the *High Performance* profile (*n* = 3), supporting Nicholls' (1984, 1989) perspective that at this age, students are more likely to hold mastery-oriented profiles than performance-oriented profiles. However, contrary to Nicholls' (1984, 1989) concept of ability, a higher percentage of primary school students were represented in the *High All* profile (*n* = 93) than both mastery-oriented and performance-oriented profiles. This supports previous findings in the primary school setting that found a distinct high mastery-approach profile, a high performance-approach profile, and a high all profile (Ning, 2018). Highlighting that these students have the capacity and capability to distinguish between mastery and performance goals, and can adopt either or both goals simultaneously.

Approach-Focused Achievement Goal Profiles

Whilst some theorists (e.g., Dweck and Leggett, 1988, Ames, 1992) have advocated the pursuit of only mastery goals, the findings from this study supports the multiple goal perspective in recognising the benefits of pursuing mastery-approach (task and self) goals and performance-approach (competition and appearance) goals together (Wentzel, 1992; Barron and Harackiewicz, 2001). Within this sample, students were more likely to simultaneously pursue all four approach goals than to just adopt either mastery or performance goals in a typical PE lesson. Students in the *High All* profile reported high levels of focus on mastery of tasks and self-improvement, in addition to also displaying a high desire to appear competent to others and to perform better than their peers. These students reported very similar optimal outcomes (including significantly higher physical activity levels) to students in profiles characterised by high mastery goals and low performance goals. This is consistent with previous research in education which has shown that the endorsement of high levels of both these types of goals produces highly adaptive outcomes (e.g., Carr, 2006; Liu et al., 2009; Wang, Morin, Ryan et al., 2016; Linnenbrink-Garcia et al., 2018). Multiple goal theorists report that the pursuit of mastery-approach and performance-approach goals allows people to experience overall enhanced motivational outcomes due to each goal adding a separate positive effect (Wentzel, 1991; 1993; Fox et al., 1994; Bouffard et al., 1995; Carr, 2006).

However, results from this study, in addition to previous literature (e.g., Elliot and McGregor, 2001; Wang et al., 2007; Lochbaum and Gottardy, 2015), highlights the negative implications for students when high levels of performance-competitive and performance-appearance goals are pursued without the pursuit of mastery-task and mastery-self goals. Findings suggest that the effects students experience when adopting low mastery-task and mastery-self goals accompanied with high levels of both types of performance-approach goals, were just as damaging as displaying very low levels of all four approach goals. Both profiles reported moderately low to low levels of physical self-worth, physical activity levels, worry, effort, attainment, and engagement, whilst moderately high to high levels of concentration disruption and disaffection. Overall results suggest that the adoption of task-based and self-based mastery-approach goals are critical to students' optimal motivation in PE (both mentally and physically) especially when high levels of both performance-appearance and performance-competition approach goals are experienced in both primary and secondary school.

Interestingly, most students displayed moderately low levels of both types of mastery-approach goals and both types of performance-approach goals which resulted in moderately low physical self-worth, physical activity levels, and teacher-reported outcomes, whilst moderately high levels of concentration disruptions and worry. This is a worrisome finding that nearly half of the whole sample are not interested in highly endorsing any of the four approach goals, irrespective of how they are defined and as a result, are more likely to display maladaptive processes and outcomes. However, this is not an unexpected finding, recent reviews (e.g., Wormington and Linnenbrink-Garcia, 2017) and the scoping review conducted in chapter three have highlighted how prevalent an *Indifferent* profile can be and how maladaptive endorsing average levels of mastery and performance goals can be to an individual.

The Influence of Sex and Age

This study identified significant differences in sex and year group within the five achievement goal profiles. These highlighted the important role age and sex have on the adoption of achievement goals and as a result their cognitions, affects, and behaviours towards PE. Interestingly, the *High Performance* profile, which was characterised as low adoption of mastery-self and mastery-task goals and high endorsement on performance-competition and performance-appearance goals, consisted of more females than male students. This contradicts the dominant trends observed by studies and meta-reviews that females usually report higher mastery-approach goals due to higher levels of effort, whilst males report higher levels of performance-approach goals due to being more competitive (Chouinard et al., 2007; Shim et al., 2008; Jaitner et al., 2019; Lochbaum et al., 2020). This is most likely the result of the further separation of the competition and appearance elements of the performance rather than the majority of previous literature that has measured performance-approach goal with no differentiation (e.g., Carr, 2006; Wang et al., 2007, 2008; Schwinger and Wild, 2012; Lee et al., 2020; Tuominen et al., 2020).

This is a concerning finding, being one of the more maladaptive profiles, and when considered alongside evidence that female students are more likely to hold more negative views and experiences towards PE than males (Biddle and Wang, 2003; Murphy et al., 2014). Further exploration of the results (appendix 13, p.313) showed that females scored higher on performance-appearance goals (M = 3.14) compared to performance-competition goals (M = 2.79), highlighting their desire and importance to appear competent to their peers rather than to perform better than them. In line with previous literature, female students scored significantly lower on physical self-worth and physical activity levels, whilst significantly higher on concentration disruption and worry than male students (Biddle and Wang, 2003; Cox et al., 2011; Balli et al., 2014). In comparison, there was a high percentage of male students in the *High All* profile, which was characterised as high levels of all four approach goals. This is consistent with other research that also found that males were found to display higher levels on all achievement goals (Preckel et al., 2008; Luo et al., 2011; Zhang et al., 2016; Arens and Watermann, 2021).

There has been a considerable amount of educational research documenting the effects of approach goals with secondary school and university samples, however, several questions have been raised whether those effects are unique to the age and educational context (e.g., Midgley et al., 2001; Hulleman and Senko, 2010). This study found that primary school students were the more prevalent age group in the *High All* and I*ndifferent* profiles. Previous work that has investigated primary/elementary school aged students and their achievement goal profiles have found similar patterns when using other approach-avoidance goal definitions (e.g., Schwinger and Wild, 2012, Schwinger et al., 2016; Linnenbrink-Garcia et al., 2018). Linnenbrink-Garcia et al. (2018) found that young students were more likely to strongly endorse multiple goals than older students, with almost half (48%) of the elementary school sample classified as being in the high multiple goal profile compared to 39% of the college sample. Schwinger and Wild (2012), and Schwinger et al. (2016) also found that 3rd and 4th grade elementary school students (aged between 7 and 10) adopted high mastery, high multiple goals, and high performance profiles. It is unexpected to see that so many students aged under 12 years old endorsing multiple goals, especially when primary/elementary schools are usually more mastery oriented than secondary schools (e.g., Eccles and Midgley, 1989; Eccles et al., 1993; Meece et al., 2006). Furthermore, Nicholls' (1984, 1989) proposal that younger students usually only pursue mastery goals at that age. However, at the end of most primary or elementary schools, assessments or exams take place (e.g., Standard Assessment Tests in Year 6 in the UK), where grades and teacher recommendations play a significant role in students' progress into secondary schools (Füssel et al., 2010; Zhang et al., 2016). Due to this shift in focus on grades and ability, social comparisons become more apparent, which might evoke these students' performance-approach goals alongside mastery-approach goals.

Another interesting finding was the high percentage of Year 7s (68%) in the *High Performance* profile, characterised by low levels of task mastery and self-improvement, and high levels of competition and appearance focused goals. This is consistent with previous research which shows that during early adolescence, achievement goals become more unstable, with decreases in mastery goals, and increases in avoidance and performance goals (Bouffard et al., 2001; Chouinard and Roy, 2008). This sudden increase in performance goal adoption is most likely due to the changes experienced during Year 7; maturation changes, increasing emphasis on competition against peers, social comparison, normative feedback, and ability-based evaluation (Harter, 1981; Eccles et al., 1984; Nicholls, 1989; Blackwell et al., 2007). This overrepresentation of Year 7 students also supports Nicholls' (1984, 1989) theoretical work that at the age of 12, children acquire a differentiated conception of ability and focus on competition, comparing abilities and wanting to outperform others. Warburton and Spray (2009) concluded that Year 7 is a critical time for students' motivational regulation in PE, with students reporting a greater focus on normative competence and a greater decline in adaptive achievement goals. Current findings also suggest that Year 7 is a critical period for intervention, with the concerning lower scores in mastery-approach goals, physical self-worth, and physical activity levels compared to the primary school students (appendix 13, p. 313). These low scores in adaptive goals and outcomes were also displayed in the Year 8 sample, with students' reporting the lowest mastery-task and mastery-self goals scores, accompanied with low scores of physical self-worth and physical activity levels, whilst high scores in concentration disruption and worry.

Conclusion

In conclusion, the present study provides an insight into the different types of approach goals endorsed by early and mid-adolescent students in PE, during a period when changes and difficulties in their motivation are likely to be experienced. This was the first study to investigate the combined effects of mastery-task and mastery-self approach goals, along with performance-competition and performance-appearance approach goals. Results suggest that early adolescent students may not differentiate between these more nuanced goals, especially the task and self components of mastery-approach goals. However, certain subgroups of the students did report varying performance-competition and performance-appearance goals (e.g., females and primary school students). Further testing is needed to examine if these goal developments are relevant and applicable to students across their school careers. The study also identified how these nuanced goals combination and the benefits associated with pursuing all four approach goals. However, further research is needed to address the limitations of the present study. The current study highlights the adaptive and maladaptive profiles pursued by young students, however, due to the cross-sectional nature of this study, these profiles should be tracked over time to identify any fluctuations that these students may display whilst endorsing approach goals over key transitions such as Key Stage 2 to Key Stage 3. Furthermore, these nuanced goals should be explored in different school subjects and the addition of avoidance goals, especially with older students. Moreover, whilst LPA allows researchers to identify different subgroups of students displaying similar achievement goal characteristics, this type of person-centred analysis does not allow researchers to explore how these goals interaction at an individual-level. Future research should explore the configuration of these nuanced goals within a student, and investigate what antecedents predict these goals to enhance our understanding of motivation patterns (e.g., implicit theories of ability, need satisfaction, and need frustration), and to assist teachers in facilitating antecedents that elicit mastery or high multiple goal pursuit.

Chapter 5

Study Three: Individual-Level Change and Stability in Approach Goal Configurations in PE

Abstract

The study examined students' stability and change in their approach goal configurations within PE between school years in Key Stage 2 and across the transition from primary to secondary school. Ipsative continuity analysis was used to assess whether sex, implicit theories of ability, and basic psychological needs were associated with stability and change within a student's goal configurations. Three outcomes were also assessed (physical self-worth, cognitive anxiety, and physical activity) and observed the effect change or stability of students' approach goal configurations had on these outcomes. Results revealed evidence of both stability and change of a student's goal configurations across the key transition and transfer periods. Evidence that implicit theories of ability and basic psychological needs play a role in students' approach goal stability and change, and influenced students' adaptive and maladaptive outcomes.

Introduction

Achievement goals are one of the major determinants of how individuals' feel, process, and react to success and failure (Dweck, 1986; Ames and Archer, 1988), and in recent decades has been utilised to understand why students engage in achievement situations (e.g., Steinmayr et al., 2019). Throughout their school career, some students will focus on developing and learning new skills, some will strive to outperform others, and some will strike a balance between the two. Within the education setting, there has been a considerable amount of research that has explored students' goal endorsement, what predicts these goals, and the outcomes associated with these goals (e.g., Warburton and Spray, 2013, 2014; Hulleman et al., 2010; Diseth, 2015; Méndez-Giménez et al., 2018; Lochbaum et al., 2020). More recently, the literature has investigated stability and changes of achievement goals over time (e.g., Warburton and Spray, 2008, 2009; Hulleman and Senko, 2010; Schwinger and Wild, 2012; Hornstra et al., 2017), and specifically in particular tasks, across transfers and transitions, and throughout university (e.g., Senko and Harackiewicz, 2005; Fryer and Elliot, 2007; Warburton, 2008, 2009; Spray et al., 2013; Corker et al., 2013). However, the majority of this research has examined mean-level change (e.g., (e.g., Anderman and Anderman, 1999; Urdan and Midgely, 2003; Warburton and Spray, 2008, 2009), which reflects change for the whole sample within a single construct. This method is unable to identify changes at the individual-level or measure the change within a cluster of constructs, thus providing an incomplete picture of students achievement goal adoption. In contrast, individual-level change offers a unique perspective and investigates the stability and change of a student's achievement goal configuration (Fryer and Elliot, 2007). Despite this distinctive person-centred approach, there has been a paucity of research in the achievement goal literature on the stability and change of achievement goals, especially in PE utilising individual-level change analyses. Consequently, this study sought to empirically explore the configuration of goals within an individual, and the factors that might effect these configurations, and their associations with outcomes in PE.

Approach Focused Achievement Goals

The initial dichotomous model proposed two types of goals that varied on the focus of competence: mastery goals that focused on the development of competence, and performance goals that focused on the demonstration of competence (Nicholls, 1984; Dweck, 1986). Since then, the theory has undergone some key changes pioneered by Elliot et al. (see Elliot, 1999, 2005 for further information). Elliot et al. (Elliot and Harackiewicz, 1996; Elliot, 1999; Urdan, 2000) believed that the original model consisted of three subcomponents in which achievement goals could be separated. Firstly, the standpoints of competence which was the development or demonstration of competence. Secondly, the standards of competence which evaluated mastery goals by task-based and self-based standards of evaluations, while performance goals were evaluated by other-based standards of evaluation. Lastly, the valence of competence distinguished between goals focused on approaching success or avoiding failure. Subsequent developments (e.g., trichotomous model and the 2x2 model) only explicitly focused on the standards and valence of competence (i.e., mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance). However, through factorial separation the model was expanded with the recognition that individuals could focus on mastery of a task separately from personal improvement (Elliot et al., 2011; Mascret et al., 2015). Consequently, 3x2 model (Elliot et al., 2011) included the three different standards to evaluate competence (task, self, and other) along with the approach and avoidance distinction. Whilst there has been consensus over the adaptability of mastery-approach goals, questions still remain regarding the definition and measuring of performance-approach goals (Hulleman et al., 2010).

Initially, performance-approach goals focused on the demonstration of competence and outperforming others. Consequent scale developments have focused on different aspects of the goal (e.g., demonstrating competence, social comparison, and normative comparisons), which, in turn, led to inconsistencies in the findings for the adaptiveness of performance-approach goals (Hulleman et al., 2010). With suggestions that the bifurcation of approach-avoidance goals does not fully explain the differences in the effects of performance-approach goals, several meta-analytical reviews revealed that research inconsistencies were the result of measurement scales not differentiating between competition (normative) and appearance elements (Hulleman et al., 2010; Senko and Dawson, 2017). This was supported by the earlier work of Urdan and Mestas (2006), who found that students' reasons for performance goal endorsement could be categorised into approach-avoidance and competition-appearance elements. In relation to the latter category, competition-focused performance goals reflect a striving to outperform others, while appearance-focused performance goals reflect a striving to look good at something to others. These goals have distinct effects on motivational outcomes especially under challenging conditions (Warburton, 2008; Hulleman et al., 2010; Warburton and Spray, 2014; Daumiller et al., 2019). Despite this, there has been little research addressing these different elements of performance-approach goals; in particular, what predicts them and the consequences of adopting these goals. Those that have been conducted have shown that competition-focused goals produced higher positive associations with achievement, performance, competence, and learning compared to appearance-focused goals in academic and sport settings (Hulleman et al., 2010; Wirthwein et al., 2013; Warburton and Spray, 2014). More recently, Lee and Bong (2021) found that appearance goals were an adaptive predictor of emotional, behavioural, and cognitive learning outcomes. Their study also revealed that mastery-approach goals played an essential role in students' cognitions, whilst performance-approach goals were more associated with the behavioural and emotional elements of learning.

Further to this, Senko and Harackiewicz (2005) argued that individuals can endorse achievement goals in isolation or in combination, suggesting the potential for a wide and complex combination of temporal patterns within the educational setting.

Stability and Change of Achievement Goals

Elliot (2006) proposed that achievement goal endorsement over time can be both stable and changeable. Elliot et al. (Elliot, 1997; Elliot and Church, 1997; Harackiewicz, Barron and Elliot, 1998) hypothesised one reason that achievement goals remain stable is that they are representations of concrete aims that emerge from personality characteristics and dispositional tendencies, such as achievement motives and temperaments. These antecedents remain influential even after goal adoption, throughout the process of goal pursuit and regulation (Elliot and Thrash, 2001). These characteristics are theorised to be dispositional, hence why one might expect some stability in achievement goals over time (Elliot and Thrash, 2001). In contrast, goal change can occur given the nature of achievement goals and due to multiple goal adoption; multiple types of change can take place within an individual (Fryer and Elliot, 2007). Fryer and Elliot (2007) suggested that goal change can be interpreted by a shift in the degree of goal endorsement. Senko and Harackiewicz (2005) believed two ways in which achievement goals may be regulated in the academic setting; namely, *goal switching* and *goal intensification*. The first type of regulation, *goal switching*, is where individuals may switch from mastery to performance, or approach to avoidance goals (or vice versa). An individual can have a dominant goal in one setting, but a different dominant goal in another setting. In contrast, the second goal regulation, *goal intensification*, is where individuals increase or decrease the level of endorsement of their goals without switching the type of goals pursued. For example, a student may be highly mastery oriented for one particular task in PE but less mastery oriented for another task. Fryer and Elliot (2007) proposed that students' achievement goal endorsement would be stable to some degree over time, but it is also likely to demonstrate some changes across time.

This has led to researchers understanding students' motivation by examining the temporal patterns of achievement goals from a developmental perspective (e.g., Linnenbrink-Garcia and Fredricks, 2008). Whilst earlier studies adopted a cross-sectional approach, in more recent years research has involved measuring achievement goals overtime in the educational setting (e.g., Senko and Harackiewicz, 2005; Fryer and Elliot, 2007; Warburton and Spray, 2017; Mammadov and Hertzog, 2021). The majority of studies have found moderate to strong correlations implying stability in the academic setting (e.g., Bong, 2005; Senko et al., 2011; Warburton and Spray, 2017). However, evidence has also shown changes in achievement goals despite these positive correlations between the measures of the same goals across time (Meece and Miller, 1999; Chouinard and Roy, 2008; Mammadov and Hertzog, 2021). Some literature has reported that mastery goals remain largely stable (e.g., Bong, 2005), whilst others have identified changes of mastery goals within and between school years, and in the transfer from primary to secondary school (e.g., Anderman and Anderman, 1999; Braten and Olaussen, 2005; Fryer and Elliot, 2007; Shim et al., 2008; Warburton and Spray, 2008, 2009).

The nature of performance goals also remains mixed, with some studies identifying instability within and between school years (Meece and Miller, 1999; Senko and Harackiewicz, 2005; Fryer and Elliot, 2007), but stable over school transfers (Anderman and Midgley, 1997; Anderman and Anderman, 1999). A meta-analysis conducted by Scherrer and Preckel (2019) reported significant decreases in students' mastery and performance-approach goals across their school career. One reason for these observed declines in students' achievement goals in the educational setting, is the mismatch between students' needs and the school environment (Meece et al., 2006). This especially intensifies during the transfer into secondary school education due to a more performance-focused environment, which emphasises grades, social comparison, less opportunities for choice, decision making, and learning experiences (Eccles and Roeser, 2009; Mammadov and Hertzog, 2021). This mismatch can have negative implications for students and has previously indicated an increase in performance goals and a decrease in mastery goals (Schwinger and Wild, 2012). Given the numerous possible patterns of stability and change it is important to investigate these temporal patterns over students' school career where they naturally encounter changes in their environment and its impact.

Measurement of Achievement Goal Stability and Change

When exploring the stability and change of achievement goals, researchers have employed different analytic techniques, however, there has been a strong focus on mean-level change (Warburton and Spray, 2017). This type of analysis investigates the change in achievement goals over time that reflect whole sample mean-level change and, therefore, is unable to distinguish the changes that occur at an individual level (Warburton and Spray, 2017). Roberts et al. (2001) believed that mean-level changes masked individual-level changes; potentially producing null results and concealing evidence of individual change. Fryer and Elliot (2007) also suggested caution should be made when interpreting and drawing conclusions from mean-level analyses when compared to individual-level change. As a result, mean-level analyses may not provide a complete understanding of changes and the dynamic processes of achievement goal adoption. In comparison, one particular type of individual-level change is ipsative continuity, which analyses the level of stability and change through examining the configuration of achievement goals within an individual over time. However, with notable exceptions, this type of person-centred approach has received little attention in the educational literature (e.g., Fryer and Elliot, 2007; Warburton and Spray, 2017; Mammadov and Hertzog, 2021).

Ipsative continuity contains three elements: shape (the pattern of profile scores), scatter (the variability of profile scores), and elevation (the level of profile scores). Both shape and scatter are referred to as *profile consistency* and *profile dispersion* respectively when investigating goal stability and change. Unlike other forms of analyses (e.g., differential continuity, mean-level change, and individual-level change) which can only examine stability and change within a single construct, ipsative continuity scrutinises stability and change within a cluster of constructs. Consequently, ipsative continuity can provide a unique perspective to achievement goal stability and change (Fryer and Elliot, 2007). Using the four approach goals, ipsative continuity provides the opportunity to consider the multiple goals perspective and whether *goal switching* or *goal intensification* may be occurring (Warburton and Spray, 2017). Both Fryer and Elliot (2007), and Warburton and Spray (2017) applied ipsative continuity analyses to their research on school and college students. Fryer and Elliot identified evidence of stability in undergraduates' achievement goals, suggesting there was little change in the relative order of achievement goals within an individual over time. However, they found that students with higher levels of fear of failure were more likely to exhibit a change in the relative order of their goals. Warburton and Spray (2017) found evidence for both goal stability and goal change across the transfer into secondary school. The majority of PE students reported that the configuration of goals was highly stable over time. However, they identified notable proportions of students displaying some alternation or an inversion of the initial ordering of their configuration of goals. Yet, we know little on the factors that may affect the configuration of these goals and their associations on educational outcomes.

Antecedents and Consequences

Implicit theories of ability have been a construct that previous studies have explored as an influential antecedent of achievement goals (Warburton and Spray, 2017; Mammadov and

Hertzog, 2021). Previous literature by Dweck et al. (Dweck and Leggett, 1988; Dweck, 2000, 2002; Yeager and Dweck, 2012) have shown the important role implicit theories play in directing an individual towards a particular achievement goal. Incremental students have the belief that ability is malleable and are likely to set mastery goals, whereas entity students have the belief that ability is fixed and are more likely to pursue performance goals. Drawing on the work by Dweck et al. (see Dweck, 1999 for an overview), Warburton and Spray (2017), and Mamadov and Hertzog (2021) explored implicit theories of ability as an important predictor of the stability and change of individual goal configurations. Both studies found that incremental and entity beliefs were correlated with adaptive and maladaptive goal adoption, e.g., students reporting high entity beliefs resulted in lower levels of adaptive goal striving and goal configuration instability. This provides further support for the promotion of students believing that their ability can be developed and improved over time. However, these goal configurations included both approach and avoidance goals, thus we do not know if similar patterns would be produced using more nuanced approach-focused goals.

One antecedent that has yet to be explored regarding its influence on the stability and change of achievement goals is the satisfaction or frustration of students' basic psychological needs. The Basic Psychological Needs Theory (Deci and Ryan, 2000) plays a central role in self-determination theory (Deci and Ryan, 1985) and elucidates that an individual's motivation is affected by the satisfaction or frustration of their basic psychological needs. According to the theory, individuals hold three basic psychology needs (autonomy, competence, and relatedness) that if satisfied lead to optimal functioning and development, yet if frustrated will lead to maladaptive outcomes. The integration of basic psychological needs with achievement goals was proposed by Adie and Bartholomew (2013) to enhance our knowledge and understanding of motivation. In relation to approach-focused goals, they predicted that the satisfaction of the needs would lead to the adoption of mastery-approach goals, whilst frustration of the needs had a negative relationship with mastery-approach goals. In contrast, both need satisfaction and frustration were proposed to have positive and/or negative relationships with performance-approach goals. Despite the proposed model, these relationships have yet to be explored in relation to the configuration of achievement goals.

Research has also attempted to identify a range of consequences which may be associated with stability and change in achievement goal adoption, such as self-perceptions and self-esteem (Spray et al., 2013), intrinsic motivation (Papaioannou et al., 2006), boredom and enjoyment (Barkoukis et al., 2010), and performance and continuation intentions (Daumiller et al., 2021). However, no outcomes have been explored from an educational context using ipsative continuity. PE provides a unique setting for students as unlike other academic subjects, students' abilities continue to be on display throughout a lesson (Fernández-Bustos et al., 2019). This is especially the case when entering secondary school education, students' cognitive anxiety levels can increase due to increased emphasis on competition and social comparison at a time where students naturally become more self-conscious (Digelidis and Papaioannou, 1999; Ntoumanis et al., 2009; Spray et al., 2013). Despite the evidence physical activity has on students' physical and psychological health, we continue to see declines in physical activity levels during the early adolescent years (Wang et al., 2008; Shen et al., 2009). Therefore, it is important to explore not only what predicts the stability and change in the relative order of achievement goals, but also the affect that stability and change in the goal configurations has on a range of important adaptive and maladaptive outcomes.

The Present Study

The purpose of the present study was to examine the stability and change of configuration of the four approach-focused goals (mastery-task, mastery-self, performance-competition, and performance-appearance) using ipsative continuity to provide a deeper understanding of the nature of achievement goals in the final years of primary school education, across the transfer into secondary school and into Key Stage 3. The study sought to investigate whether two key theories, namely implicit theories of ability and basic psychological needs, predicted ipsative change in students' achievement goal endorsement. Three outcomes were also assessed (physical self-worth, cognitive anxiety, and physical activity), and the effect of stability or instability of the goal configurations on these outcomes. Based on previous research, it was predicted that the configuration of students' approach goals would remain stable across the transfer into secondary school. Building upon the work established by Warburton and Spray (2017), and Mammadov and Hertzog (2021), it was expected that students with high entity beliefs would be more likely to report change in goal configuration, whereas students with high incremental beliefs would be more likely to report stability. Despite no previous work on basic psychological needs as antecedents of achievement goals, it was hypothesised that students with high satisfaction of autonomy, competence, and relatedness would be more likely to display stability in their goal configurations, whilst students exhibiting high frustration in their needs would be more likely to report instability in their goal configuration. Similarly for the outcomes, it was hypothesised that high physical self-worth and physical activity levels would be associated with in stable goal configurations, whilst high cognitive anxiety would be associated with instability in students' goal configurations.

Method

Participants

A total of 154 students (73 males; 81 females) from two feeder primary schools were examined across Key Stage 2 and the transfer into one secondary school located in the East of England. Data was collected at three time points: wave one – students were nearing the end of Year 5 (May 2019) (age M = 10.34, SD = .28); wave two – students were starting Year 6

(November 2019) (age M = 10.66, SD = .22); and wave three – students had transferred into Year 7 of secondary school (November 2020) (age M = 11.66, SD = .23). Following wave one, data was collected at five months and 18 months after the first data collection, and incorporated a transition to Year 6 between wave one and two and a transfer of schools between wave two and three. Although ethnicity data was not formally recorded, the majority of students were white British. Primary school students were taught in mixed-sex and mixed ability classes for PE, whilst secondary school students were taught in single-sex and mixed ability classes for PE.

Procedures

All procedures followed the ethical guidelines of the British Psychological Society and British Educational Research Association and ethical approval from the institution's research ethics committee (appendix 3, p.287). Access to each school and consent were obtained from the head teachers of the primary and secondary schools (appendix 4, p.288). Once approval from a school was given, parental information statements and consent forms were, via paper form, to the students and their parent/guardian two-to-three weeks prior to data collection administered (appendix 5, p.289). Students' informed assent was obtained in paper form prior to data collection (appendix 6, p.293). All participants were reminded of their right to withdraw at any point during the study and that questionnaire answers remained confidential at all times. Participants in both primary and secondary schools completed the questionnaire during form time, at the start of the day, with their form tutor and researcher present. The questionnaire took approximately 15 minutes to complete. Procedure was repeated at wave two and wave three.

Measures

Each student completed a multi-section questionnaire that was developed using validated and reliable instruments (appendix 9, p.301). Some minor adaptions were made to align the questionnaires more closely with the PE context. The questionnaires selected have been previously used within cross-sectional and longitudinal research in education and sport (e.g., Grossbard et al., 2009; Garn et al., 2012; Thomas and Upton, 2014; Warburton and Spray, 2014; Mulvenna et al., 2020), and have been administrated to children as young as eight years old (Midgley et al., 1998). Students' demographic information was collected on the cover sheet of the questionnaire.

Personal Information. Data collected included sex, date of birth, year group, and PE class. The questionnaires were anonymous and because of multiple time points, this information allowed students to be identified at each data point.

Mastery-Approach Goals. Two types of mastery-approach goals (mastery-task and mastery-self) were assessed using six items developed/adapted from Hulleman et al.'s (2010) meta-analysis review on achievement goals and Mascret et al.'s (2015) 3x2 Achievement Goal Questionnaire-Sport (AGQ-S). The two subscales were measured using a five-point Likert scale ranging from not at all true (1) to strongly agree (5). Following the stem 'In my PE class', example items included 'It is important to me to understand how to do new techniques' (mastery-task, $\alpha = .87$[1]) and 'I want to gain a broader and deeper knowledge of the activities we do' (mastery-self, $\alpha = .87$). Mulvenna et al. (2020) and Mascret et al. (2015) reported high-performing factor loadings and internal consistency for the two subscales.

Performance-Approach Goals. Two types of performance-approach goals were assessed using Warburton and Spray's (2014) scale for performance-competition and

[1] The alphas presented for each scale and subscale are the average alphas across each of the three waves of measurement.

performance-appearance, and was adapted using Senko and Dawson's (2017) meta-analytic review on defining performance goals and Mascret et al.'s (2015) 3x2 AGQ-S. The six items were measured using a five-point Likert scale ranging from not at all true (1) to strongly agree (5). Following the stem 'In my PE class', example items included 'I try to perform better than most other students' (performance-competition, $\alpha = .92$) and 'I want to show the teacher and my classmates that I am good at PE' (performance-appearance, $\alpha = .91$). Warburton and Spray (2014) found that all items exceeded .55 from factor regression coefficient, and internal consistency estimates exceeded .70.

Need Satisfaction and Need Frustration. To assess the degree to which students experienced the satisfaction and frustration of the three psychological needs (autonomy, competence, and relatedness), the 24-item Basis Psychological Need Satisfaction and Frustration Scale (BPNSFS; Chen et al., 2015) was used. Twelve items were used to measure the three subscales, and twelve items measured the three frustration subscales. A five-point Likert scale was used, with the anchor points from strongly disagree (1) to strongly agree (5). Following the stem 'In my PE class', example items from the subscales include: 'I feel a sense of choice and freedom in the activities I do' (autonomy-satisfaction, $\alpha = .85$); 'I feel confident that I can do the activities well' (competence-satisfaction, $\alpha = .92$); 'I feel that the classmates I care about also care about me' (relatedness-satisfaction, $\alpha = .90$); 'Most of the activities I do I feel like I have to' (autonomy-frustration, $\alpha = .93$); 'I have serious doubts about whether I can do the activities well' (competence-frustration, $\alpha = .89$); and 'I feel ignored from the group I want to belong to' (relatedness-frustration, $\alpha = .90$). Costa et al. (2018) found all six subscales to have adequate factorial, reliability, and validity.

Implicit Theories of Ability. Students' beliefs about their ability were assessed using an adapted version of Dweck's (1999) implicit theories of intelligence for children scale. Dweck recommended only using the entity scale for younger children, so the entity items were used for all age groups. Three items measured implicit theories using a six-point Likert scale with the anchor points from strongly disagree (1) to strongly agree (6). Following the stem 'In PE', an example of the measure includes: 'You have a certain amount of ability, and you really can't do much to change it' (α = .96).

Physical Self-Worth. Students' perceptions of physical self-worth were assessed using three items from the short version of Marsh et al.'s (2010) Physical Self-Description Questionnaire (PSDQ). These items were measured using a six-point Likert scale using the anchor points of strongly disagree (1) to strongly agree (6). An example item includes: 'Physically, I am happy with myself' (α = .98). This version of the PSDQ has reported good reliability, factor structure, and test-retest stability over the short and long-term (Marsh et al., 2010).

Cognitive Anxiety. Students' perceptions of worry and concentration disruption were assessed using the subscales from Smith et al.'s (2006) Sport Anxiety Scale-2 (SAS-2). Ten items were used to assess the two subscales using a four-point Likert scale ranging from not at all (1) to very much (4). Following the stem 'In my PE class', examples include: 'I worry that I won't perform well' (worry, α = .87); and 'It is hard to concentrate in the lesson' (concentration disruption, α = .91). Smith et al. (2006) identified that the subscale reliability coefficients were .89 for worry and .84 for concentration disruption.

Physical Activity Levels. Students' moderate and vigorous physical activity in the last seven days was assessed using Crocker et al.'s (1997) Physical Activity Questionnaire for Older Children (PAQ-C). Five items were used to indicate students' physical activity levels using a five-point Likert scale, with higher scores representing higher levels of activity. An example item includes: 'On the last weekend, how many times did you do sports, dance, or play games in which you were very active?' (α = .83). Thomas and Upton (2014) reported that the PAQ-C had good internal reliability, factor structure, and construct validity.

Data Analysis

All analyses were carried out using Microsoft Excel (Version 16), SPSS 27 (IBM Corp), and Mplus 8.6 (Muthén and Muthén). All datasets were examined for missing data across the three timepoints to determine whether associations were evident between missing data and the variables being investigated. Data was missing as a result of normal absences on the days of the questionnaire administration. Any missing data was handled via the Full Information Maximum Likelihood (FIML) procedure implemented in Mplus 8 (8.7, Muthén and Muthén). Implicit theories of ability variable was recoded so high scores indicated incremental beliefs, and low scores indicated entity beliefs as recommended by Dweck (1999). When conducting the ipsative continuity analysis, methods were followed that were outlined by Roberts et al. (2001), Fryer and Elliot (2007), and Warburton and Spray (2017).

Preliminary Analyses

To assess the factorial validity of the mastery-approach and performance-approach goal questionnaire, a series of nested models testing a range of alternative structures were analysed using Mplus. This was conducted to see if the priori factor structure was evident at each time point. A unidimensional model, two-factor model (mastery and performance), and a four-factor model (mastery-self/task and performance-appearance/competition) were tested. Following the confirmatory factor analysis (CFA), the factor structures of the questionnaire was tested for structural invariance across sex. Longitudinal factorial invariance (LFI) was used to assess the structural stability of the questionnaire using a series of nested models with increasingly more constrained model parameters (see Conroy et al., 2003, 2006). Four individual models were used to assess each achievement goal, one for each approach goal. The LFI assessed whether the change over time in achievement goal scores was due to true score change or change in random or specific error (Conroy et al., 2003).

Ipsative Continuity

Within-person correlations (Q correlations; Stephenson, 1952; Cronbach and Gleser, 1953) were used to determine changes in profile consistency. Profile consistency coefficients were estimated by correlating each student's score for each achievement goal at a time point with their score for the same achievement goal at a different time point. Profile consistency estimates were assessed with a large positive coefficient indicating stability in the configuration of goals within the individual and a small positive or negative estimate reflecting a degree of change in the configuration of goals (Fryer and Elliot, 2007). Within-person standard deviations were also computed to determine changes in profile dispersion. Profile dispersion coefficients were estimated by calculating within-person standard deviations (WPSD) at each time point based on all four achievement goals, and subtracting the WPSD from the initial time point from the latter time point for each time point comparison. If profile dispersion increased over time, then a positive coefficient would have been observed, but if profile dispersion decreased over time, then a negative coefficient would have been observed (Fryer and Elliot, 2007).

Pearson product-moment correlations were used to assess the sex differences, antecedents, and outcomes on profile consistency and profile dispersion. The significance of the profile consistency and profile dispersion estimates were examined using the dual-hypothesis testing method of Conroy and Pincus (2006). This strategy involves testing whether the sample estimates differ both from zero (no-effect null hypothesis) and what would be expected by chance alone (chance-effect null hypothesis). The rejection of both null hypotheses would allow for the conclusion that an effect of stability exists in this sample but also that the observed effect is not simply an artifact due to repeated measurements of the same construct. According to De Fruyt et al. (2006), it is important to compare within-person correlations against a random paired bootstrapped sample. A bootstrapped sample was constructed for comparison using the observed data. In line with Fryer and Elliot (2007), and due to the mean of the bootstrapped and observed samples being similar (see Fryer and Elliot, 2007 for explanation), the standard deviations of the WPSD in the bootstrapped and observed samples were compared.

Results

Preliminary Analyses

Factorial Validity of Achievement Goals. At each wave measurement, achievement goals were assessed for factorial validity and longitudinal factorial invariance (see appendices 13a to 14b, p.313-315 for details of these analyses). The CFA results revealed that the priori factor structure of the four-factor framework exhibited a good fit to the data across the time points. The four-factor model met the criteria for an excellent/adequate fitting model and Satorra-Bentler chi-squared difference tests also supported that the four-factor model was the best fit to the data at all data points. Across the time points all standardised factor loadings were moderate to strong (ranging from .52 to .97), with each item loading significantly only on its specified latent variable. The CFAs conducted at each timepoint showed positive correlations between the latent factors: for mastery-task with mastery-self (.88 to .99), and for performance-appearance with performance-competition (.77 to .93). The LFI analyses were conducted to assess the structural stability and invariance of students' responses to the four achievement goal subscales. According to absolute fit criteria, all subscales achieved adequate or excellent fit for configural, metric, and scalar, indicating that the change observed was a true score change rather than due to random or specific error.

Ipsative Continuity

Table 5.1 presents evidence of goal stability in the sample. The mean and median profile consistency scores were moderate, and the range of profile consistency was large. Evidence for both goal stability and goal change shown in Table 5.2. In the sample, the majority of students reported that the configuration of goals were highly stable over time. However, there were notable proportions of students that evidenced some alteration (negative profile consistency) or an inversion of the initial ordering (large negative profile consistency) of their configuration of goals. There were no significant sex differences in profile consistency scores in the sample across any of the time points.

	Year 5 to Year 6	**Primary to Secondary Transfer**	
	T1 to T2	T1 to T3	T2 to T3
Mean	.59	.32	.65
Median	.87	.56	.90
Range	-.97 – 1.00	-1.00 – 1.00	-1.00 – 1.00

Table 5.1. Profile consistency descriptive statistics.

	Year 5 to Year 6	**Primary to Secondary Transfer**	
	T1 to T2	T1 to T3	T2 to T3
Highly Consistent Profile	65.5%	44.6%	70.5%
Negative Profile Consistency	15.1%	26.6%	10.1%
Large Negative Profile Consistency	5.8%	14.4%	6.5%

Table 5.2. Percentages of individuals exhibiting different profile consistencies.

Testing the Significance of Profile Consistency Scores. The no-effect null hypothesis was rejected for each time point comparison in the sample (T1-T2, $t[132] = 12.87$, $p<.001$; T1-T3, $t[132] = 5.86$, $p<.001$; T2-T3, $t[132] = 13.94$, $p<.001$), suggesting that, on average, the level of profile consistency observed in the students over each time point comparison was significantly different from zero. The chance-effect null hypothesis was tested using a random paired bootstrapped sample of the observed data. The means of a bootstrapped sample (T1-T2: M = .13; T1-T3: M = .07; T2-T3: M = .09) were lower than those of the observed sample (Table 1). For each time point comparison, the chance-effect null hypothesis was rejected (T1-T2, z = 6.24, p<.05; T1-T3, z = 2.91, p<.001; T2-T3, z = 7.18, p<.05), suggesting that, on average, the level of profile consistency observed in the students over each time point comparison had more similarity than would be expected by chance alone. The rejection of both hypotheses provides evidence of goal stability in the sample.

Predicting Profile Consistency. Pearson product-moment correlations were used to examine the relationship between implicit theories of ability, need satisfaction, and need frustration and the shape component of ipsative continuity across the three time points. Within the sample, there were no significant associations found across time point comparisons for implicit theories of ability. The satisfaction of relatedness was a positive predictor of profile shape between T1-T3 (r =.19, p<.05), indicating that as satisfaction of relatedness increased, profile consistency increased. Autonomy satisfaction was also positively associated with profile consistency coefficients over the transfer into secondary school (T2-T3, r = .23, p<.05), indicating that as satisfaction of autonomy increased, profile consistency increased. Autonomy, competence, and relatedness frustration at the start of the study were negative predictors of profile shape (autonomy T2-T3, r = -.22, p<.05; competence T1-T2, r = -.18, p<.05, T1-T3, r = -.21, p<.05; relatedness T1-T2, r = -.17, p<.05). This suggests that students high in need frustration evidenced more change in their overall configuration of goals at each time point comparison.

Consequences of Profile Consistency. Pearson product-moment correlations were used to examine the relation between physical self-worth, physical activity levels, worry, and concentration disruption and the shape component of ipsative continuity across the three time points. There was no significant associations across the time point comparisons for physical self-worth or physical activity levels. Worry and concentration disruption were negative outcomes of the profile shape between T1-T2 (r = -.19, p<.05; r = -.25, p<.05), T1-T3 (worry, r = -.27, p<.05) and T2-T3 (concentration disruption, r = -.23, p<.05), indicating that as profile consistency increased, worry and concentration disruption decreased.

Profile Dispersion. Further evidence of goal stability is shown in Table 5.3. Across the sample, mean profile dispersion scores were small for each time point comparison and the range of profile dispersion scores for each time point comparison was large. No significant sex differences in profile dispersion scores were found.

Testing the Significance of Profile Dispersion Scores. For the sample, the variability in the scatter was lower in the observed sample (T1-T2 = .37; T1-T3 = .60; T2-T3 = .45) than the bootstrap sample (T1-T2 = .54; T1-T3 = .70; T2-T3 = .64) for each time point comparison (T1-T2, z = -.49, p < .05; T1-T3, z = -2.49, p < .001; T2-T3, z = -1.37, p < .05). This indicated that the observed scatter was less than what would have been expected by chance alone, allowing for the rejection of the chance-effect null hypothesis and providing further evidence of within-person goal stability.

	Year 5 to Year 6	**Primary to Secondary Transfer**	
	T1 to T2	T1 to T3	T2 to T3
Mean	-.03	.14	.17
Range	-1.57 – 1.04	-1.41 – 2.11	-.82 – 1.24

Table 5.3. Profile dispersion descriptive statistics.

Predicting Profile Dispersion. Pearson product-moment correlations were used to observe the relation between implicit beliefs, need satisfaction, and need frustration and the scatter component of ipsative continuity across the three time points. Incremental beliefs were a negative predictor of profile scatter between T1-T3 (r = -.23, p<.05) and T2-T3 (r = -.19,

$p<.05$), indicating that as incremental beliefs increased, profile dispersion decreased. In contrast, entity beliefs were positively associated with profile dispersion coefficients between T1-T3 ($r = .20$, $p<.05$), indicating that as entity beliefs increased, profile dispersion increased. Satisfaction of competence was also a negative predictor of profile scatter between T1-T2 ($r = -.26$, $p<.05$), and T1-T3 ($r = -.19$, $p<.05$), indicating that as satisfaction of competence increased, profile dispersion decreased. Whilst, frustration of relatedness was a positive predictor of profile scatter between T1-T2 ($r = .25$, $p<.05$), and T1-T3 ($r = .22$, $p<.05$), indicating that as frustration of relatedness increased, profile dispersion also increased.

Consequences of Profile Dispersion. Pearson product-moment correlations were used to scrutinise the relation between physical self-worth, physical activity levels, worry, and concentration disruption and the scatter component of ipsative continuity across the three time points. There were no significant associations across the time point comparisons for worry or physical activity levels. Physical self-worth was a negative outcome of the profile scatter between T1-T2 ($r = -.17$, $p<.05$), and T1-T3 ($r = -.21$, $p<.05$), indicating that as profile dispersion increased, physical self-worth decreased. Concentration disruption was a positive outcome of profile scatter between T2-T3 ($r = .20$, $p<.05$), indicating that as profile dispersion increased, concentration disruption increased.

Discussion

The present study explores an important but largely overlooked element of achievement goal literature – the issue of individual-level goal stability and change. This study conducted ipsative continuity analyses to examine the degree to which achievement goals relative order remain stable or change over key transitions and transfers in PE. Unlike other school subjects, PE provides a unique environment for students where their physical competence is salient and can be easily evaluated and compared with their peers. Understanding students' motivation towards PE, when it changes, and the factors and consequences associated with change are important for educators to ensure that students have positive PE experiences which transfer into positive attitudes and participation in physical activity beyond education (Biddle, 2001; Hagger et al., 2003; Warburton and Spray, 2017). This study extends the research literature on the stability and change of achievement goal configurations by employing ipsative continuity analyses within the PE context between school years in Key Stage 2 and across the transfer from primary to secondary school. The present study sought to examine whether implicit theories of ability and basic psychological needs were associated with ipsative change in achievement goal adoption, and lastly, whether these changes or stability in achievement goals impacted a range of PE-focused outcomes.

Stability and Change of Achievement Goals

Ipsative continuity analyses revealed both individual-level stability and change in students' approach goal configurations in primary and secondary school PE. Individual change analyses revealed strong evidence of stability in the configuration of the four approach goals across the three year groups. Findings show that students' achievement goals remained fairly stable even during the transfer into secondary school education, which supports Warburton and Spray's (2017) observations that despite a significant environmental change such as the transfer into secondary school, little change or instability in the goals were shown. This high stability in PE contrasts from previous findings in other educational settings where students displayed high instability in their achievement goals, however, this maybe the result of a range of contextual and sample factors. For example, the majority of previous literature had used undergraduate students whose achievement goals were measured for a specific activity/task within relatively short periods of time (e.g., between 2 weeks and one academic year; Fryer and Elliot, 2007; Muis and Edwards, 2009; Mammadov and Hertzog, 2021). Both this study and the study by Warburton and Spray (2017) investigated the contextual level of achievement goals towards PE rather than a specific task. Participants in these two studies were younger than the previous studies that explored university students goal configurations (e.g., Fryer and Elliot, 2007; Muis and Edwards, 2009). This also coincides with Nicholls' (1984, 1989) perspective of when students develop the capability to differentiate between effort and ability. Students within this study were aged between 9 and 12 years, with the majority of students younger than the predicted age of 12, when according to Nicholls (1984, 1989) students are able to endorse both mastery and performance goals. Research has previously indicated that when pursuing multiple goals, students in early adolescence had a higher probability of maintaining the same or similar profile membership (e.g., Tuominen-Soini et al., 2011; Tuominen-Soini et al., 2012), which may account for the high stability levels displayed by both this study and Warburton and Spray's (2017) research despite the goals in the configurations being different (e.g., approach and avoidance goals versus mastery-task, mastery-self, performance-competition, and performance-appearance).

Although the majority of students reported high stability in their achievement goals, there was some evidence of students displaying changes in their achievement goal configurations. Typically, theorists within the achievement goal literature have assumed that achievement goals are relatively stable characteristics (Dweck and Leggett, 1988). However, recent studies, including the research in this thesis, have found that achievement goals can be stable and can also change (e.g., Fryer and Elliot, 2007; Muis and Edwards, 2009; Warburton and Spray, 2017). Fryer and Elliot (2007) explained that initial goal adoption is driven by elements brought by the individual (e.g., basic psychological needs and implicit theories of ability) and features of the environment. Whilst goal change is also determined by additional information that is acquired after encountering an achievement task and the feedback from that task. Within this thesis, the change in the relative order of students' achievement goal endorsement was observed more substantially between T1 (Year 5) and T3 (Year 7) where negative/large negative profile consistencies were observed. In addition, although small, students across the transfer reported the highest mean dispersion across all time points. It is not surprising that achievement goals were most likely to change over the transfer from primary to secondary school education. During this time students experience significant changes in the educational system and classroom climate (Gutman, 2006). Studies have shown that the increase in competition and normative comparisons especially in subjects such as PE, leads to students shifting from mastering and developing skills to normative achievement standards (Digelidis and Papaioannou, 1999; Ntoumanis et al., 2009; Spray et al., 2013). Warburton and Spray (2017) also analysed students' achievement goals across the primary and secondary school transfer and identified both adaptive and maladaptive changes. They found between 1% and 26% of students reported a negative/large negative profile consistency, however, this was smaller than the amount of students exhibiting negative/large negative profile consistencies in Key Stage 3 students (between 9% and 35%). The ipsative continuity results for these approach-based goals in this study have provided evidence of both goal stability but also change, indicating that other characteristics of the student or the environment may contribute to the variability of the goals (Fryer and Elliot, 2007).

Predictors and Consequences of Achievement Goal Stability and Change

In addition to documenting the stability and change of the goal configurations, the present study established implicit theories of ability and basic psychological needs as predictors of students' goal configurations. Within the achievement goal literature, implicit theories of ability have been shown to be an important predictor of goal adoption (Robins and Pals, 2002; Cury et al., 2006). As anticipated, a fixed entity belief was a negative predictor of profile consistency, meaning that students with entity beliefs displayed a greater amount of change in their goal profile configuration. There was a significant correlation between entity beliefs and goal instability between T1 (year 5) and T3 (Year 7), whilst, students that reported high incremental beliefs experienced stability in their goal profiles. These findings are consistent with previous studies that identified entity beliefs were associated with goal change (Fryer and Elliot, 2007; Warburton and Spray, 2017), with Fryer and Elliot (2007) suggesting that students exhibiting entity beliefs become more responsive to competence feedback which, as a result, makes them more likely to experience change in their achievement goals than students displaying incremental beliefs. However, due to the nature of ipsative continuity, we are unable to identify the direction of these changes (positive or negative). However, based on the extensive literature, the endorsement of entity beliefs generally leads to performance goals which can result in maladaptive consequences (Elliot and Church, 1997; Ommundsen, 2004; 2006). We can, therefore, assume that entity beliefs led to an increased intensity of the performance-approach goals (competition and appearance), thus changing the goal configuration.

In contrast to the abundance of literature on the relationship between implicit theories of ability and achievement goals, basic psychological needs relationship with goals had yet to be fully explored. Analyses revealed that the satisfaction of autonomy and relatedness was associated with stability in the goal configuration. This implied that students that felt that they were the origin of their own choices and decisions, and felt a sense of belonginess to and from their teacher and peers, were more likely to display high profile consistency, indicating that the individual’s configuration of approach-based goals were highly stable over time. However, if students felt that their need for relatedness was not met and was frustrated, then this resulted in high instability of the approach goal configurations over time. Literature has shown when these needs are satisfied then this leads to adaptive outcomes, whilst if these needs are frustrated then this can lead to maladaptive consequences (e.g., Adie et al., 2008; Stebbings et al., 2012; Bartholomew et al., 2014; Warburton et al., 2020). These associations highlight the antecedents teachers need to take into account when trying to promote adaptive goal adoption. Muis and Edwards (2009) argued that from an educational standpoint, teachers should consider goal antecedents rather than the actual classroom goal structure, especially if they help maintain adaptive goal configurations. For example, promoting incremental beliefs and satisfaction of the three needs to influence the stability of goal configurations that consist of high mastery-task and mastery-self goals. Or these same antecedents to influence instability of goal configurations that consist of high performance-competition and performance-appearance goals. Future research should examine other potential antecedents that may influence the stability and change in achievement goal endorsement.

The final aim of this study was to explore how the stability and change in students' goal configurations effected adaptive and maladaptive PE outcomes. Elliot (2006) elucidated that achievement goals are experienced by everyone differently and produce different consequences as a function of the antecedent foundation. In line with expectations, students with increasing profile consistency reported decreasing levels of worry and concentration disruption in PE lessons. In comparison, as profile dispersion increased, students' concentration disruption in class increased, whilst physical self-worth decreased. Showing that profile consistency was associated with adaptive PE outcomes and profile dispersion was correlated with more maladaptive outcomes. These findings combined with the antecedent findings, implies that the promotion of incremental beliefs and need satisfaction leads to increasing profile consistency (high goal configuration stability) which in turn leads to decreasing maladaptive outcomes such as cognitive anxiety. The exploration of these antecedents and outcomes in relation to ipsative continuity allows researchers to create an overall motivational profile of students across school transfers and transition. Measuring a range of predictors and outcomes can help identify which factors can positively influence students' motivation in PE and aid interventions (Warburton and Spray, 2017).

Conclusion

It has only been in more recent years that the stability and change of achievement goals at an individual-level has gained research attention with the person-centred literature, despite its unique perspective on an individual's goal configuration which can inform educational practice and interventions (Fryer and Elliot, 2007). Within this study, the majority of students exhibited stable goal configurations, however, there were some students that showed change and malleability in the relative ordering of their achievement goals. Whilst this study has identified what antecedents and outcomes are associated with the stability and change of students' relative order of their achievement goals, it is unable to identify the direction and intensity of these goal changes. Future research should utilise other person-centred analyses (e.g., LTA) for assessing the characteristics and membership of these changing achievement goal profiles and the differences between experiencing adaptive or maladaptive outcomes. This is the first study to investigate the satisfaction and frustration of the basic psychological needs in playing a role in the stability and change in achievement goal adoption. Whilst this study identified the important role implicit theories of ability and basic psychological needs have in predicting stability and change in an individual's approach-goal configuration, the question remains which students are experiencing these changes or stability in their goal configurations and under what conditions? How should teachers identify these students in the classroom? To answer these questions, multiple analytical methods (e.g., LPA, individual-level change, LTA, and latent growth curve analysis) should be used to examine the stability and change of goal profile membership to further develop our understanding of students' achievement motivation. This is one of the few studies that has explored profile configuration using younger students and across the key transfer into secondary school education. However, this study contained a relatively small sample of 154 students, future studies should explore the transfer and subsequent transitions with a larger sample to identify different patterns of stability and change may arise for these students.

Chapter 6

Study Four: The Prevalence, Stability, and Antecedents of Approach Goal Profiles Across Primary and Secondary School PE

Abstract

The study sought to identify approach-based achievement goal profiles (mastery-task, mastery-self, performance-competition, and performance-appearance) and explore profile membership across primary and secondary school PE. The study also sought to establish whether implicit theories of ability and basic psychological needs predicted change in these identified profiles. Analyses revealed that some students pursued these nuanced goals to varying degrees, for example, Year 7 students pursuing high levels of performance-appearance goals, whilst Year 8 students were more likely to pursue high levels of performance-competition goals. Latent transition analyses identified that the majority of Year 6 students displayed high instability in profile membership, with 69% of students changing profiles once transferred into Year 7. Furthermore, students were more likely to move to more maladaptive profiles than adaptive ones. Logistic regression revealed competence satisfaction predicted the adoption of high performance-approach goal profiles, whilst autonomy satisfaction, relatedness satisfaction, and incremental beliefs predicted the adoption of high mastery-approach goal profiles. In addition, female students were more likely to pursue primarily mastery-oriented goal profiles, whilst male students were more likely to hold primarily performance-oriented or multiple goal profiles.

Introduction

Achievement goal theory (Elliot, 1997, 1999; Elliot et al., 2011) has become an influential perspective to help researchers and educators understand students' motivation in education (Senko et al., 2011; Linnenbrink-García et al., 2012). Initially, theorists proposed two achievement goals (mastery and performance) that were independent of each other; however, in recent decades the simultaneous pursuit of multiple goals, and to varying degrees, has become widely accepted (Pastor et al., 2007). This has led to plethora of studies exploring the adaptiveness of multiple goals compared to single goal endorsement in academic settings (Schwinger and Wild, 2012; Schwinger et al., 2016; Hornstra et al., 2017). Nonetheless, there has been limited exploration on students' developmental changes in achievement goal adoption among key transfers and transitions; which can be stressful times for students and can impact their motivation, achievement, and well-being (Tuominen et al., 2020). Despite research suggesting that decline in students' motivation starts in the later years of primary school education and continues to deteriorate into early adolescence (Jacobs et al., 2002), it has been underemphasised in the achievement goal literature.

Approach-Focused Goals

In its initial conception, achievement goal theory proposed two goals (mastery and performance) that were situated on opposite ends of a single dimension (Nicholls, 1984; Dweck and Leggett, 1988). This dichotomous perspective focused on achieving competence and believed that the pursuit of a mastery goal was to strive to develop one's competence in relation to themselves, whereas the pursuit of a performance goal was to demonstrate one's competence relative to others. It was suggested that the model consisted of subcomponents that distinguished between the standpoints, standards, and valence of competence (Elliot and Harackiewicz, 1996; Elliot 1999; Urdan, 2000). The standpoints distinguished between: developing or demonstrating competence; the standards evaluated competence by task/self-based or other-based standards; and valence distinguished between goals focused on approaching success or avoiding failure. However, despite the proposed subcomponents, the distinction of approach-avoidance goals which led to the development of the trichotomous model (Elliot, 1994, Elliot and Harackiewicz, 1996) and the 2x2 model (Elliot, 1999) only encompassed the standards and valence of competence (for further details on the bifurcation of achievement goals please see Elliot and Harackiewicz, 1996; Elliot, 1997, 1999). Within these models, mastery-approach goals focused on a combination of attaining success relative to the absolute demands of the task and past performances. However, Elliot et al. (2011) recognised that individuals could focus on mastery of a task distinctly from personal improvement, and expanded the model into a 3x2 framework. Consequently, the model included three standards of evaluation of competence (task, self, and other) in addition to the approach and avoidance distinction, enhancing the precision of the model and greater understanding of achievement goal striving (Mascret et al., 2015). A task-approach goal focused on attaining task-based competence (e.g., doing the task correctly), whilst a self-approach goal focused on attaining self-competence (e.g., doing better than a previous performance).

In comparison to mastery-approach goals, performance-approach goals have observed much change and debate since the initial dichotomous model (Wirthwein and Steinmayr, 2020). The goal's original definition focused on the demonstration of and attaining favourable judgements of competence (Elliot and Church, 1997). However, since then, when creating quantitative measurements for performance-approach goals, researchers focused on different elements of the goal. Some saw the demonstration of high ability and social comparison as a core aspect (e.g., Duda and Nicholls, 1992; Midgley et al., 1998), whilst others distinguished between normative goals (e.g., trying to do well compared to others) and self-presentation goals (e.g., trying to appear better to others, Harackiewicz et al., 2002). These measurement inconsistencies led to contradictions in the correlations between performance-approach goals and maladaptive outcomes identified by several meta-analytic reviews (Hulleman et al., 2010; Senko and Dawson, 2017).

Within their review, Hulleman et al. (2010) identified two key components based on theoretical considerations and similarities between the scales, a *competition* component and an *appearance* component. These two distinctions have been cited throughout the literature including the original works by Dweck and Elliot (1983), Nicholls (1984), and Elliot (1999, 2005). They defined these goals as trying to look good to others (appearance) and trying to do better than others (competition), and have produced separate effects on motivation and behaviour in achievement settings especially under challenging conditions (Hulleman et al., 2010; Warburton and Spray, 2008, 2014; Daumiller et al., 2019). Nonetheless, very few studies have explicitly addressed these different elements of performance-approach goals empirically. In their review, Hulleman et al. (2010) found items that were competition-focused, produced a positive correlation with performance, whilst appearance-focused items had a negative association with performance. Researchers concluded that competition goals produced stronger positive associations with academic achievement than appearance goals because outcomes such as grades were normatively referenced (Hulleman et al., 2010; Wirthwein et al., 2013; Wirthwein and Steinmayr, 2020). More recently, Lee and Bong (2021) found that appearance goals were an adaptive predictor of emotional, cognitive, and behavioural learning outcomes, while in the PE setting appearance goals have been found to be negative predictors for learning and performance (Warburton and Spray, 2014). Lee and Bong (2021) also found that performance-approach goals were more associated with emotional and behavioural elements of learning, whilst mastery-approach goals played a more essential role in students' cognitions.

Multiple Goal Pursuit: A Person-Centred Approach

The differentiated definition and measurement of performance-approach goals has been the source of some outcome inconsistencies, with a number of researchers arguing that the mixed findings were the result of individuals simultaneously endorsing performance-approach goals with other achievements goals (Pintrich, 2000a; Harackiewicz et al., 2002). Since then, increased interest has led researchers to investigate the relationships and interactions among different combinations of achievement goals. Through the adoption of person-centred approaches, researchers have been able to explore these complex interactions and dynamics by identifying subgroups of individuals expressing distinct achievement goal profiles (Pastor et al., 2007; Hornstra et al., 2017). This approach assumes the population is heterogeneous, whilst sub-populations that share the same attributes can be classified (Lauresen and Hoff, 2006). These identified profiles show quantitative differences in the attribute profile level and qualitative differences in the profile shape (Marsh et al., 2009). Various educational and sport domain studies have identified distinct achievement goal profiles among students, showing that students can indeed pursue multiple goals simultaneously (e.g., Carr, 2006; Wang et al., 2007; Liu et al., 2009; Conley, 2012; Bae and DeBusk-Lane, 2018). However, the issue as to which combinations of goals are the most beneficial for students' educational outcomes is still to be determined.

Supporters of the 'mastery perspective' believe that only mastery-approach goals yield educational benefits (Midgley et al., 2001; Kaplin et al., 2002), and that the simultaneous pursuit of performance-approach goals will come at a cost to the individual and decrease the benefits associated with mastery goals. In comparison, proponents of the 'multiple goal perspective' suggest that pursuing both approach goals will result in greater benefits than when just pursuing mastery goals (Barron and Harackiewicz, 2001; Harackiewicz et al., 2002). Some of the educational literature has supported this perspective that students displaying high approach goals have equally or more adaptive educational outcomes compared to students that only adopt high mastery goals (Pintrich, 2000c; Tuominen-Soini et al., 2008; Senko et al., 2011, 2013; Hornstra et al., 2017), while other findings have been inconclusive (Schwinger and Wild, 2012). Van der Veen and Peetsma (2009) concluded that the adaptive effects of pursuing both approach goals also held specifically for students. Studies also identified that high correlations between the goals were found among young students, differing from what was found in older populations (Bong, 2009; Hulleman et al., 2010; Bjørnebekk and Diseth, 2010; Schwinger and Wild, 2012). Nonetheless, there is currently no research that has examined achievement goal profiles based on the mastery-task and mastery-self approach goal distinction with the performance-appearance and performance-competition approach goal distinction. Consequently, we do not know how these nuanced context-specific goals combine or if students can adopt multiple approach goals.

Stability of Achievement Goals in Primary and Secondary Education

During a young student's school career, the transfer into secondary education can be one of the most stressful events that they will experience, due to significant individual, social development, and environmental changes (Zeedyk et al., 2003). This can have an impact on a student's academic achievement, well-being and, of course, their achievement goal profiles (Bae and DeBusk-Lane, 2018). In recent years, there has been an upsurge in longitudinal studies exploring the stability of students' multiple goal pursuits across primary and secondary education, however, findings have been mixed (e.g., Schwinger and Wild, 2012, Wigfield et al., 2015; Hornstra et al., 2017; Lo et al., 2017). For example, Schwinger et al. (Schwinger and Wild, 2012; Schwinger et al., 2016) found students in German primary school education mathematics had a low probability of staying in the same profile (30%) and were more likely to change to a profile that decreased in goal endorsement (e.g., from high achievement goals to moderate levels). In contrast, other studies conducted in Holland and Finland found patterns indicating between 78-85% of primary school students' profiles remained stable from ages 8 to 12 (Jansen in de Wal et al., 2016; Hornstra et al., 2017; Tuominen et al., 2020). However, students that did shift profiles in primary school education were found to transition to less favourable profiles, e.g., high performance to indifferent, indifferent to high avoidance (Tuominen et al., 2020). The transfer from primary to secondary education has also shown mixed results, with some research reporting low stability (Gonçalves et al., 2017) and other studies identifying higher stability (Tuominen-Soini et al., 2012; Tuominen et al., 2020). Tuominen et al. (2020) found students that did shift profiles across the transfer were predominantly to less favourable profiles. These shifts to less favourable profiles and declining motivation were seen to be a consequence of the mismatch between individual needs and the school environment not facilitating positive development (Meece et al., 2006). Studies have also shown an increased emphasis on competition and social comparison in subjects such as PE, where students become more self-conscious, which can impede on positive developmental outcomes (Digelidis and Papaioannou, 1999; Ntoumanis et al., 2009; Spray et al., 2013). Consequently, the shift from mastering and developing skills in primary school education to normative achievement standards in secondary school education, makes it more likely for students to adopt competition-based and appearance-based performance goals.

After the transfer into secondary education, the consequential transitions have received more attention from educational researchers due to being a critical point in their development (Blackwell et al., 2007; Evans et al., 2018). Studies have shown that during early adolescence, maturational processes initiate both physical and cognitive changes, which may consequently lead to qualitative changes in adolescents' achievement goals (Stipek and Mac Iver, 1989; Bong, 2009; Schwinger and Wild, 2012). From an achievement goal perspective, the transfer into secondary school education coincides with Nicholls' notion of students' understanding of the concepts of effort and ability (see Nicholls, 1984, 1989). Nicholls established that at around the age of 12, students obtain a *differentiated* conception of ability, and are able to distinguish between effort and ability. At this age students start to incorporate social comparison when evaluating their own competence, and infer higher ability is when the same level of performance is achieved but with less effort (Bong, 2009). Research exploring multiple goal pursuit during early adolescence has found that these students had a higher probability of maintaining the same or similar profile membership (e.g., Tuominen-Soini et al., 2011, 2012; Mädamürk et al., 2021). Literature has found higher profile stability amongst older students, and more instability amongst younger students (e.g., Lo et al., 2017; Bae and DeBusk-Lane, 2018). Overall, studies showed that changes from maladaptive to adaptive profiles were more frequent across the transfer into secondary school education (Gonçalves et al., 2017). The majority of longitudinal studies have concluded that changes in group membership over time were to neighbouring profiles with similar achievement goal adoption compared to fewer substantial qualitative shifts (Tuominen-Soini et al., 2011, 2012; Gonçalves et al., 2017; Tuominen et al., 2020). Although there has been an increased in longitudinal achievement goal profile studies in the last ten years (e.g., Schwinger and Wild, 2012; Jansen in de Wal et al., 2015; Schwinger et al., 2016 Hornstra et al., 2017; Bae and Debusk-Lane, 2018; Mädamürk et al., 2020), the present literature has only explored students' profiles from a trichotomous or 2x2 model perspective. No current study has examined the developments proposed by theory or research (e.g., Hulleman et al., 2010; Elliot et al., 2011; Warburton and Spray, 2014; Senko and Dawson, 2017) and profiled using differentiated mastery and performance approach goals. Furthermore, none of the current longitudinal literature has been conducted within UK school nor within the PE setting.

Predicting Achievement Goals Profiles

In his Hierarchical Model of Approach and Avoidance Achievement Motivation, Elliot (1997, 1999) theorised that a range of antecedents stimulate the adoption of achievement goals, thus mediating the effects of antecedents on achievement-relevant processes and outcomes. Specifically, Elliot outlined six categories of antecedents: competence-based, self-based, relationally-based, demographics, environmental, and neurophysiological predispositions. These antecedents along with achievement goals are believed to perform complementary roles; the antecedents explaining why an individual engages in an achievement situation, while achievement goals explain how they engage.

One antecedent that has strong theoretical and empirical evidence in the adoption of achievement goals is Dweck's (1989, 1999) Implicit Theories of Ability (ITA). Implicit theories are the beliefs about the stability or malleability of someone's intelligence, ability, attributes, and behaviours. Work by Dweck et al. (see Dweck and Elliot, 1983; Dweck, 1986, 1999; Elliot and Dweck, 1988) led to the identification of two implicit theories: an entity theory and an incremental theory. Dweck described entity theorists as individuals that view their attributes and behaviours as fixed, stable quantities which cannot be changed through effort. In comparison, incremental theorists view their attributes and behaviours as malleable, controllable qualities that can be developed through effort and learning. It was believed that the two implicit theories would lead an individual towards a particular achievement goal (Dweck and Elliot, 1983; Dweck and Leggett, 1988). The endorsement of entity beliefs would lead to the adoption of performance goals, due to heightened evaluative concerns about their performance, and if accompanied with low perceived competence would result in maladaptive outcomes. In contrast, the endorsement of incremental beliefs led to the adoption of mastery goals, due to seeking out opportunities to develop and improve skills. These individuals were more likely to experience positive motivational outcomes (Dweck and Leggett, 1988). Whilst, there is an abundance of literature supporting the influence implicit theories has on the adoption of achievement goals (e.g., Biddle, Wang, Chatzisarantis et al., 2003; Liu and Wang, 2005; Burnette et al., 2013; Liu et al., 2021), one theory that has lacked the same recognition as a possible antecedent is Basic Psychological Needs Theory (BPNT, see Deci and Ryan, 2000).

Basic Psychological Needs Theory (Deci and Ryan, 2000) explains how an individual's motivation is affected by the satisfaction or frustration of their basic psychological needs. According to Deci and Ryan (2000), individuals possess three basic needs; autonomy, competence, and relatedness, that if satisfied will lead to optimal functioning and development; however, if frustrated, it can lead to severe costs for an individual's health and well-being. Drawing on the established literature from BPNT and Elliot's (1999) Hierarchical Model of Achievement Motivation, Adie and Bartholomew (2013) proposed that need satisfaction and frustration can play a role in the adoption of achievement goals. Adie and Bartholomew's (2013) proposed model assumed that the satisfaction of the psychological needs would lead to the adoption of mastery-approach goals, whereas the frustration of the basic needs would predict avoidance goals. They were unsure about the relationships between the need satisfaction and need frustration, and performance-approach goals.

The theoretical relationship between implicit theories and approach-avoidance goal adoption has strong empirical evidence in education, however, this relationship has had limited exploration from a person-centred approach, especially using more nuanced definitions of mastery and performance goals. Relevant predictors of these approach goals should be investigated to enhance our understanding of motivational patterns, and to assist researchers and educators in developing and enhancing adaptive approach goal profiles. In addition, due to the hypothesised predictive nature of basic psychological needs by researchers (e.g., Adie and Bartholomew, 2013; Dweck, 2017) on achievement goals, this relationships need to be explored.

The Present Study

The purpose of the present study was to identify approach-based achievement goal profiles (mastery-task, mastery-self, performance-competition, and performance-appearance) of primary and secondary school students, and explore the stability of these profiles over key transfers and transitions. The study also sought to establish whether implicit theories of ability and basic psychological needs predicted change in these identified profiles. These profiles were examined in the context of PE, which is important as findings increasingly point to the domain-specific nature of achievement goals (e.g., Bong, 2001; Usher and Pajares, 2009; Chen and Usher, 2013). The PE setting is a unique environment underpinned by learning and improvement but also involves physical activities which can be perceived as naturally competitive. Unlike other school subjects, where students can hide their level of intelligence during a lesson, students' physical competence is salient, and can be easily evaluated and compared with their peers (Warburton, 2008). However, despite this distinctive environment compared to other educational settings, the majority of studies have focused on core subjects such as mathematics, science, and English. With research supporting the notion of domain specific achievement goal profiles, it is important to explore students' achievement goal profiles in all types of educational settings. To date, only a limited number of studies in the educational literature (e.g., Gonçalves et al., 2017; Hornstra et al., 2017; Bae and DeBusk-Lane, 2018; Lee et al., 2020) have examined the stability of students' achievement goal profiles across primary and secondary school education, and currently none from a PE perspective. In addition, whilst these studies that have used a longitudinal design to explore which combinations of achievement goals predict favourable educational outcomes, only a handful of studies have investigated the antecedents that influence and predict these goal profiles. If we are unable to identify what predicts stability or change in these adaptive profiles, how can teachers know what to promote in lessons? Therefore, the first aim of this study was to identify the approach-based achievement goal profiles among early adolescent students during Year 6 in primary school, and Year 7 and 8 in secondary school. The second aim of the study was to explore the stability and change in the goal profile membership across the transfer into secondary education and the subsequent year group transitions. While the third aim of the study was to investigate how the changes in achievement goal profiles are predicted by implicit theories of ability and basic psychological needs.

Method

Participants

A total of 761 students (366 males; 395 females) from two primary schools (n = 245, males n = 106, female n = 139) and two secondary schools (n = 516, male n = 260, female n = 256) located in the East of England participated in this study. The study started in June 2019 and comprised three measurement occasions at an interval of five months between time one (T1) and time two (November 2019), and a year between time two (T2) and time three (T3) (November 2020). At the first measurement, students were aged between 10 to 13 years old (M = 12.36, SD = .88) and were in Year 6 (n = 245, males n = 106, female n = 139, age M = 11.34, SD = .28), Year 7 (n = 274, males n = 136, female n = 138, age M = 12.34, SD = .29) and Year 8 (n = 242, males n = 124, female n = 118, age M = 13.41, SD = .29). At the second measurement, students were aged between 11 and 14 years old (M = 12.75, SD = .84), and were in Year 7 (n = 245, males n = 106, female n = 139, age M = 11.75, SD = .29), Year 8 (n = 274, males n = 136, female n = 138, age M = 12.75, SD = .30), and Year 9 (n = 242, males n = 124, female n = 118, age M = 13.73, SD = .29). At the third measurement, students were aged between 12 and 15 years old (M = 13.74, SD = .84), and were in Year 8 (n = 245, males n = 106, female n = 139, age M = 12.75, SD = .29), Year 9 (n = 274, males n = 136, female n = 138, age M = 13.74, SD = .30), and Year 10 (n = 242, males n = 124, female n = 118, age M

= 14.73, SD = .30). Although ethnicity data was not formally recorded most students were white British. Primary school students were taught in mixed-sex and mixed ability classes for PE, whilst secondary school students were taught in single-sex and mixed ability classes for PE.

Procedure

All procedures followed the ethical guidelines of the British Psychological Society and British Educational Research Association and received ethical approval from the institution's research ethics committee (appendix 3, p.287). Access to each school and consent were obtained from the head teachers of the primary and secondary schools (appendix 4, p.288). Once approval from a school was given, parental information statements and consent documents were administered via paper form to the students and their parent/guardian two weeks prior to the first data collection (appendix 5, p.289). Students' informed assent was obtained in paper form prior to the first data collection (appendix 6, p.293). All procedures took place at the start of the day with their form tutor and researcher present. Participants were reminded of their right to withdraw at any point during the study and that questionnaire answers remained confidential at all times. Participants were shown how to complete each section of the questionnaire and were provided with the opportunity to ask any questions. Each participant completed an anonymous multi-section questionnaire which took approximately 15 minutes to complete. These procedures were repeated for the second time point. Due to the coronavirus disease (COVID-19) and associated global pandemic, the final data collection was completed as an online version of the questionnaire.

Measures

Each student completed a multi-section questionnaire (appendix 10, p.308) that were developed using previously established validated and reliable measures that required some minor adaptions to align the questionnaires more closely with the PE context; for example, the stem of the questionnaires became PE-focused. The questionnaires selected have been previously used within cross-sectional and longitudinal research in education and sport (e.g., Grossbard et al., 2009; Garn et al., 2012; Thomas and Upton, 2014; Warburton and Spray, 2014; Mulvenna et al., 2020), and have been completed by students as young as eight years old (Midgley et al., 1998). Students' demographic information was collected on the cover sheet of the questionnaire.

Personal Information. Data collected included sex, date of birth, year group and PE class. The questionnaires were anonymous and because of multiple time points, this information allowed students to be identified at each data point.

Mastery-Approach Goals. Two types of mastery-approach goals (mastery-task and mastery-self) were assessed using six items developed/adapted from Hulleman et al.'s (2010) meta-analysis review on achievement goals and Mascret et al.'s (2015) 3x2 Achievement Goal Questionnaire-Sport (AGQ-S). The two subscales were measured using a five-point Likert scale ranging from not at all true (1) to strongly agree (5). Following the stem 'In my PE class', example items include 'It is important to me to understand how to do new techniques' (master-task) and 'I want to gain a broader and deeper knowledge of the activities we do' (mastery-self). Mulvenna et al. (2020) and Mascret et al. (2015) reported high factor loadings and internal consistency for the two subscales.

Performance-Approach Goals. Two types of performance-approach goals were assessed using Warburton and Spray's (2014) scale for performance-competition and performance-appearance, and was adapted using Senko and Dawson's (2017) meta-analytic review on defining performance goals and Mascret et al.'s (2015) 3x2 AGQ-S. The six items were measured using a five-point Likert scale ranging from not at all true (1) to strongly agree (5). Following the stem 'In my PE class', example items include 'I try to perform better than most other students' (performance-competition) and 'I want to show the teacher and my classmates that I am good at PE' (performance-appearance). Warburton and Spray (2014) found that all items exceeded .55 for factor regression coefficient, and internal consistency estimates exceeded .70.

Need Satisfaction and Need Frustration. To assess the degree to which students experienced the satisfaction and frustration of the three basic psychological needs (autonomy, competence, and relatedness), the 24-item Basis Psychological Need Satisfaction and Frustration Scale (BPNSFS; Chen et al., 2015) was used. Twelve items were used to measure the three subscales (i.e., autonomy, competence, and relatedness), and twelve items measured the three frustration subscales. A five-point Likert scale was used, with the anchor points from strongly disagree (1) to strongly agree (5). Following the stem 'In my PE class', example items from the subscales include: 'I feel a sense of choice and freedom in the activities I do' (autonomy-satisfaction); 'I feel confident that I can do the activities well' (competence-satisfaction); 'I feel that the classmates I care about also care about me' (relatedness-satisfaction); 'Most of the activities I do feel like I have to' (autonomy-frustration); 'I have serious doubts about whether I can do the activities well' (competence-frustration); and 'I feel ignored from the group I want to belong to' (relatedness-frustration). Costa et al. (2018) found all six subscales to have adequate factorial structure invariance, reliability, and validity.

Implicit Theories of Ability. Students' beliefs about their ability were assessed using an adapted version of Dweck's (1999) implicit theories of intelligence for children scale. Dweck (1999) recommended only using the entity scale for younger children, so the entity items were used for all age groups. Three items measured implicit theories using a six-point Likert scale using the anchor points from strongly disagree (1) to strongly agree (6). Following the stem 'In PE', an example of the measure includes 'You have a certain amount of ability, and you really can't do much to change it'.

Data Analysis

Preliminary Analyses

Firstly, data was screened for univariate and multivariate normality outliers using SPSS 27 (IBM Corp). Secondly, datasets were examined for missing data across the three timepoints to determine whether associations were evident between missing data and the variables being explored. Data was missing as a result of normal absences on the days of questionnaire administration. Any missing data was handled via the Full Information Maximum Likelihood (FIML) procedure implemented in Mplus 8 (8.7, Muthén and Muthén). Implicit theories of ability variable was recoded so high scores indicated incremental beliefs, and low scores indicated entity beliefs as recommended by Dweck (1999). Means, standard deviations, and correlations for each time point were computed for all variables.

Before identifying and examining the stability of approach goal profiles, measurement invariance was conducted to see if the goal items measured the same underlying constructs across all time points. A Confirmatory Factor Analysis (CFA) was conducted to assess the factorial validity of the achievement goals items using Mplus on every individual year group at all three time points. The four-factor model (mastery-task, mastery-self, performance-competition, and performance-appearance) was compared to two alternative models: 1) A uni-dimensional model which did not distinguish between any of the goals; and 2) a two-factor model that distinguished between mastery and performance, but not self, task, competition, or appearance. As recommended by Hoyle and Panter (1995), several different indices were used to evaluate the fit of the model to the data including, the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Standardised Root Mean Square Residual (SRMR), Root Mean Square Error of Approximation (RMSEA), and a Satorra-Bentler chi-squared differences test. The following criteria (Hu and Bentler, 1999) was used to evaluate the adequacy of the model fit:

CFI≥.95 (excellent fit), ≥.90 (adequate fit), TLI≥.95 (excellent fit), ≥.90 (adequate fit), SRMR ≤.05 (excellent fit), ≤.08 (adequate fit), and RMSEA ≤.06 (excellent fit), ≤.08 (adequate fit).

The structural invariance and stability of students' answers was evaluated by testing a series of Longitudinal Factorial Invariance (LFI) models using Mplus 8.7. Separate models were created for each achievement goal subscale to reduce complexity and to support the independence of these subscales (Conroy et al., 2003). The LFI hypotheses were tested by comparing a series of nested models with increasingly more constrained model parameters. The baseline model was a *configural invariance* model that freely estimated factor loading, item intercepts, residual variances and factor covariances. Factor variances were fixed to equal one whilst factor means were all fixed to equal zero, and the same subscale items were correlated across time. A *metric invariance* model was estimated by constraining the factor loading to equality across time, and that the factor variance at time one was fixed to identify the factor metric, all other specifications were identical to the configural invariance model. A *scalar invariance* model was estimated by constraining item intercepts to equality across time. In addition to the specifications made in the metric invariance model, the factor mean at time one was fixed to zero to establish the means identification. Comparison of absolute and relative fit indices between invariance models (e.g., metric-configural, scalar-metric) provided evidence for evaluating model fit, with significant reduction in model fit indicating selection of the less constrained model (Conroy et al., 2003).

Main Analyses

Identification of Multiple Achievement Goal Profiles

To identify the achievement goal profiles displayed by students, Latent Profile Analysis (LPA) was conducted in Mplus 8.7 separately for each year group at each time point. This allows the profiling of students' responses on their endorsement of the four approach goals into several homogeneous groups at each time point so they could be characterised into heterogeneous groups. Students' averages for the four achievement goals were used as profile indicators using Mplus 8.7 Robust Maximum Likelihood (MLR) estimator and Mplus design-based correction for the students' nesting within classrooms (Asparouhov, 2005). All LPAs were conducted using the TYPE = COMPLEX option in Mplus 8.7, which computed standard errors that were considered non-independent in observations to account for the multilevel character of the data (Schwinger et al., 2016). To decide the optimal number of profiles from the data, two to six profile solutions were tested. The number of initial stage random starts was set to 1000, and after 20 iterations, the 100 best sets of starting values were retained for final stage optimisations.

Guided by previous LPA research (e.g., Lubke and Muthén, 2005; Barron et al., 2007; Morin and Wang, 2016), a range of tests were conducted to compare each profile solution and aid in the selection of the final model. Akaike's Information Criterion (AIC; Akaike, 1974; models with a smaller value favoured), Bayesian Information Criterion (BIC; Schwarz, 1978; models with a smaller value favoured), Likelihood Ratio Test (LRT; a significant p-value implies that the model with one extra class is favoured), and entropy (higher value favoured; Nyland et al., 2007). In addition to these tests, information criteria (AIC, BIC, and adjusted BIC) were graphically presented through elbow plots, where the point after which the slope flattens out indicates the optimal number of profiles. Overall, the optimal solution was decided on fit indexes, interpretability, and previous research on achievement goal profiles. Individual latent class memberships from the best fitting LPAs from each time point was then stored for use in further analysis.

Latent Transition Analysis (LTA) was conducted between the profiles at T1 and T2, and T2 and T3 to assess the probability of students changing group membership. Using the LPAs as a measurement model, LTA amalgamates an autoregressive element that describes the probability of transitioning between T1 and T2 profiles, and between T2 and T3 profiles (Nylund, 2007; Bae and DeBusk-Lane, 2018). The Latent Transition Probabilities (LTP) represent a coefficient of stability or instability of profiles and range from 0 to 1, with scores closer to 1 indicating a higher probability that students in a given achievement goal profile at T1 or T2 will remain in the same profile at T2 or T3. In contrast to other person-centred longitudinal methods (e.g., growth mixture modelling), LTA addresses both within-person profile stability (individual transitions between profiles) and within-sample profile stability (whether the profiles change over the school year, Kam et al., 2016; Bae and DeBusk-Lane, 2018). Multivariate analysis of variance (MANOVA) was conducted at each timepoint to identify significant differences between the profiles for the four approach goals.

Antecedents of the achievement goal profiles were investigated using multinominal logistic regression analyses in Mplus 8. Sex, need satisfaction, need frustration, and implicit theories of ability were examined as predictors of latent profile membership. Each predictor was evaluated by the R3STEP function in Mplus, which provided a multinomial logistic regression of each latent profile on each predictor (Vermunt, 2010; Bakk and Vermunt, 2016). Mean differences were used to explore if changes in antecedents scores predicted changes in profile membership.

Results

Preliminary Analyses

Factorial Validity of Achievement Goals. At each time point, achievement goals were assessed for factorial validity and longitudinal factorial invariance (see Appendices 15a – 20b, p.316-323 for details of these analyses). The fit indices of the CFAs revealed that the four-factor structure (mastery-task, mastery-self, performance-competition, and performance-appearance) exhibited the best fit to the data and supported previous research in the physical and educational domain (Hulleman et al., 2010; Warburton and Spray, 2014). All standardised factor loadings were strong (ranging from .77 to .98); each item loaded significantly only on its specified latent variable. All subsequent analyses, therefore, utilised a four-factor conceptualisation of mastery-task, mastery-self, performance-competition, and performance-appearance approach goals. The CFAs conducted at each timepoint showed positive correlations between the latent factors: for mastery-task with mastery-self (.86 to .95), performance-competition (.11 to .36) and performance-appearance (.04 to .42); for mastery-self with performance-competition (.14 to .42) and performance-appearance (.11 to .46); and for performance-competition with performance-appearance (.81 to .89). The LFI analyses were conducted to assess the structural stability and invariance of students' responses to the four achievement goal subscales. According to absolute fit criteria, all subscales achieved adequate or excellent fit for configural, metric, and scalar, indicating that any change observed in student scores was a true score change rather than due to random or specific error.

Descriptives

Table 6.1 presents the descriptive statistics, internal consistency estimates, and bivariate correlations among each timepoint. All variables were above the scale mid-point except competence-frustration and relatedness-frustration on all timepoints. Mastery-task goals had the highest mean score for all three timepoints, whilst competence-satisfaction and relatedness-satisfaction had the highest mean scores for the antecedents across the timepoints. Internal consistency estimates exceeded .70 for all variables measured.

Table 6.1. Descriptive statistics, internal consistency estimates, and bivariate correlations for whole sample at each timepoint.

Timepoint 1	M (SD)	Scale	∝	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Mastery-Task	3.70 (.96)	1-5	.89	-										
2. Mastery-Self	3.57 (.99)	1-5	.88	.814**	-									
3. Performance-Comp	3.05 (1.21)	1-5	.94	.254**	.300**	-								
4. Performance-App	3.22 (1.18)	1-5	.92	.287**	.318**	.791**	-							
5. Autonomy-Satisfaction	3.35 (.89)	1-5	.84	.525**	.531**	.198**	.263**	-						
6. Competence-Satisfaction	3.74 (.90)	1-5	.90	.547**	.560**	.362**	.377**	.700**	-					
7. Relatedness-Satisfaction	3.74 (.94)	1-5	.90	.415**	.451**	.198*	.271**	.548**	.574**	-				
8. Autonomy-Frustration	2.84 (1.09)	1-5	.90	-.382**	-.415**	-.173**	-.203**	-.561**	-.477**	-.289**	-			
9. Competence-Frustration	2.41 (1.00)	1-5	.87	-.343**	-.373**	-.215**	-.211**	-.469**	-.588**	-.345**	.633**	-		
10. Relatedness-Frustration	2.09 (.96)	1-5	.88	-.257**	-.304**	-.102**	-.120**	-.340**	-.390**	-.490**	.429**	.623**	-	
11. Implicit Beliefs	3.67 (1.53)	1-6	.96	.109**	.081*	-.106**	-.151**	.056	.020	-.009	-.083*	-.098*	-.081**	-
Timepoint 2	**M (SD)**	**Scale**	**∝**	**1.**	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**	**8.**	**9.**	**10.**	**11.**
1. Mastery-Task	3.61 (1.18)	1-5	.94	-										
2. Mastery-Self	3.45 (1.19)	1-5	.94	.839**	-									
3. Performance-Comp	3.05 (1.30)	1-5	.96	.227**	.275**	-								
4. Performance-App	3.27 (1.36)	1-5	.96	.179**	.210**	.796**	-							
5. Autonomy-Satisfaction	3.30 (.99)	1-5	.92	.639**	.654**	.297**	.301**	-						
6. Competence-Satisfaction	3.70 (.98)	1-5	.94	.516**	.540**	.494**	.525**	.690**	-					
7. Relatedness-Satisfaction	3.62 (1.02)	1-5	.94	.571**	.581**	.258*	.260**	.686**	.618**	-				
8. Autonomy-Frustration	2.89 (1.14)	1-5	.94	-.550**	-.529**	-.213**	-.220**	-.657**	-.527**	-.503**	-			
9. Competence-Frustration	2.37 (1.09)	1-5	.94	-.403**	-.419**	-.332**	-.349**	-.494**	-.698**	-.459**	.586**	-		
10. Relatedness-Frustration	2.17 (1.07)	1-5	.94	-.423**	-.429**	-.158**	-.139**	-.496**	-.484**	-.666**	.524**	.610**	-	
11. Implicit Beliefs	3.73 (1.51)	1-6	.96	.325**	.315*	-.169**	-.264**	.204**	.083*	.177**	-.212*	-.129**	-.219**	-
Timepoint 3	**M (SD)**	**Scale**	**∝**	**1.**	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**	**8.**	**9.**	**10.**	**11.**
1. Mastery-Task	3.59 (1.29)	1-5	.96	-										
2. Mastery-Self	3.34 (1.26)	1-5	.96	.875**	-									
3. Performance-Comp	2.98 (1.34)	1-5	.93	.155**	.226**	-								
4. Performance-App	3.23 (1.43)	1-5	.97	.185**	.194**	.837**	-							
5. Autonomy-Satisfaction	3.35 (1.05)	1-5	.94	.704**	.696**	.329**	.343**	-						
6. Competence-Satisfaction	3.71 (1.07)	1-5	.95	.520**	.525**	.514**	.561**	.756**	-					
7. Relatedness-Satisfaction	3.59 (1.04)	1-5	.94	.657**	.639**	.309*	.316**	.806**	.726**	-				
8. Autonomy-Frustration	2.76 (1.15)	1-5	.95	-.592**	-.558**	-.251**	-.283**	-.716**	-.612**	-.601**	-			
9. Competence-Frustration	2.33 (1.08)	1-5	.95	-.442**	-.428**	-.365**	-.404**	-.592**	-.733**	-.574**	.699**	-		
10. Relatedness-Frustration	2.18 (1.05)	1-5	.94	-.515**	-.498**	-.224**	-.220**	-.611**	-.576**	-.682**	.635**	.700**	-	

Notes. M = mean, SD = standard deviation, ∝ = alpha, performance-comp = performance-competition, performance-app = performance-appearance.

Main Analyses – Year 6 Cohort

Identifying Achievement Goal Profiles. The results of the LPAs showed that the LRT and entropy supported a four-to-six profile solution over the three time points (see appendix 21, p.324). Furthermore, the elbow plots indicated a five-profile solution. Five profiles were selected based on the profile solutions, theory and previous research (Marsh et al., 2009).

Characteristics of Approach Goal Profiles. One-way MANOVA for each timepoint indicated significant differences between the profiles for achievement goals. T1: F (16, 960) = 39.16, p<.001, Pillai's Trace = 1.58, partial η^2 = .40. T2: F (16, 960) = 45.78, p<.001, Pillai's Trace = 1.73, partial η^2 = .43. T3: F (16, 960) = 44.14, p<.001, Pillai's Trace = 1.70, partial η^2 = .42. The means, standard deviations, and z scores of the five different achievement goal profiles are reported in Table 6.2. Students in Profile 1 labelled *High Mastery* displayed the highest values for both mastery-task and mastery-self goals, and the lowest for performance-competition and performance-appearance goals. This was the smallest profile at T1 and consisted of more female students at each timepoint.

Students in Profile 2 labelled *High All* scored high for both mastery goals and very high for both performance goals across the three timepoints. This profile represented the largest group at all timepoints and on average had equal sex representation.

Students assigned to Profile 3, labelled *High Mastery to Indifferent* reported high in both mastery goals and moderate in both performance goals scores at T1, however, these high mastery goals scores decreased over the next two timepoints, changing into an indifferent profile. This profile was the second largest group at T2 and T3, and consisted of more female students at T2 and T3.

Students allocated to Profile 4, labelled *Moderate to High Performance* reported moderate performance goals at T1, very high scores for performance-appearance goals at T2, and very high levels of both performance goals at T3.

Table 6.2. Means, standard deviations, z scores, and profile characteristics for Year 6 cohort.

		Mastery-Task			Mastery-Self			Performance-Competition			Performance-Appearance			Profile Characteristics		
TP	Profile	Mean	SD	Z	Mean	SD	Z	Mean	SD	Z	Mean	SD	Z	*n*	Male	Female
End of Year 6	HM	4.68[a]	.44	.90	4.30[a]	.56	.63	1.44[a]	.52	-1.10	1.40[a]	.53	-1.41	33	12 (36%)	21 (64%)
	HA	4.43[a]	.49	.63	4.40[a]	.63	.73	4.60[b]	.44	1.35	4.65[b]	.40	1.22	57	30 (53%)	27 (47%)
	HM/ID	4.34[a]	.59	.53	4.18[a]	.66	.50	3.04[c]	.58	.14	3.58[c]	.73	.29	53	28 (53%)	25 (47%)
	HP	3.01[b]	.55	-.92	2.87[b]	.66	-.88	3.07[c]	.64	.16	3.30[c]	.68	.13	48	17 (35%)	31 (65%)
	LA	3.02[b]	.69	-.92	2.88[b]	.69	-.86	1.54[a]	.46	-1.03	2.12[d]	.62	-.82	54	19 (35%)	35 (65%)
Start of Year 7	HM	4.72[a]	.47	.77	4.13[a]	.99	.47	1.60[a]	.56	-1.09	1.42[a]	.46	-1.36	44	14 (32%)	30 (68%)
	HA	4.68[a]	.50	.74	4.58[b]	.68	.82	4.45[b]	.66	1.03	4.76[b]	.38	.93	72	35 (49%)	37 (51%)
	ID	3.76[b]	.78	.02	3.48[c]	.88	-.04	2.98[c]	.75	-.06	3.47[c]	.61	.04	64	28 (44%)	36 (56%)
	HP	1.82[c]	.65	-1.51	1.79[d]	.64	-1.36	3.67[d]	1.24	.44	4.89[b]	.32	1.01	29	14 (48%)	15 (52%)
	LA	2.16[c]	.65	-1.24	2.20[d]	.72	-1.04	1.76[a]	.58	-.98	1.83[d]	.65	-1.07	36	15 (42%)	21 (58%)
Start of Year 8	HM	4.81[a]	.33	.88	4.20[a]	.62	.65	1.54[a]	.66	-1.02	1.64[a]	.67	-1.12	44	19 (43%)	25 (57%)
	HA	4.58[a]	.44	.71	4.28[a]	.86	.71	3.97[b]	1.00	.80	4.53[b]	.56	.88	88	38 (43%)	50 (57%)
	ID	3.19[b]	.44	-.36	2.96[b]	.59	-.32	2.47[c]	.76	-.32	2.70[c]	.84	-.38	67	23 (34%)	44 (66%)
	HP	1.48[c]	.69	-1.67	1.45[c]	.69	-1.49	3.96[b]	.87	.79	4.68[b]	.68	.99	25	14 (56%)	11 (44%)
	LA	1.51[c]	.47	-1.65	1.43[c]	.44	-1.51	1.40[a]	.45	-1.13	1.40[a]	.47	-1.29	21	12 (57%)	9 (43%)

Notes. Profile descriptions are relative to one another in the sample. Means in the same column that do not share the same superscript differed at $p < .05$ using Bonferroni post hoc tests. TP = timepoint, SD = standard deviation, Z = z score, n = sample number, HM = high mastery profile, HA= high all profile, HM/ID = high mastery to indifferent profile, HP = high performance profile, LA= low all.

Mastery goal scores were very low across the timepoints. At T1 there was a higher percentage of female students in this profile which became more equal at T2 and T3.

Finally, students in Profile 5, labelled *Low All* was characterised by low to very low levels of all achievement goals. This was the smallest group at T3 and consisted of more female students at T1 and T2 than male students.

Stability and Change in Profile Membership. LTAs were conducted with the number of profiles identified in the LPAs for each year group to examine within-person stability patterns from T1 to T2 to T3 (see appendix 22, p.325). The profiles in the LTA aligned with the LPA results. Entropy values for the models were .89, .94, and .95 for year groups 6, 7, and 8.

Results from the LTA showed that between T1 and T2, Year 6 students who were in the *High All* group had the highest latent transition probability (LTP = .64) of staying in this group after transferring into Year 7 (secondary education), followed by the *Low All* profile (LTP = .28) and the *Moderate to High Performance* group (LTP = .23). There were also notable shifts, with students in the *High Mastery* profile moving to either the *Indifferent* (LTP = .45) or the *High All* (LTP = .25) profiles. Students in the *High All* group had relatively small probabilities of moving to one of the other four profiles, with students shifting to the *High Performance* (LTP = .20) the highest probability shift.

Students in the *High Mastery to Indifferent* group were most likely to move to the *High All* (LTP = .50) or the *High Mastery* (LTP = .26) groups. While, students in the *Moderate to High Performance* group were most likely to move to the *Indifferent* group (LTP = .44), followed by the *Low All* profile (LTP = .33). Lastly, students in the *Low All* profile were most likely to go into the *High All* (LTP = .44) or the *Indifferent* (LTP = .20) groups.

Results also revealed that between T2 and T3, Year 7 students who were in the *High All* group were the most likely to stay within the same profile (LTP = .83), followed by *High*

Performance (LTP = .80) and *High Mastery* (LTP = .77) groups. Some shifting between the profiles occurred but not as frequently as between the first two timepoints. Students in the *High Mastery* (LTP = .21) and *Low All* (LTP = .47) groups were most likely to shift to the *Indifferent* profile. Students in the *High All* profile reported very low transition probabilities for the other four profiles (LTP ranging from .00 to .09). Whilst students in the *Indifferent* (LTP = .36) and *High Performance* (LTP = .15) groups were most likely to shift to the *High All* group.

Predictors of Profile Membership. There were no main effects for sex across the time timepoints (see Table 6.3). With respect to the satisfaction of the basic psychological needs, six main effects were observed. As indicated by *Odds Ratios* (*OR*) smaller than 1, at the end of Year 6, students with higher autonomy satisfaction were more likely to adopt the *High Mastery* profile than a *High All* (*OR* = .20), *High Mastery to Indifferent* (*OR* = .28), or *Moderate to High Performance* (*OR* = .19) profiles. Also, by the end of Year 6, students with higher competence satisfaction were less likely to be in the *High Mastery* profile compared to the *High All* profile (*OR* = 4.66). An increase in competence satisfaction between T1 and T2 significantly predicted that students were less likely to be in *High Mastery* group compared to the *High Performance* profile (*OR* = 3.04). In contrast, an increase in competence satisfaction between T2 and T3, meant that students were more likely to adopt the *High Mastery* profile compared to the *High Performance* group (*OR* = .35).

Regarding the frustration of the basic psychological needs, eight significant effects were identified. Students with higher autonomy and competence frustration at the end of Year 6, were less likely to be in the *High Mastery* profile compared to the *Low All* profile (*OR* = 2.71, *OR* = 1.39) respectively. An increase in autonomy frustration during the transfer into Year 7, resulted in students being less likely to be in the *High Mastery* profile compared to all other profiles (*OR* = 2.29, *OR* = 4.23, *OR* = 6.18 and *OR* = 3.55). Similarly, an increase in autonomy and relatedness frustration between the start of Year 7 and the start of Year 8, resulted in students being less likely to be in the *High Mastery* profile compared to the *High All* group (*OR* = 2.16, *OR* = 2.02).

When exploring implicit theories of ability as a predictor, analyses indicated that at T1 students with high incremental beliefs regarding their ability in PE, were more likely to be in the *High Mastery* profile compared to the *High Mastery to Indifferent* group (*OR* = .58). An increase in incremental beliefs between T2 and T3, meant that students were more likely to belong to the *High Mastery* group compared to all other groups (*OR* = .08, *OR* = .16, *OR* = .00 and *OR* = .13). In addition, an increase in incremental beliefs between T2 and T3, produced similar findings, with students more likely to adopt the *High Mastery* profile compared to *Indifferent*, *High Performance*, and *Low All* profiles (*OR* = .65, *OR* =.32 and *OR* =.23).

Table 6.3. Logistic regression for Year 6 cohort.

Predictors	End of Year 6				Start of Year 7 vs End of Year 6				Start of Year 8 vs Start of Year 7			
	Profile 1 vs. 2	Profile 1 vs. 3	Profile 1 vs. 4	Profile 1 vs. 5	Profile 1 vs. 2	Profile 1 vs. 3	Profile 1 vs. 4	Profile 1 vs. 5	Profile 1 vs. 2	Profile 1 vs. 3	Profile 1 vs. 4	Profile 1 vs. 5
Sex	.66	.63	1.26	1.33	.45	.72	.53	.87	1.33	1.62	1.33	.80
Autonomy Satisfaction	**.20**	**.28**	**.19**	.61	1.43	.73	.57	.70	1.56	1.03	1.33	1.59
Competence Satisfaction	**4.66**	2.27	.94	.42	1.73	1.48	**3.04**	.79	1.35	.76	**.35**	.45
Relatedness Satisfaction	1.32	1.18	1.90	1.21	.65	.52	.58	.50	1.27	.81	2.22	1.24
Autonomy Frustration	1.02	.99	1.20	**2.71**	**2.29**	**4.23**	**6.18**	**3.55**	**2.16**	1.07	.44	1.76
Competence Frustration	1.38	1.46	.69	**1.39**	.67	1.01	.44	1.41	.89	1.48	1.14	1.08
Relatedness Frustration	.84	.63	1.51	1.32	.99	.59	2.06	1.00	**2.02**	.91	2.50	1.07
Implicit Beliefs	.70	**.58**	1.16	.81	**.08**	**.16**	**.00**	**.13**	1.33	**.65**	**.32**	**.23**
Nagelkerkes R^2	.42				.64				.32			

Note. Profile 1 = High Mastery, Profile 2 = High All, Profile 3 = Indifferent, Profile 4 = High Performance, Profile 5 = Low all. Profile 1 is chosen as reference category. *ORs* < 1 indicate a higher probability to belong to the reference profile when the predictor is increased by one unit. Odds Ratio significant at $p < 0.05$ are printed in bold.

Main Analyses – Year 7 Cohort

Identifying Approach Goal Profiles. The results of the LPAs showed that the LRT and entropy supported a four-to-six profile solution over the three time points (see appendix 23, p.326). Furthermore, the elbow plots indicated a five-profile solution. Five profiles were selected based on the profile solutions, theory and previous research (Marsh et al., 2009).

Characteristics of Approach Goal Profiles. One-way MANOVA for each timepoint indicated significant differences between the profiles for achievement goals. T1: F (16, 1076) = 41.30, p<.001, Pillai's Trace = 1.52, partial η^2 = .38. T2: F (16, 1076) = 53.92, p<.001, Pillai's Trace = 1.78, partial η^2 = .45. T3: F (16, 1076) = 51.43, p<.001, Pillai's Trace = 1.73, partial η^2 = .43. The means, standard deviations, and z scores of the five different achievement goal profiles are reported in Table 6.4. Students in Profile 1, labelled *High Mastery*, displayed the high scores for both mastery-task and mastery-self goals, and the low scores for performance-competition and performance-appearance goals. There was a higher representation of female students, compared to their male counterparts, at every time point.

Profile 2 was labelled *High All* and students assigned to this group reported high levels of all four approach goals and was the largest profile at every timepoint.

Students in Profile 3, labelled *High Performance*, reported very low mastery goals and high to very high performance goals. This was the smallest profile across all timepoints and had a high percentage of male students in T2 and T3.

Profile 4, labelled *Indifferent*, had students with moderate levels for all four approach goals across the timepoints; this group was the second largest profile in T1 and reported similar representation for both sexes across the time timepoints.

Lastly, students in Profile 5, labelled *Low All*, reported very low scores for all achievement goals and had a higher representation of female students at T2 and T3.

Table 6.4. Means, standard deviations, z scores, and profile characteristics for Year 7 cohort.

		Mastery-Task			*Mastery-Self*			*Performance-Competition*			*Performance-Appearance*			*Profile Characteristics*		
TP	**Profile**	**Mean**	**SD**	**Z**	**Mean**	**SD**	**Z**	**Mean**	**SD**	**Z**	**Mean**	**SD**	**Z**	***n***	**Male**	**Female**
End of Year 7	HM	4.33^{a}	.59	.66	4.16^{a}	.55	.60	2.42^{a}	.74	-.65	2.61^{a}	.66	-.64	61	26 (42%)	35 (57%)
	HA	4.49^{a}	.47	.81	4.43^{b}	.49	.87	4.29^{b}	.61	.96	4.38^{b}	.58	.96	75	42 (56%)	33 (44%)
	HP	2.35^{b}	.68	-1.34	1.98^{c}	.69	-1.54	4.53^{b}	.53	1.17	4.42^{b}	.57	.99	22	10 (46%)	12 (55%)
	ID	3.37^{c}	.65	-.31	3.35^{d}	.51	-.19	3.08^{c}	.65	-.08	3.36^{c}	.74	.03	68	34 (50%)	34 (50%)
	LA	2.64^{b}	.68	-1.05	2.38^{e}	.58	-1.15	1.90^{d}	.73	-1.10	2.00^{d}	.61	-1.19	48	24 (50%)	24 (50%)
Start of Year 8	HM	4.59^{a}	.53	.74	4.26^{a}	.59	.66	1.95^{a}	.72	-.84	2.32^{a}	.95	-.71	60	23 (38%)	37 (62%)
	HA	4.69^{a}	.42	.83	4.68^{b}	.40	.99	4.55^{b}	.58	1.03	4.69^{b}	.47	.96	73	42 (58%)	31 (43%)
	HP	2.00^{b}	.54	-1.33	1.84^{c}	.59	-1.29	4.27^{b}	.63	.83	4.73^{b}	.41	.98	34	24 (71%)	10 (29%)
	ID	3.77^{c}	.70	.09	3.24^{d}	.67	-.17	3.28^{c}	.93	.12	3.43^{c}	.96	.07	51	23 (45%)	28 (55%)
	LA	2.23^{b}	.67	-1.14	2.11^{c}	.56	-1.06	1.64^{a}	.55	-1.06	1.70^{d}	.54	-1.15	56	24 (43%)	32 (57%)
Start of Year 9	HM	4.77^{a}	.40	.85	4.42^{a}	.54	.83	1.49^{a}	.53	-1.10	1.99^{a}	1.04	-.90	48	21 (44%)	27 (56%)
	HA	4.57^{a}	.53	.70	4.26^{a}	.72	.71	4.19^{b}	.74	.82	4.43^{b}	.65	.74	101	52 (52%)	49 (49%)
	HP	1.68^{b}	.74	-1.37	1.51^{b}	.58	-1.35	4.38^{b}	.58	.95	4.83^{b}	.35	1.01	35	23 (66%)	12 (34%)
	ID	3.36^{c}	.56	-.16	2.95^{c}	.45	-.27	2.42^{c}	.71	-.45	2.67^{c}	1.07	-.44	53	25 (47%)	28 (53%)
	LA	1.50^{b}	.48	-1.49	1.52^{b}	.47	-1.35	1.53^{a}	.65	-1.08	1.57^{a}	.72	-1.19	37	15 (40%)	22 (60%)

Notes. Profile descriptions are relative to one another in the sample. Means in the same column that do not share the same superscript differed at $p < .05$ using Bonferroni post hoc tests. TP = timepoint, SD = standard deviation, Z = z score, n = sample number, HM = high mastery profile, HA= high all profile, HM/ID = high mastery to indifferent profile, HP = high performance profile, LA= low all.

Stability and Change in Profile Membership. LTAs were conducted with the number of profiles identified in the LPAs for each year group to examine within-person stability patterns from T1 to T2 to T3 (see Appendix 24, p.327). The profiles in the LTA aligned with the LPA results. Entropy values for the models were .89, .94, and .94 for year groups 7, 8, and 9.

Results from the LTA revealed that between T1 and T2, Year 7 students who were in the *High All* group had the highest latent transition probability (LTP = .81) of staying within the profile after transitioning into Year 8, followed by the *Low All* (LTP = .77) and the *High Mastery* (LTP = .77). There were also notable shifts with students in the *Indifferent* group moving to *High Performance* (LTP = .24) or *Low All* (LTP = .15) groups. Students in the *High All* group had relatively small probabilities of moving to one of the other profiles (LTP = .04 to .06). Students in the *High Mastery* profile were more likely to shift to the *High All* group (LTP = .12), whilst students in the *High Performance* group were most likely to move to the *Low All* profile (LTP = .17). Lastly, students in the *Low All* group were most likely to move into the *High Mastery* (LTP = .12) or the *High Performance* (LTP = .09) groups.

Results also highlighted that between T2 and T3, Year 8 students who were in the *High Performance* group were the most likely to stay within the same profile (LTP = .82), followed by the *High All* (LTP = .80) and *High Mastery* (LTP = .67) profiles. Compared to the first two timepoints where profile stability was the highest probability for all profiles, between Year 8 and Year 9, students in the *Indifferent* group were more likely to move to the *High All* group (LTP = .49), than to stay in the same profile (LTP = .40). Some shifting between profiles occurred with students in the *High Mastery* group likely to move to the *Indifferent* (LTP = .18) or *High All* (LTP = .13) profiles, whilst students in the *Low All* were likely to shift to the *Indifferent* group (LTP = .27).

Predictors of Profile Membership. As shown in Table 6.5, there were no main effects for sex across the first timepoint. When comparing the start of Year 8 to the end of Year 7, as indicated by an *OR* smaller than 1, female students had a higher probability of adopting a *High Mastery* profile compared to the *High All* (OR = .43) or the *High Performance* profile (OR = .26) compared to male students. Similarly, when comparing the start of Year 9 to the start of Year 8, female students were more likely to adopt a *High Mastery* profile compared to a *High Performance* (OR = .36) profile.

Regarding the satisfaction of the basic psychological needs, nine main effects were observed. At the end of Year 7 students with higher autonomy satisfaction were more likely to adopt a *High Mastery* profile compared to the *Low All* profile (*OR* = .45). However, no other effects were observed in the other two measurement occasions. Also, by the end of Year 7, students with higher competence satisfaction had a lower probability to be in the *High Mastery* profile compared to the *High All* profile (*OR* = 2.05). An increase in competence between T1 and T2 significantly predicted that students were likely to be in the *High Mastery* profile compared to the *High Performance* (*OR* = 2.95) or *Indifferent* profiles (*OR* = 2.39). However, students were more likely to be in the *High Mastery* group compared to the *Low All* profile (*OR* = .46). An increase in competence between T2 and T3, resulted in students being more likely to adopt the *High Performance* profile compared to the *High Mastery* group (*OR* = 2.73). At the end of Year 7, students with higher relatedness had an increased probability of being in the *High Mastery* profile compared to the *High Performance* (*OR* =.38) or *Low All* (*OR* = .57) groups. An increase in relatedness between the start of Year 8 and the start of Year 9, revealed that students were more likely to be in the *High Mastery* than the *Low All* group (OR = .58).

Table 6.5. Logistic regression for Year 7 cohort.

Predictors	End of Year 7				Start of Year 8 vs End of Year 7				Start of Year 9 vs Start of Year 8			
	Profile 1 vs. 2	**Profile 1 vs. 3**	**Profile 1 vs. 4**	**Profile 1 vs. 5**	**Profile 1 vs. 2**	**Profile 1 vs. 3**	**Profile 1 vs. 4**	**Profile 1 vs. 5**	**Profile 1 vs. 2**	**Profile 1 vs. 3**	**Profile 1 vs. 4**	**Profile 1 vs. 5**
Sex	.56	1.18	.83	1.00	**.43**	**.26**	.77	.81	.69	**.36**	.74	.88
Autonomy Satisfaction	.94	.68	.80	**.45**	1.18	.74	.70	.87	1.42	.70	.67	.62
Competence Satisfaction	**2.05**	1.86	.94	.77	1.01	**2.95**	**2.39**	**.46**	.85	**2.73**	.83	.65
Relatedness Satisfaction	1.50	**.38**	.77	**.57**	.91	.47	.77	**.58**	1.05	.46	.81	.71
Autonomy Frustration	1.02	1.79	1.21	1.61	1.07	.92	1.00	.96	.85	1.99	**2.38**	**2.75**
Competence Frustration	.63	.79	1.09	1.57	.83	**.41**	1.11	1.24	**2.07**	1.15	1.47	.94
Relatedness Frustration	1.32	.95	.96	.63	1.04	1.78	1.18	1.41	.79	.65	1.13	1.42
Implicit Beliefs	**.64**	**.18**	.70	1.04	1.19	**.39**	.80	.71	**.37**	**.31**	**.49**	**.39**
Nagelkerkes R^2		.47				.40				.40		

Notes. Profile 1 = High Mastery, Profile 2 = High All, Profile 3 = Indifferent, Profile 4 = High Performance, Profile 5 = Low all. Profile 1 is chosen as reference category. *ORs* < 1 indicate a higher probability to belong to the reference profile when the predictor is increased by one unit. Odd Ratio significant at $p < 0.05$ are printed in bold.

With respect to the frustration of basic psychological needs, four significant effects were identified. A positive change in competence frustration between the start of Year 8 and the end of Year 7, students were more likely to be in the *High Mastery* profile compared to *High Performance* profile (*OR* = .41). In contrast, an increase in autonomy frustration between T2 and T3 meant that students were less likely to be in *High Mastery* than *Indifferent* (*OR* = 2.38) or *Low All* (*OR* = 2.75), whilst an increase in competence between these timepoints resulted in students being less likely to be in *High Mastery* than *High All* (*OR* = 2.07).

When exploring implicit theories of ability as a predictor, analyses indicated that at T1, students with high incremental beliefs regarding their ability in PE, were more likely to endorse a *High Mastery* profile compared to the *High All* (*OR* = .64) or *High Performance* (*OR* = .18) profiles. An increase in incremental beliefs between the end of Year 7 and the start of Year 8, meant that students were more likely to belong to the *High Mastery* group compared to the *High Performance* group (*OR* = .39). Likewise, an increase in incremental beliefs between the end of Year 8 and the start of Year 9, resulted in students being more likely to adopt a *High Mastery* profile compared to all other profiles (*OR* = .37, *OR* = .31, *OR* = .49, and *OR* = .39).

Main Analyses – Year 8 Cohort

Identifying Approach Goal Profiles. The results of the LPAs showed that the LRT and entropy supported a four-to-six profile solution over the three timepoints (see appendix 25, p.328). Furthermore, the elbow plots indicated a five-profile solution. Five profiles were selected based on the profile solutions, theory and previous research (Marsh et al., 2009).

Characteristics of Approach Goal Profiles. One-way multivariate analysis of variance (MANOVAs) for each timepoint indicated significant differences between the profiles for achievement goals. T1: F (16, 948) = 33.08, p<.001, Pillai's Trace = 1.43, partial η^2 = .36. T2: F (16, 948) = 36.48, p<.001, Pillai's Trace = 1.52, partial η^2 = .38. T3: F (16, 948) = 40.33, *p*<.001, Pillai's Trace = 1.62, partial η^2 = .41.The means, standard deviations, and z scores of the five different achievement goal profiles are reported in Table 6.6. Students in Profile 1 labelled *High Mastery* displayed high levels of mastery goals and low endorsement of performance goals. This group had a high percentage of female students at the end of Year 8, whilst male representation increased by the start of Year 9.

Profile 2 was labelled *High All* and students assigned to this group reported high levels of all four approach goals throughout the timepoints. This was the joint largest profile at T1 and had a higher percentage of male students compared to their female counterparts at each timepoint.

Students assigned to Profile 3, labelled *High Performance*, had very high endorsement for performance-competition goals at T1, with performance-appearance goals increasing to very high endorsement by T2. This was the smallest profile across all timepoints and had a very high representation of male students at T1.

Students in Profile 4 labelled *Indifferent,* reported moderate endorsement of all approach goals. This profile was the largest group across all timepoints and had an equal sex split at each measurement occasion.

The final profile labelled *Low All* included students with very low levels of all achievement goals and had a higher representation of female students at all timepoints.

Stability and Change in Profile Membership. LTAs were conducted with the number of profiles identified in the LPAs for each year group to examine within-person stability patterns from T1 to T2 to T3 (appendix 25, p.328). The profiles in the LTA aligned with the LPA results. Entropy values for the models were .88, .92, and .93 for year groups 8, 9, and 10.

Table 6.6. Means, standard deviations, z scores, and profile characteristics for Year 8 cohort.

		Mastery-Task			*Mastery-Self*			*Performance-Competition*			*Performance-Appearance*			*Profile Characteristics*		
TP	**Profile**	**Mean**	**SD**	**Z**	**Mean**	**SD**	**Z**	**Mean**	**SD**	**Z**	**Mean**	**SD**	**Z**	***n***	**Male**	**Female**
End of Year 8	HM	4.36^{a}	.41	.86	4.14^{a}	.46	.70	2.26^{a}	.79	-.71	2.27^{a}	.79	-.78	36	9 (25%)	27 (75%)
	HA	4.21^{a}	.51	.69	4.16^{a}	.61	.72	4.18^{b}	.63	.92	4.32^{b}	.62	.94	85	55 (65%)	30 (35%)
	HP	1.13^{b}	.30	-2.54	1.33^{b}	.41	-2.17	4.53^{b}	.65	1.23	3.73^{bc}	1.44	.45	5	4 (80%)	1 (20%)
	ID	3.19^{c}	.47	-.38	3.11^{c}	.48	-.35	2.85^{c}	.76	-.21	3.04^{c}	.73	-.14	85	42 (49%)	43 (51%)
	LA	2.17^{d}	.61	-1.45	1.99^{b}	.70	-1.50	1.52^{d}	.56	-1.34	1.56^{d}	.55	-1.38	31	14 (45%)	17 (55%)
Start of Year 9	HM	4.03^{a}	.67	.61	4.05^{a}	.57	.53	2.12^{a}	.58	-.70	2.13^{a}	.60	-.75	55	27 (49%)	28 (51%)
	HA	4.40^{b}	.48	.85	4.40^{b}	.58	.96	4.22^{b}	.76	1.13	4.43^{b}	.58	1.15	47	31 (66%)	16 (34%)
	HP	2.27^{c}	.73	-1.24	2.04^{c}	.74	-1.22	4.45^{b}	.41	1.23	4.43^{c}	.42	1.11	17	10 (59%)	7 (41%)
	ID	3.30^{d}	.51	-.06	3.28^{d}	.47	-.02	3.11^{c}	.64	.12	3.25^{c}	.58	.15	78	39 (50%)	39 (50%)
	LA	2.31^{c}	.67	-1.06	2.10^{c}	.66	-1.14	1.81^{a}	.59	-.99	1.90^{a}	.66	-.96	45	17 (38%)	28 (62%)
Start of Year 10	HM	4.23^{a}	.60	.62	4.00^{a}	.61	.59	1.84^{a}	.49	-.90	1.82^{a}	.56	-.94	49	26 (53%)	23 (47%)
	HA	4.61^{b}	.45	.95	4.52^{b}	.51	1.04	4.56^{b}	.51	1.22	4.75^{b}	.39	1.21	44	31 (70%)	13 (30%)
	HP	2.09^{c}	.67	-1.24	1.98^{c}	.65	-1.17	4.55^{b}	.52	1.21	4.74^{b}	.44	1.21	22	11 (50%)	11 (50%)
	ID	3.72^{d}	.68	.17	3.50^{d}	.59	.16	3.25^{c}	.62	.20	3.38^{c}	.71	.20	79	38 (48%)	41 (52%)
	LA	2.13^{c}	.79	-1.21	1.85^{c}	.66	-1.28	1.59^{a}	.52	-1.09	1.69^{a}	.63	-1.04	48	18 (37%)	30 (63%)

Notes. Profile descriptions are relative to one another in the sample. Means in the same column that do not share the same superscript differed at $p < .05$ using Bonferroni post hoc tests. TP = timepoint, SD = standard deviation, Z = z score, n = sample number, HM = high mastery profile, HA= high all profile, HM/ID = high mastery to indifferent profile, HP = high performance profile, LA= low all.

Results from the LTA revealed that between T1 and T2, Year 8 students assigned to the *Low All* profile had the highest probability (LTP = .68) of staying within that profile after transitioning into Year 9, followed by the *High Performance* profile (LTP = .60), and the *High Mastery* profile (LTP = .58). Students in remaining profiles were also more likely to stay in the same profile after transitioning (LTP = .40 to .44). Some movement between the profiles also occurred between Year 8 and Year 9, the largest movement was students from the *High All* profile transferring into the *Indifferent* group (LTP = .34). This shifting to the *Indifferent* profile was also observed in the *High Mastery* (LTP = .18) and *High Performance* (LTP = .20) groups. Moving to the *High Mastery* profile was also a popular shift in profiles, with all four other profiles producing significant transition probabilities (LTP = .15 to .20). In comparison, the transfer from Year 9 to Year 10 produced very stable profile probabilities for all five profiles (LTPs ranging from .81 to .91). Some small probability shifts between the profiles were observed, with students in the *High Mastery* (LTP = .11) or the *High Performance* (LTP = .12) profiles moving into the *Indifferent* group. Students allocated to either the *Indifferent* or *Low All* profiles produced small probabilities of shifting between the two (LTP = .11 and .10).

Predictors of Profile Membership. As shown in Table 6.7, three main effects were identified for sex across the time points. At the end of Year 8 as indicated by an *OR* smaller than 1, female students had a higher probability of being in the *High Mastery* profile compared to the *High All* (*OR* = .22) and *High Performance* (*OR* = .23) profiles than their male counterparts. Similarly, when comparing the start of Year 9 to the end of Year 8, female students were more likely to have higher representation in the *High Mastery* profile compared to the *High All* profile (*OR* = .44) than male students.

Nine main effects were identified for the satisfaction of the three basic psychological needs. Students reporting higher levels of autonomy satisfaction at the end of Year 8 were more likely to adopt a *High Mastery* profile compared to the *High Performance* profile (*OR* = .05).

Table 6.7. Logistic regression for Year 8 cohort.

	End of Year 8				Start of Year 9 vs End of Year 8				Start of Year 10 vs Start of Year 9			
Predictors	**Profile 1 vs. 2**	**Profile 1 vs. 3**	**Profile 1 vs. 4**	**Profile 1 vs. 5**	**Profile 1 vs. 2**	**Profile 1 vs. 3**	**Profile 1 vs. 4**	**Profile 1 vs. 5**	**Profile 1 vs. 2**	**Profile 1 vs. 3**	**Profile 1 vs. 4**	**Profile 1 vs. 5**
Sex	**.22**	.10	**.23**	.28	**.44**	.38	.86	1.44	.47	.94	1.21	1.88
Autonomy Satisfaction	1.10	**.05**	.69	.46	.83	**.47**	.84	**.44**	.78	.83	.69	**.30**
Competence Satisfaction	2.04	.23	.62	**.20**	**1.94**	**3.07**	.89	1.61	.89	**3.28**	**2.47**	1.01
Relatedness Satisfaction	1.64	.37	.96	.57	.68	1.03	.69	.82	.95	.37	.95	.56
Autonomy Frustration	1.05	.86	1.55	**3.27**	1.10	1.24	1.07	1.00	1.37	1.50	1.07	1.75
Competence Frustration	1.05	.12	1.78	.99	.94	1.54	.90	1.51	.75	.85	.89	.87
Relatedness Frustration	**2.29**	1.67	1.11	.73	1.08	.92	.96	1.18	.69	.72	.77	1.53
Implicit Beliefs	**.51**	**.08**	.73	**.46**	.84	**.26**	**.57**	**.51**	.55	**.33**	.74	**.41**
Nagelkerkes R^2		.65				.31				.38		

Notes. Profile 1 = High Mastery, Profile 2 = High All, Profile 3 = Indifferent, Profile 4 = High Performance, Profile 5 = Low all. Profile 1 is chosen as reference category. *ORs* < 1 indicate a higher probability to belong to the reference profile when the predictor is increased by one unit. Odd Ratio significant at $p < 0.05$ are printed in bold.

A positive change in autonomy satisfaction between Year 8 and 9, and Year 9 and Year 10, students were more likely to endorse a *High Mastery* profile compared to the *High Performance* (*OR* = .47) or *Low All* (*ORs* = .44, and .30) profiles. At the end of Year 8, students with higher competence satisfaction were more likely to be assigned to the *High Mastery* profile compared to the *Low All* profile (*OR* = .20). However, increasing competence levels between the end of Year 8 and the start of Year 9 resulted in students less likely to adopt the *High Mastery* profile compared to the *High All* (*OR* = 1.94) or *High Performance* (*OR* = 3.07) groups. Likewise, increases in competence observed between the start of Year 9 and the start of Year 10, meant that students were likely to be allocated in the *High Mastery* profile compared to the *High Performance* (*OR* = 3.28) or *Indifferent* (*OR* = 2.47) groups.

Only one main effect was identified for the frustration of basic psychological needs as a predictor for the achievement goal profiles. Students displaying high levels of autonomy frustration were less likely to be endorsing the *High Mastery* profile compared to the *Low All* profile (*OR* = 3.27).

The logistic regression also showed that students endorsing incremental beliefs of ability in PE were more likely to pursue the *High Mastery* profile compared to the *High All* (*OR* = .51), *High Performance* (*OR* = .08), and *Low All* (*OR* = .46) profiles. Increasing incremental beliefs between Year 8 and 9 predicted that students were more likely to be in the *High Mastery* profile compared to the *High Performance* (*OR* = .26), *Indifferent* (*OR* = .57), or *Low All* (*OR* = .51) profiles. Correspondingly, increasing incremental beliefs observed between the start of Year 9 and the start of Year 10 showed that students were more likely to adopt the *High Mastery* profile compared to the *High Performance* (*OR* = .33) or *Low All* (*OR* = .41) profiles.

Discussion

The current study identified approach-based goals profiles displayed by students in primary and secondary school PE, examined the stability and change of profile membership over a key academic transition and subsequent transfer, and predictors of profile membership stability and change. Although there has been an increase in longitudinal person-centred research investigating students' achievement goals (e.g., Schwinger and Wild, 2012; Jansen in de Wal et al., 2015; Schwinger et al., 2016; Hornstra et al., 2017; Gonçalves et al., 2017; Lee et al., 2020), this study provides an insight into the combined effects of mastery-task, mastery-self, performance-competition, and performance-appearance approach goals within the PE context. The study established the stability and change of these approach-goal combinations and the predictive nature of implicit theories of ability and basic psychological needs on these profiles. This study extends the current literature on achievement goals by 1) being the first study to explore students' profiles using more nuanced achievement goals, 2) identified sex and year group differences across these unique profiles within PE, 3) providing evidence of students' stability and change within these approach-based profile membership, and 4) the first study to examine need satisfaction and need frustration as important predictors of achievement goal profiles.

The Prevalence of Achievement Goal Profiles

The study identified that the majority of students pursued mastery-task and mastery-self goals, and performance-competition and performance-appearance goals in similar ways and strengths across the profiles (i.e., high or low in both differentiations within the same profile). However, when exploring the levels of both mastery goals in the *High Mastery* profile within the Year 6 cohort, task-focused goals scores were higher than self-focused goals at every time point. This indicated that students in this profile focused more on accomplishing the tasks rather than personal improvement. At this age, students may find it easier to identify success and improving competence through completing tasks rather than comparing present with past results in tasks. Furthermore, previous sports literature has found that students with high perceived competence as more likely to adopt mastery-task goals and strive towards successful completing a task (Mascret et al., 2015). Interestingly, within the same cohort, Year 6 students reported moderate levels of both performance goals, yet at the second measurement point at the beginning of Year 7, students reported moderate levels of performance-competition goals and very high performance-appearance goal scores. This finding is not surprising given the contrasting environmental differences between primary and secondary school PE (e.g., Eccles et al., 1993; Meece et al., 2006). This new PE environment is likely to facilitate Year 7 students into strongly endorsing appearance goals as a result of striving to appear competent to their new and larger reference group. This supported previous literature that found that the salience of appearance goals heightens in a setting that is very public in nature, where students' ability can easily be observed and evaluated (e.g., Ntoumanis et al., 2009; Spray et al., 2013; Warburton and Spray, 2014).

However, this desire for appearing competent became less important within the Year 8 cohort, who exhibited an increased desire to perform better than others. During the first time point, Year 8 students reported moderate performance-appearance goals and very high levels of performance-competition goals. This shift of focus to performance outcomes maybe the result of not needing acceptance from peers anymore, but wanting to do better than their peers due to the increased competitive nature of PE, and increased performance-focused assessments (e.g., Ntoumanis et al., 2009; Spray et al., 2013). This increase pursuit of competition-based goals has shown to produce adaptive outcomes for some students, with some displaying increased effort and perseverance at tasks, resulting in increased competence and performance (Warburton and Spray, 2014).

The study also revealed a high amount of students endorsing multiple goals (either high multiple goal indifferent), with these being the two largest groups across all year groups and time points. Within the Year 6 cohort, where students were aged between 10 and 11 years, students that reported high levels of all four approach goals represented the largest profile, whereas the same aged students that endorsed high levels of both mastery approach goals, was the smallest profile. Previous profiling studies that explored primary aged students within different subjects and countries reported distinct high mastery and performance profiles (e.g., Schwinger and Wild, 2012; Schwinger et al., 2016; Hornstra et al., 2017; Ning, 2018), supporting the view that students under the age of 12 have the capability to differentiate between mastery and performance goals, and pursue both. It has also been argued that students have a growing capacity for social comparison during primary school years, and with Nicholls conducting his studies in the 1980s and, therefore, it is plausible that students today are more capable of social comparisons at a younger age (Schwinger et al., 2016).

Profile Stability and Change in Profiles Across Transfer and Transitions

Results from this study identified that only 31% of Year 6 students held the same profile over the transfer into secondary school and into Year 7. With these students adjusting to their new surroundings at secondary school this high instability in achievement goal profiles was not unexpected. An abundance of literature has shown the difficulties faced when transferring, including: adjusting to a new environment, making new friends, puberty, and the mismatch between needs and the environment (e.g., Youngman, 1978; Measor and Woods, 1984; Hargreaves and Galton, 1999; Meece et al., 2006). However, in contrast, other researchers have found high profile stability across the primary-to-secondary school transfer. Tuominen et al. (2020) found up to 75% of Finnish students displayed identical motivational profiles over time. Their findings supported previous studies that demonstrated notable stability in goal profiles over transfers (e.g., Tuominen-Soini et al., 2011; Jansen in de Wal et al., 2016; Lo et al., 2017; Gonçalves et al., 2017). One reason for this discrepancy was that the Finnish students (Tuominen-Soini et al., 2011, 2020), Taiwanese students (Lo et al., 2017), and Portuguese students (Gonçalves et al., 2017) were slightly older when they transferred into secondary education (aged between 12 and 13) which could account for the higher stability levels. The Dutch students in the Jansen in de Wal et al. (2016) study were of similar age to this study, yet around 80% of their sample did not change achievement goal profiles across measurement waves. Furthermore, the majority of these studies were conducted on general academia and classroom-based subjects, in contrast, this study explored students' achievement goal profiles in a specific subject and a non-traditional classroom setting, i.e., PE, which could also count of the contrasting findings.

Nonetheless, findings from this study align with those of Schwinger and Wild (2012) and Schwinger et al. (2016) who demonstrated low stability in achievement goal profiles among primary aged German students. They found between 67% and 85% of students did not hold the same profile over time both within and between school years. However, findings revealed that once settled at secondary school, between Year 7 and Year 10, students displayed between 54% and 88% profile stability across the year group transitions. This supports literature that students' membership in achievement goal profiles becomes more stable over their school career (Bae and DeBusk-Lane, 2018). This indicates that older students appear to have more solidified and differentiated endorsements of achievement goals compared to younger students.

Analyses revealed that some PE students displayed high instability in their profile membership. Whilst most movement was towards similar neighbouring profiles supporting prior studies (e.g., Tuominen-Soini et al., 2011, 2012; Gonçalves et al., 2017), adaptive and maladaptive shifts were also observed. Overall, 13% of all students demonstrated an adaptive shift, this included students moving from the *Indifferent* or *Low All* profiles into *High Mastery* or *High All* profiles. The younger students observed the most positive change (24% of students from Year 6 cohort) but respectively, this decreased as the students became older (11% and 12% for students in Year 7 and 8 cohorts). The biggest shifts occurred in the Year 7 cohort where 49% of students displaying moderate achievement goals (*Indifferent*) during the second time point and reported high levels of both mastery and performance goals (*High All*) by the final time point. Similarly, 44% of Year 6 students that endorsed low levels of all achievement goals (*Low All*) at the end of Year 6, reported high levels of mastery goals (*High Mastery*) at the beginning of Year 7. These patterns indicate that as students progress through primary and into secondary education, they can shift from maladaptive profiles to adaptive profiles. The shift from the *Low All* to *High Mastery* over the transfer is a surprising finding given the reported negative impact the secondary school PE environment can have on a student's motivation (Barkoukis and Hagger, 2009; Ntoumanis et al., 2009; Taylor et al., 2014). This demonstrates how factors such as a perceived mastery goal climate, teacher-student relationships, peer relationships, and learning opportunities play a positive influence on these shifts (e.g., Cury et al., 2002; Liem et al., 2008; Wang, Liu, Chatzisarantis et al., 2010; Wang and Holcombe, 2010; Wigfield et al., 2015) and should be examined in future person-centred studies to further understand the influences environmental factors play on profile membership.

On the other hand, there were similar levels of maladaptive shifts, with an average of 11% of the whole sample demonstrating movement from either the *High Mastery* or *High All* to the *Indifferent* or *Low All* profiles. These shifts represented a decline in achievement goals with the younger students (15% of students in the Year 6 cohort) more likely to report decreases in endorsement compared to older students (7% for Year 7 cohort and 13% of students in Year 8). The largest maladaptive movements occurred in the transfer from Year 6 to Year 7, where 45% of students moved from *High Mastery* to the *Indifferent* profile. This highlights the contrasting effects the transfer into secondary school has on different students and is most likely explained by the changes in the PE environment such as increased teacher control and class size, and the use of social comparison-based standards (e.g., Pajares et al., 2000; Otis et al., 2005; Shim et al., 2008). This was followed by the Year 8 cohort, where between the first and second time point, 34% of students shifted from the *High All* profile to the *Indifferent* profile. This extends previous findings showing students' motivation and interest in PE declines as they get older (Hagger et al., 2003; Spray et al., 2013; Taylor et al., 2014), and that Year 7 is a critical time for young adolescent students' motivation in school PE (Warburton and Spray, 2008, 2009). Furthermore, although it is important to know the direction of these instabilities, identifying what predicts these changes is also worth investigating in future studies.

Antecedents of Approach Goal Profiles

To our knowledge, this was the first study to explore basic psychological needs as an antecedent to achievement goal profiles and to investigate antecedents such as sex and implicit theories of ability using more nuanced approach goals. The study found evidence that high or increasing levels of competence satisfaction significantly predicted the adoption of high performance-approach goals, and was associated with the *High All* and the *High Performance* profiles. This suggests that students with high satisfaction for effectively bring about desired outcomes (Ryan and Deci, 2000, 2002), which from an interpersonal evaluation is to appear competent to their peers or outperforming their peers. This supports previously findings between competence satisfaction and other-based approach goals from the 3x2 model (Cecchini et al., 2019). Achievement goals were created based on the way individuals understand their competence, however, individuals can differ in how they understand competence based on the individual and situational factors (Elliot and Dweck, 2005). Findings from this study implies that many PE students that were satisfying their need for competence, were more likely to define their competence as striving to appear competent to others (appearance-based goals) and/or striving to do better than their peers (competition-based goals), rather than task-based or self-based standards of evaluation. This may be the result of the competitive nature of PE, leading to the adoption of performance-approach goals compared to mastery-approach goals when the need for competence is satisfied. In contrast, logistic regressions revealed that high or increasing levels of autonomy and relatedness satisfaction were significantly more likely to adoption the *High Mastery* profile. This implies that when students feel that they are the origin of their choices and decisions or when they assimilate values and behaviours that are compatible with their self, whilst also feeling a sense of belonginess to and from their peers, they are more likely to endorse goals that focus on mastering the task or personal improvement. Whilst this is one of the first studies to explore the relationship between achievement goals and basic psychological needs, especially from a person-centred approach, more research is needed to explore this relationship in different settings. For example, are these psychological needs associated with the same achievement goal profiles within classroom-based subjects?

When investigating the predictive nature of frustrated basic psychological needs, unsurprisingly high or increasing levels of autonomy, competence, and relatedness frustration significantly predicted maladaptive profiles such as the *Indifferent* or *Low All* profiles. Logistic regressions revealed that these significant increases in needs frustration (especially autonomy) were observed in the Year 6 cohort, when comparing the end of Year 6 (first time point) with the start of Year 7 (second time point). Highlighting that the transfer into secondary school can have strong negative impact on students' sense of autonomy, competence, and relatedness. Previous literature has shown that the frustration of the needs can play a major role in the decrease in motivation during early adolescence (e.g., Wang and Eccles, 2012; Paulick et al., 2013; Duchesne et al., 2016). Moreover, these findings adds further support that Year 7 is a critical time for students motivation in PE with increases of needs frustration and maladaptive profiles (Warburton and Spray, 2009).

Analyses revealed that students with high or increasing levels of incremental beliefs were significantly more likely to adopt the *High Mastery* profile than all other profiles across all cohorts. This supports the AMM (Dweck and Leggett, 1988) that the endorsement of incremental beliefs leads to the adoption of mastery-approach goals (task-based and self-based) with students seeking out opportunities to improve and develop ability. These findings add to the current limited literature that has explored implicit theories as an antecedent of students' achievement goal profiles (e.g., Schwinger et al., 2016). In contrast, students reporting low or decreasing levels of incremental beliefs were associated with the *High All* profile in the Year 6 cohort. A similar finding was identified by Schwinger et al. (2016) with their German elementary school sample, and found students with high entity beliefs were more likely to adopt multiple goal profiles. They argued that the reasons behind pursuing mastery goals in addition to performance goals is different for incremental and entity theorists. Whilst incremental students might aim to develop and learn skills, an entity student's aim might be to demonstrate their competence to others. Another explanation is that the students within the Year 6 cohort were transitioning to the *High All* profile from the *Indifferent* or *High Performance* profiles where the students are more likely to be adopting high entity beliefs about their ability already. Findings from this study showed that students were more likely to move from those two profiles than from a *High Mastery* profile where individuals had a high incremental endorsement.

Data from this study also extends evidence on sex differences in achievement goals to the formation of individual goal profiles in primary and secondary school education. Analyses revealed that more female than male students showed a primarily mastery-oriented goal profile, whereas more male than female students held high performance or multiple goal profiles. These results are consistent with previous profile studies in younger student samples and meta-analytic observations (Hulleman et al., 2010; Luo et al., 2011; Schwinger and Wild, 2012; Schwinger et al., 2016). This also supports the sports literature that female students usually report higher mastery-approach goals due to displaying higher levels of effort, whilst male students report higher endorsement of performance-approach goals due to being more competitive (Shim et al., 2008; Jaitner et al., 2019; Lochbaum et al., 2020).

Limitations and Future Research

This study makes an important and unique contribution to the achievement goal literature by providing an insight into students' profile membership across primary and secondary school education using nuanced approach goals. Whilst this study has contributed to our current knowledge and understating of achievement goal profiles within primary and secondary school students, it also has several limitations. Firstly, this study has shown that certain subgroups of students have the capability to distinguish and endorse mastery-self and mastery-task, performance-competition and performance-appearance approach goals, however, future research should explore these more nuanced goals with both approach and avoidance goals and investigate the relationship between these goals from a person-centred approach.

Furthermore, the study has identified important previously unexplored antecedents of achievement goal profiles (i.e., basic psychological needs), however, there has been very little exploration of other antecedents on achievement goal profiles. Previous variable-centred studies have shown the interactive effects between achievement goals and perceived classroom goal structure (e.g., Lau and Nie, 2008; Murayama and Elliot, 2009; Wang, Liu, Chatzisarantis et al., 2010; Schwinger and Stiensmeier-Pelster, 2011), although, very little literature have examined classroom climate as an antecedent in person-centred studies. This study has shown that the transfer from primary to secondary education can have an impact on students' stability of adaptive achievement goal profiles, however, we are unsure how influential the perceived classroom goal structure is compared to other antecedents such as implicit beliefs and basic psychological needs. How students perceive the classroom climate, especially when first entering secondary school education, can assist teachers in promoting a classroom environment that encourages endorsement of adaptive achievement goal profiles. From a methodological standpoint, more measurement occasions could have been included for both within and between year groups (e.g., Schwinger et al., 2016), as this would have created a more accurate presentation of students profiles throughout the course of the academic year in addition to the transfer and transitions. Furthermore, although the LPAs conducted in this study allowed for the identification of qualitatively different goal profiles, they did not produce an impression of motivational decline across time (Schwinger et al., 2016). It is recommended that researchers may use growth mixture models to enable the exploration of individual goal trajectories (Muthén and Muthén, 2017).

Conclusion

In conclusion, the present study has provided new insights into achievement goal profiles displayed by students in primary and secondary school PE. The examination of students' mastery-task, mastery-self, performance-competition, and performance-appearance elements of achievement goals across primary and secondary education provides a more nuanced understanding of young students' achievement goal adoption. Findings indicate important year group differences in achievement goal profiles, patterns of stability and significant predictors of these profiles, particularly the effects of need satisfaction and need frustration that warrant further longitudinal investigation. This study emphasises the importance of exploring these interesting and influential combinations of achievement goals in greater detail if we are to fully understand the motivational processes underpinning students' motivation in school education.

Chapter 7

General Discussion

The PE setting provides an opportunity for researchers and educators to understand students' achievement motivation in a unique and complex environment. In contrast to most school subjects where individuals can hide their competence within the classroom setting, PE is very public in nature, whereby a student's own and others ability can be easily observed and evaluated. PE is the only physical environment that can play a significant role in encapsulating every child up to the age of 16 from all backgrounds and characteristics, it is distinct from other physical contexts (Warburton, 2008). Furthermore, numerous studies have shown that experiences in PE play an essential part in influencing attitudes towards physical activity and participation beyond school (Biddle, 2001; Hagger et al., 2003; Polet et al., 2019; Coulter et al., 2020). Considering the concern over continuous declining physical activity levels, rising sedentary behaviours, and obesity levels, the importance of understanding the motivational processes that direct adolescents' behaviour has become increasingly warranted (Tremblay and Willms, 2003; Department of Health and Social Care, 2019; Park et al., 2020).

Achievement Goal Theory has formed the main theoretical framework of the research within this thesis. The first study reviewed the current achievement goal literature within primary and secondary school education from a person-centred perspective. The second study provided a cross-sectional examination of the types of achievement goal profiles and their consequences expressed by adolescent students in PE. This study and the subsequent studies concentrated explicitly on approach goals, which were further differentiated by the mastery task-self, and the performance appearance-competition distinctions. The relationships between these goals and student-reported and teacher-reported outcomes were determined. The final two studies longitudinally explored students' approach goal adoption in PE across significant transfer and transitions in relation to two key antecedents, namely implicit theories of ability and the satisfaction and frustration of basic psychological needs. The third study examined individual-level stability and change of the approach goal profile configurations within students across the final years of primary school and the transfer into secondary school, and sought to establish what predicted stability and change in students' goal configurations and their associated outcomes. The final study focused on the identification of students' distinct approach goal profiles and the stability of profile membership across primary and secondary school. The study sought to identified what predicted initial profile adoption and if changes in these antecedents predicted change or stability in profile membership.

Summary of Research Findings

Study One: Approach and Avoidance Goals in Education: A Scoping Review of Students' Achievement Goal Profiles. The scoping review highlighted a dominance of cross-sectional research since the development of the approach-avoidance distinction. However, there has been a steady increase of longitudinal studies in the last ten years. The majority of studies were conducted with secondary school students (11 to 18 years), and limited studies with students under the age of 11 years. Subjects such as English, mathematics, and science have had more attention both cross-sectional and longitudinally than more non classroom-based subjects such as PE, drama, and music. The *High All* and *High Mastery* profiles were the most frequently endorsed by students, and were associated with the most adaptive outcomes. In contrast, the *Average All* profile was associated with the most maladaptive outcomes. The types of measurement used influenced the types of profiles produced; with the PALS measurement generating more adaptive profiles, while the AGQ instrument created less adaptive profiles. This was the result of the measures varying on how they defined performance goals, with PALS measure focused on appearance-based performance goals, whilst the AGQ assessed normative performance goals. Female students were highly represented in more maladaptive profiles, such as the *Average All* and *Low All* profiles. In contrast, male students had high representation in the *High Performance* and *High All* profiles, whilst younger students (primary/elementary aged students) were more likely to adopt the *High All* or *Average All* profiles compared to older students (secondary school aged students).

Study Two: Multiple Goal Pursuit in PE: The Prevalence and Consequences of Approach Goal Profiles in Adolescent Students. The cross-sectional study provided an insight into the different types of approach goal (mastery-task, mastery-self, performance-competition, and performance-appearance) profiles endorsed by early and mid-adolescent students in PE. Latent profile analysis revealed that the majority of students may not differentiate between these more nuanced goals proposed by theory and research (e.g., Hulleman et al., 2010; Elliot et al., 2011; Warburton and Spray, 2014; Korn and Elliot, 2016; Senko and Dawson, 2017). However, certain subgroups (female students and primary-aged students) reported higher scores on the performance-appearance element of performance-approach goals. Students were more likely simultaneously pursue all four approach goals than just adopting one or two goals in a typical PE lesson. This profile (*High All*) reported similar optimal outcomes to those characterised by the high mastery and low performance goals. Moderately low levels of all goals (*Indifferent*) was the most frequent profile expressed by students, which were associated with low levels of physical self-worth, physical activity levels, and teacher-reported outcomes, and high levels of worry and concentration disruption. There was a higher representation of female students in the *High Performance* profile than male students, and females scored significantly lower on physical self-worth and physical activity levels, whilst higher on worry and concentration disruption. Primary school students were more prevalent in *High All* and *Indifferent* profiles, however, Year 7 students reported a high percentage in the *High Performance* profile.

Study Three: Individual-Level Change and Stability in Approach Goal Configurations in PE. Ipsative continuity analyses revealed both individual-level stability and change in students' approach goal configurations in primary and secondary school PE. The majority of students displayed stability of the four approach goals across the three year groups. Findings showed that students' relative order of their goal configurations remained fairly stable during the transfer into secondary school (Year 6 to Year 7). In contrast, the most change was observed between Year 5 and Year 7. Implicit theories of ability and basic psychological needs were found to be strong predictors of approach goal configuration stability and change. Entity beliefs predicted change in students' goal profile configuration, while incremental beliefs predicted stability in students' goal configurations. Analyses also revealed that the satisfaction of autonomy and relatedness predicted stability in goal configuration. In contrast, frustration of relatedness resulted in high instability of goal configurations. Across the transfer, students with increased profile stability predicted decreased levels of worry and concentration disruption in PE lessons. In comparison, increased profile change resulted in increased levels of concentration disruption and decreased levels of physical self-worth.

Study Four: The Prevalence, Stability, and Antecedents of Approach Goal Profiles Across Primary and Secondary School PE . The majority of students pursued mastery-task and mastery-self goals, and performance-competition and performance-appearance goals in similar ways and strengths across the profiles. However, there was evidence of differentiating between the more nuanced goals in some profiles across the cohorts. For example, Year 6 cohort students in the *High Mastery* profile adopted higher task-focused goals than self-focused goals at every time point. Furthermore, Year 7 students (Year 6 cohort) reported high levels of performance-appearance goals in the *Indifferent and High Performance* profiles. However, this changed within the Year 8 cohort, where performance-appearance goals decreased and performance-competition goals increased within the *High Performance* profile. Latent transition analyses revealed a high percentage of students across the cohorts endorsed multiple goal pursuits across the transfer and transitions in primary and secondary school PE (e.g., *High All, Indifferent,* and *Low All* profiles). Over the transfer from primary into secondary school, 31% of Year 6 students held the same profile in Year 7. In contrast, transitions between Year 7 and Year 10, students displayed between 54% and 88% profile stability. Most instability was evidenced by movements to similar neighbouring profiles (e.g., *Low All* to *Indifferent* profiles, *High Mastery* to *High All* profiles), while younger students evidenced the most adaptive shifts (e.g., *Indifferent/Low All* to *High Mastery/High All).* However, the same set of students (Year 6 cohort) were also most likely to observe maladaptive shifts (e.g., *High Mastery/High All* profiles to *Indifferent/Low All* profiles) than older students. Across the cohorts, female students were more highly represented in the *High Mastery* profile, while males were more likely to be in the *High Performance* profile. Logistic regressions revealed that students who believed their ability could be improved and developed over time (i.e., incremental beliefs) were significantly more likely to adopt a *High Mastery* profile than any other profile. In comparison, students who believed their ability should be displayed and used to outperform others (i.e., entity beliefs) had a higher probability of adopting *High Performance* goal profiles. Students displaying high or increasing levels of autonomy and relatedness satisfaction were more likely to adopt a *High Mastery* profile, whilst students displaying high or increasing levels of competence satisfaction were more likely to adopt the *High Performance* or *High All* profiles. In contrast, the frustration of all three needs predicted maladaptive profiles such as the *Indifferent* and *Low All* profiles.

Nuanced Approach Goals

There has been very little research on the mastery-task, mastery-self, performance-competition, and performance-appearance goals despite theoretical models (e.g., 3x2 model, 2x2 standpoints model) and research calling for these distinctions in the achievement goal literature (e.g., Hulleman et al., 2010; Elliot et al., 2011; Warburton and Spray, 2014; Korn and Elliot, 2016; Senko and Dawson, 2017). The scoping review (study one) revealed that no current studies within the school setting had explore task-based or self-based mastery goals from a person-centred perspective. Furthermore, only one study (Gonçalves et al., 2017) distinguished between competition and appearance when investigating performance goals using person-centred research. As the majority of achievement goal models and developments were conducting using university students (e.g., Elliot, 1994, 1999, 2005, 2006; Elliot and McGregor, 2001; Elliot et al., 2011), in addition to the scoping review highlighting little or no exploration of these goals within compulsory education, the current thesis studies sought to establish if these nuanced goals are appliable to younger students.

Cross-sectionally, preliminary analyses revealed that we could measure these goals in younger students with the CFA supporting the four-factor model. However, main analyses including bivariate correlations and latent profile analyses indicated that students reported similar means and z scores for self-based and task-based mastery goals, and competition-based and appearance-based performance goals across the five profiles. However, further exploration of the approach goal means differentiated by sex and year group (appendix 13, p.313), revealed the female students and primary school students differed on the performance-approach goals, with both samples scoring higher on the performance-appearance goal (M = 3.14, M = 3.33) than the competition component (M = 2.79, M = 2.88). This implies that these sets of students had a stronger desire to appear competent to their peers, rather than wanting to perform better than them. Previous achievement literature that have explored these two goals, have disagreed on which one is more adaptive. Some studies found that competition goals produced higher positive associations with academic achievement, competence, learning, and performance (e.g., Hulleman et al., 2010; Wirthwein et al., 2013; Warburton and Spray, 2014). However, cross-sectional findings from study two concurred with Lee and Bong (2021) that appearance goals were a stronger predictor of behavioural, cognitive, and emotional learning outcomes. Bivariate correlations from study two found that performance-appearance goals produced stronger positive correlations with physical self-worth and physical activity levels, and stronger negative associations with concentration disruption and disaffection than performance-competition goals. Cross-sectionally, latent profile analyses and mean scores of subsamples suggested that all young students may not differentiate between task-based and self-based mastery goals. However, there is some evidence that certain subgroups differentiate and pursue varying degrees of performance-competition and performance-appearance based goals. This warranted further exploration from a longitudinal perspective to examine if these goal developments are relevant and applicable to students across their school careers.

Longitudinally, individual-level analyses revealed that the majority of students exhibited stable configurations of these four approach goals across Year 5, 6, and 7. These findings suggest that these students had little change in the relative order of their approach goal adoption and that their PE motivation remained fairly stable and robust despite the transfer from primary to secondary school (Year 6 to Year 7). Furthermore, this evidence of goal stability contrasts with previous findings from the educational setting that found high percentage of individual change in students' goal configurations, however, these studies measured different achievement goals (approach and avoidance goals), within different subjects and measuring university-aged students' goal configurations (e.g., Fryer and Elliot, 2007; Muis and Edwards, 2009; Daumiller et al., 2021). However, it does support and extend the findings from Warburton and Spray (2017). Both studies found high stability despite the goals in the configurations being different (e.g., 2x2 model versus mastery-task, mastery-self, performance-competition, performance-appearance approach goals).

Moreover, consistent with study two findings, the latent profile and transition analyses (study four) showed at the majority of students pursued both task-based and self-based mastery approach goals, and performance-competition and performance-appearance approach goals to similar degrees. However, there were exceptions to these with some profiles displaying varying levels of the nuanced goals. For example, within the Year 6 cohort, students in the *High Mastery* profile reported higher mean and z scores for task-based mastery goals at every time point (e.g., Year 6, Year 7, and Year 8). This indicated that these students focused more on accomplishing the tasks rather than personal improvement. Furthermore, previous sports literature found that students with high perceived competence were more likely to adopt mastery-task focused goals (Mascret et al., 2015).

The same Year 6 cohort also reported adopted varying degree of performance-competition and performance-appearance approach goals. Before the transfer into secondary school, these Year 6 students reported moderate levels of both competition and appearance goals. However, after the transfer, a steep increase in performance-appearance goals within the first term of secondary school was observed (Year 7). This highlights the impact the environmental characteristics of secondary school (e.g., larger class size, wider range of abilities) may have on students' achievement goal adoption especially in subjects where students abilities are on display to others (Warburton and Spray, 2014). However, as these students become older (Year 8), they shift their focus from wanting to appear competent to an increased desire to outperform their peers. These findings agree with previous literature that found as students become older, they no longer need acceptance from peers, but want to perform better than their peers in a naturally competitive environment (Warburton and Spray, 2014). The studies within this thesis provides new evidence of how adolescent students adopt more nuanced achievement goals and how these adoptions change throughout their school careers. Whilst initial cross-sectional person-centred research (study two) suggested that students may not differentiate between these nuanced approach goals, further longitudinal person-centred studies (study three and four) implied that certain students do differentiate and adopt fluctuating degrees of each approach goals during key transfer or transitions in a student's school career.

Multiple Goal Pursuit

The present thesis extends the person-centred literature exploring multiple goal pursuits within the school context by measuring previously unexplored achievement goals, both cross-sectionally and longitudinally, within a country and school subject that has had little attention. Cross-sectional data (study two) revealed that 32% of the PE sample were likely to endorse a *High All* profile compared to 17% of the PE sample that endorsed a *High Mastery* profile. When comparing the two profiles, students in the *High All* profile reported very similar scores for the adaptive outcomes (e.g., physical self-worth, effort, attainment, and engagement), and significantly higher physical activity levels than students in the *High Mastery* profile. However, the *High All* students did report higher scores in the maladaptive outcomes (e.g., concentration disruption and worry). This is consistent with previous person-centred literature that high approach goals can produce high adaptive outcomes (e.g., Liu et al., 2009; Wang, Morin, Liu et al., 2016; Linnenbrink-Garcia et al., 2018), however it does show the negative implications performance-approach goals can cause if not pursued with mastery-approach goals. This is why many researchers recommend that teachers should firstly promote mastery goals, especially when research has highlighted the consequences of when performance goals are solely pursued (e.g., Elliot and McGregor, 2001; Wang et al., 2007; Lochbaum and Gottardy, 2015). Studies within this thesis revealed students that displayed a *High Performance* profile was just as maladaptive in terms of consequences as students reporting low levels of all four approach goals. Both profiles reported moderately low to low levels of physical self-worth, physical activity levels, effort, attainment, and engagement, whilst moderately high to high levels of concentration disruption and disaffection. This extends to current literature that identified the negative implications of pursuing performance-approach and performance-avoidance goals (e.g., Elliot and McGregor, 2001; Wang et a., 2007; Lochbaum and Gottardy, 2015). Findings from study two suggests that the adoption of task-based and self-based mastery-approach goals are critical to students' optimal motivation in PE (both mentally and physically) especially when high levels of both performance-appearance and performance-competition approach goals are experienced in both primary and secondary school PE.

This thesis also investigated if early adolescent students have the capability to pursue multiple goals in similar ways to older students. The majority of previous literature that has explored multiple goal pursuit were with secondary school and university aged students (e.g., Pastor et al., 2007; Luo et al., 2011; Berger, 2012; Pulkka and Niemivirta, 2013a, 2013b), however, questions were raised if multiple goal pursuit and their effects were unique to the setting and age group (Hulleman and Senko, 2010). Within this thesis, students as young as nine (Year 5) were found to pursue multiple goal adoptions within the profiles identified within the PE setting, in fact, *High All* and *Indifferent* profiles were the most prevalent within primary school students (study two and study four). This supported and extends the limited research that had previously explored achievement goal profiles with primary aged students in other subject areas and different countries (e.g., Schwinger and Wild, 2012; Schwinger et al., 2016; Hornstra et al., 2017; Linnenbrink-Garcia et al., 2018). Students as young as seven years old exhibited a *High All* profile (Schwinger and Wild, 2012; Schwinger et al., 2016), whilst others found that primary aged students were more likely to strongly endorse multiple goals than secondary school students (Linnenbrink et al., 2018). The evidence from this thesis and previous literature contradicts the proposals made by Nicholls (1984, 1989), that students under the age of 12 are unlikely to pursue both mastery and performance goals. However, it is argued that since these predictions were made based on school studies in the 1980s, it is plausible that students' capability of differentiating between effort and ability has developed earlier due to an increase in social comparison in the primary school setting (Schwinger et al., 2016).

The biological make-up of a student was found to have a significant influence on the types of achievement goals adopted and consequently, the affect, behaviour, and cognition in PE lessons. Both cross-sectional and longitudinal studies (study two and study four) revealed that male students were more likely to display high levels of all approach goals (*High All* profile) than their female counterparts and was consistent with previous educational literature (Preckel et al., 2008; Luo et al., 2011; Zhang et al., 2016; Arens and Watermann, 2021). Latent transition analyses (study four) identified that female students had higher representation in the *High Mastery* profiles, whilst males were more likely to a hold a primarily performance-oriented profile (*High Performance*). This supported that limited literature that have explored sex differences within achievement goal profiles (e.g., Hulleman et al., 2010; Luo et al., 2011; Schwinger and Wild, 2012; Schwinger et al., 2016). In addition, it also aligns with previous sports literature (e.g., Shim et al., 2008; Jaitner et al., 2019; Lochbaum et al., 2020) that found on average, females displayed higher effort levels, which in turn, made them more likely to pursue mastery goals. Whereas, males were more likely to be competitive within these sports settings, thus, more likely to adopt performance goals. However, female students had higher representation in the *High Performance* profile than male students within study two. This contradicts the dominant patterns observed in PE and other school subjects (e.g., Hulleman et al., 2010; Zhang, 2016; Mädamürk et al., 2021). This is a concerning finding such as given the links between the *High Performance* profile and maladaptive outcomes, and that female students are more likely to hold negative views and experiences towards PE than male students (e.g., Biddle and Wang, 2003; Murphy et al., 2014).

Characteristically, achievement goals are relatively stable characteristics (Dweck and Leggett, 1988), however, in more recent years, studies have found that achievement goals can be stable but can also change (e.g., Fryer and Elliot, 2007; Muis and Edwards, 2009; Warburton and Spray, 2017). The ipsative continuity analyses conducted in study three, showed that students displayed both stability and change in their achievement configurations at an individual-level. Results highlighted that students' goal configurations were fairly stable across the transfer from primary to secondary school (Year 6 to Year 7), despite the significant environment changes experiences by students during that time. Similar findings were identified by Warburton and Spray (2017), who also found high stability in approach and avoidance goal configurations across the transfer into secondary school PE, despite different population and definition of achievement goals in the configurations. In contrast, the largest change in achievement goal endorsement was observed between Year 5 and Year 7 (a transition and a transfer), where negative and large negative profile consistencies were reported. However, these changes were seen as relatively small compared to the amount of students demonstrating stability in their approach goal configurations during this time.

Stability of approach goal profiles was also explored across key transfers and transitions in study four through latent profile and transition analyses. Compared to the goal configuration findings from study three, study four revealed that only 31% of Year 6 students held the same profile after transferring into Year 7 at secondary school. This high instability is not surprising given that these students are adjusting to their new school setting. Previous achievement goal literature has reported mixed findings concerning the stability of achievement goal profiles over the transfer. Some are consistent with study four's findings, that high instability is shown before and after the transfer into secondary school, and becomes more stable after Year 7 within other school subjects (Schwinger and Wild, 2012; Schwinger et al., 2016; Bae and DeBusk-Lane, 2018). In contrast, other researchers found high stability across the transfer, however, the majority of students within these samples were older (12 or 13 years old) when they transferred into secondary school compared to UK schools (e.g., Tuominen-Soini et al., 2011; Lo et al., 2017; Gonçalves et al., 2017). The largest negative movement was observed over the transfer, where 45% of students moved from a *High Mastery* profile to an *Indifferent* profile. This illustrates the potential impact of the secondary school environment on students' goal endorsement even within the first few months of secondary school. This could be the result of the big-fish-little pond effect (BFLPE, Marsh, 1984). The movement from small sized classes in primary school to much larger classes in secondary school has shown to have negative effect on students' self-concept, which can impact their performance and mental development (Fang et al., 2018).

Literature also highlighted that social comparison has a strong influence on students' self-concept (e.g., Marsh, 1988, Marsh et al., 1995; Möller et al., 2009; Parker et al., 2013; Niepel et al., 2014). Students especially in subjects like PE, compare their achievement with their peers, which can lead them the feel more negative about their own competence in a high-achieving environment, and consequently adopt more maladaptive achievement goal profiles. Contrastingly, within the same cohort of students, nearly half of students that displayed a *Low All* profile in Year 6, shifted to a *High Mastery* profile within the first term of secondary school, highlighting that not all students are negatively impacted by the transfer into secondary school, and that students can move from a very maladaptive profile to a highly adaptive profile (i.e., *High Mastery* profile). There could be a range of reasons why this movement was observed. For example, students going from a generalist primary school teachers teaching PE, to being taught by specialists in secondary school PE could result in increased adoption of mastery-approach goals. Furthermore, going from mixed-sex taught PE lessons to single-sex PE lessons has shown increased motivation and participation in lessons especially for female students (e.g., Evans, 2006; Wallace et al., 2020).

Antecedents and Consequences of Approach Goal Profiles

Implicit theories of ability play a major role in directing an individual towards a particular goal, making it an influential predictor of achievement goals (Dweck, 2000, 2002; Warburton and Spray, 2017; Mammadov and Hertzog, 2021). Previous findings have consistently shown the strong empirical link between incremental beliefs and mastery goals, and between entity beliefs and performance goals (e.g., Dweck and Leggett, 1988; Biddle, Wang, Chatzisarantis et al., 2003; Liu and Wang, 2005; Burnette et al., 2013; Liu et al., 2021). At a contextual level (study three and four), longitudinal comparisons not only support the theoretical propositions and literature, but documented implicit theories as predictors of changes in approach goal configurations and profiles over time. Ipsative continuity analyses revealed students that endorsed believed their ability was a fixed stable quantity were more likely to display greater change in their goal configuration, with the largest change observed between Year 5 and Year 7. Furthermore, these entity beliefs can have negative implications on their goal adoption and subsequent outcomes (e.g., Warburton & Spray, 2008, 2009, 2017). In comparison, students that believed their PE ability could be developed and improved were more likely to have stable goal configurations. Previous literature found that entity theorists were more responsive to competence-based feedback and consequently more likely to change their goal adoption than incremental theorists (Fryer and Elliot, 2007).

Due to the limited amount of literature on antecedents of achievement goal profiles, the present thesis explored the predictive nature of implicit theories on approach goal profiles. As predicted, incremental students were significantly more likely to adopt a *High Mastery* profile, with these individuals reporting the highest mean scores for implicit theories at most time points. This supports the AMM (Dweck and Leggett, 1988) that students seeking out opportunities to improve and develop their ability lead to the adoption of task-based and self-based mastery approach goals. These findings enhance to the current limited literature that has explored implicit theories as an antecedent of students' achievement goal profiles in general academia (e.g., Schwinger et al., 2016). In comparison, high entity students were more likely to adopt a *High Performance* profile. Furthermore, the study four found that within the Year 6 cohort, high entity beliefs were associated with the *High All* profile, especially at time points one and two. This association was also identified by Schwinger et al. (2016) with entity beliefs increasing the likelihood of adopting multiple goal adoption profiles within general academia (e.g., *High All, Indifferent,* and *Low All* profiles). They suggested that students have different reasons for pursuing a *High All* profile, from an incremental theorists viewpoint and an entity theorists viewpoint. However, latent transition analyses suggested that PE students that were in the *High All* profile at the second or third time points, moved from an *Indifferent* or *High Performance* profile, with already strong entity beliefs.

Despite the theoretical assumptions of basic psychological needs as a predictor of achievement goals (e.g., Adie and Bartholomew, 2013; Dweck, 2017), there has been very limited exploration of this relationship. While in more recent years, researchers have started to investigate the relationship from a variable-centred approach (e.g., Duchesne, Ratelle et al., 2017; Janke et al., 2022), to my knowledge no study has examined the predictive nature of needs on achievement goal profiles. Longitudinal analyses from study three revealed that the satisfaction of autonomy and relatedness were associated with the stability of the goal configurations. This showed that students that felt that they were making their own choices and decisions in PE lessons, and felt a sense of belonginess were more likely to report stability in their goal adoption. However, if these students felt that they did not belong within the lessons (relatedness frustration), then they would report high instability in their goal adoption. These findings illustrate the significant role basic psychological needs appear to have in the stability and change of achievement goal adoption, and that teachers should take into account these needs, and find ways of satisfying them within the PE setting.

Further investigation through latent profile and transition analyses (study four) supported the important role the satisfaction of these needs have on achievement goal adoption. Within the Year 6 cohort, at the end of primary school, students with high autonomy satisfaction were more likely to adopt a *High Mastery* profile compared to any other profile. This relationship continued after the transfer and in the following transitions. Similar patterns were identified with relatedness satisfaction within the Year 7 cohort, with high/increasing levels of relatedness being associated with the *High Mastery* profile compared to the *High Performance* and *Low All* profiles. These findings imply that students that felt they were able to make their own choices and decisions within the PE lesson and felt a sense of belonginess to their peers, were more likely to strive towards mastering tasks and personal improvement. In contrast, students with high competence satisfaction had a higher probability of pursuing a *High All* profile compared to the *High Mastery* profile. Increases in competence satisfaction across the transfer and subsequent transitions showed that students were more likely to report high levels of performance goals (*High Performance* profile) or high levels of all four approach goals (*High All* profile) than the *High* Mastery profile. This link between competence satisfaction and performance-approach goals has been identified before using the 3x2 model (Cecchini et al., 2019). These findings suggest that these PE students that are effectively bringing about their desired outcomes (competence), are more likely to appear competent to their peers (appearance-focused) or to outperform their peers (competition-focused).

When exploring the influence of need frustration on the approach goal profiles, the majority of students across the transfer and all following transition that had increasing need frustration, were less likely to adopt a *High Mastery* profile than all other profiles. The only exception was between the end of Year 7 and the start of Year 8, where increases in competence frustration resulted in students being more likely to adopt the *High Mastery* profile compared to the *High Performance* profile. In contrast to implicit theories scores which increased over the transfer into secondary school, all three need satisfaction scores decreased from Year 6 into Year 7, and continued to decrease the following year. Dissimilar, the frustration of the three needs increased across the transfer, however they did slightly decrease once transitioned into Year 8. These are worrisome findings given the abundance of positive outcomes and benefits to motivation, learning, and well-being associated with the satisfaction of all three needs (e.g., Adie et al., 2008; Williams et al., 2011; Mouratidis et al., 2011; Warburton et al., 2020), and the negative outcomes such as burnout, exhaustion, negative affect, and ill-being associated with need frustration (e.g., Bartholomew et al., 2014; Costa et al., 2014; Teixeria et al., 2018). This also highlights the mismatch that can be experienced between students' needs and the secondary school environment, and can have negative implications for the students and their motivation (Meece et al., 2006).

The thesis also investigated the outcomes associated with these approach goal profiles and goal configurations (study two and study three). Cross-sectional data from study two revealed that students that simultaneously pursued high levels of all four approach goals reported the highest scores for adaptive student-reported outcomes (e.g., physical self-worth and physical activity levels) and adaptive teacher-reported outcomes (e.g., effort, attainment, and engagement). Students pursuing only mastery-task and mastery-self approach goals reported similar adaptive outcomes as the *High All* profile, however, displayed lower scores in the maladaptive student-reported and teacher-reported outcomes (e.g., concentration disruption, worry, and disaffection). Whilst, this supports previous person-centred literature of the adaptiveness of the *High All* profile (e.g., Luo et al., 2011; Hornstra et al., 2017; Gonçalves et al., 2017), the higher mean scores in some maladaptive outcomes (such as cognitive anxiety and disaffection), highlights that students may still be vulnerable to maladaptive outcomes compared to mastery-approach adoption. The study also highlighted the negative consequences experienced by students when solely adopting performance-approach goals (competition and appearance goals). These students reported similar maladaptive outcomes that were experienced to students endorsing low levels of all four approach goals. Both profiles produced low levels of physical self-worth, physical activity levels, worry, effort, attainment, and engagement, in addition to high levels of concentration disruption and worry. This worrisome finding provides evidence for the need for teachers to promote the adoption of mastery-approach goals in PE.

These outcomes were also explored longitudinally at an individual-level, to see how stability and change in students' goal configurations effected these adaptive and maladaptive outcomes. Ipsative continuity analyses identified that students with stable approach goal configurations reported lower levels of maladaptive student-reported outcomes (e.g., worry and concentration disruption). In contrast, students with changing approach goal configurations reported increases in maladaptive outcomes (e.g., concentration disruption) and decreases in adaptive outcomes (e.g., physical self-worth). These findings show the implications having stable or changing approach goal configurations can have on a student's educational outcomes.

Implications

Interventions in PE

PE is a unique setting that not only can influence students' cognitions and behaviours about physical activity, but supports their overall development. As well as learning and developing physical skills, PE teaches students intellectual skills, to navigate social situations, and nurtures their emotional development (Brubaker, 2011). However, in recent decades, a continuous decline in students' physical activity levels and motivation especially during adolescence has been observed (Pratt et al., 1999; Carr, 2006; Shen et al., 2009; Park et al., 2020). Understanding what predicts and influences their motivation in PE, particularly during key academic changes provides educators the opportunities to promote adaptive motivation in the classroom. However, as shown in the scoping review, there is a clear lack of person-centred studies exploring these questions especially within subjects such as PE. This thesis provides an insight into the achievement goals adopted by during a critical time for students' motivation in PE, what predicts these achievement goal patterns, and the implications these goals have on affective, behavioural and cognitive outcomes.

Findings from study two revealed that out of the five identified profiles, students in all year groups were most likely to adopt moderately low levels of all approach goals (*Indifferent* profile) across all year groups. This is a worrisome finding given that the profile was associated with moderately low levels of the adaptive outcomes (e.g., physical self-worth, physical activity levels, attainment, and engagement) and moderately high levels of the maladaptive outcomes (e.g., concentration disruption and worry). This profile consisted of 60% female students, whom are more likely to hold negative views and opinions about PE than their male counterparts (Biddle and Wang, 2003; Murphy et al., 2014). In addition, 42% of the primary school sample (consisting of Year 5 and 6 students) resided within this profile. This correlates with findings from Jacobs et al. (2002), that students' motivation in PE is already on a downward trajectory before they transfer into secondary school, and that the transfer appears to accelerate the decline. These findings imply interventions need to be put in place that focus on mastering tasks and personal improvement before the transfer into secondary school to promote mastery-approach with special focus on female students.

Longitudinal evidence from study four revealed declines in adaptive profiles after the transfer, with the greatest decline in the *High Mastery* profile within the Year 7 cohort, and the *High All* profile within the Year 8 cohort. In contrast, there were increases in maladaptive profiles within these cohorts, with increases in the *High Performance* profile in both cohorts, and increases in the *Low All* profile within the Year 8 cohort. These profiles were strongly associated with the maladaptive outcomes and negatively correlated with the adaptive consequences. This is likely the result of the contrasting PE environments of primary versus secondary school. The observed increase in competition and appearance goals are the result of an increased focus on ability and competition with peers, social comparison, normative feedback, and ability-based evaluation within the secondary school setting (e.g., Nicholls, 1989; Blackwell et al., 2007; Warburton and Spray, 2014). Moreover, analyses from study four indicated that students were more likely to change achievement goal profiles across the transfer into secondary school. Only one profile (*High All*) showed stability between Year 6 and Year 7, whilst all other profiles showed high instability during this time. However, across subsequent transitions (Year 8 to Year 10), students' achievement goal profiles became more stable, showing little change in their goal adoption once settled in key stage three and into key stage four. This suggests that the profiles adopted in Year 7 sets the precedent for their goal adoption in Year 8, 9, and 10. Current findings suggest that Year 7 is a critical period for intervention, with concerning low scores in mastery-approach goals, physical self-worth, and physical activity levels compared to the final year at primary school (Year 6). This extends the literature that identified Year 7 to be critical time for students' motivation in PE, with students' reporting a greater focus on normative competence and a greater decline in adaptive achievement goals (Warburton and Spray, 2009). Therefore, Year 7 students within the first term of secondary school would be most susceptible to interventions where adaptive achievement adoption is promoted. This could be combined with interventions in the final years of primary school to promote adaptive goal adoption and make the transfer into secondary school less negatively impactful on students affects, cognitions, and behaviours towards PE.

Once the time of the intervention has been selected, next is what should be promoted within these interventions to be effective. When exploring the stability and change of achievement goal configuration in study three, autonomy and relatedness satisfaction were significant predictors of profile consistency across the transfer to secondary school. This meant high or increasing levels of autonomy and relatedness resulted in stability in profile configuration. Findings from study four produced new evidence of the predictive nature of autonomy and relatedness on mastery-task and mastery-self approach goals across the transfer and the transitions into key stage three and key stage four. In contrast, competence satisfaction predicted performance-competence and performance-appearance goals, which contradicts previous variable-centred studies that found competence satisfaction with mastery-approach goals (Duchesne, Ratelle et al., 2017; Janke et al., 2022). However, these findings were found with secondary and university students within general academia. In contrast, study four's findings is it not surprising given the inherently competitive focus of activities in PE and the focus on displaying their competence to outperform others or to look good at something to others.

Both need satisfaction and implicit theories of ability were strong predictors of the adoption of mastery-oriented profiles (*High Mastery*) across all three cohorts. Students were more likely to adopt a *High Mastery* profile if students reported high or increasing levels of autonomy satisfaction, relatedness satisfaction, and incremental beliefs. Interventions could, therefore, focus on teaching strategies that would increase one or all three of the basic psychological needs. For example, if trying to enhance students' autonomy, teachers may focus on using non-controlling language and explain the fundamentals of the lesson and activities. Furthermore, teachers can offer students a choice of tasks that vary in skill level and provide students enough time to learn and complete tasks (e.g., Reeve, 2009; White et al., 2020; Gråstén et al., 2023). Moreover, if trying to enhance students' competence, teachers could modify rules, equipment or space to support students' individual needs. Teachers could also create novel activities that develop new skills and give students the opportunity to design activities/tasks in pairs or small groups (Gråstén et al., 2019; White et al., 2020). Lastly, concerning the enhancement of relatedness satisfaction, teachers may want to assist students in developing familiarity with class peers, especially when students first transfer into secondary school. Lastly, teachers could create an expectation of social responsibility, such as supporting peers, helping to set up activities and equipment, and allowing students to lead warm-ups and cool downs (Gibbons, 2014). Promotion of these elements are likely to lead to the satisfaction of the basic psychological needs and as a result, more students adopting high mastery-oriented profiles and thus experiencing adaptive consequences.

Measurement of Mastery and Performance Goals

Another set of implications which has arisen from the present thesis is the future measurements for mastery and performance goals. As previously discussed, how achievement goals are operationalised will affect the association between achievement goals and educational outcomes. However, since its conception, the definition and focus of both mastery and performance goals have varied, with researchers concentrating on different aspects of each goals when creating measurements. Elliot et al. (2011) separated mastery-task and mastery-self goals, recognising individuals could focus on mastery of a task separately from personal improvement. However, despite the 3x2 measurement creating a more nuanced conceptualisation of mastery goals, very little research has used this instrument. The scoping review revealed that the majority of studies explored achievement goal profiles using either trichotomous or 2x2 based questionnaires (e.g., PALS, AGQ), which only differentiated by mastery and performance goals by approach and avoidance distinction, and only focused on certain aspects of performance-approach goal distinctions. For example, PALS focused solely on the appearance element of performance-approach goals, whilst AGQ focused solely on the competition element of performance-approach goals.

Although research showed that primary school students could differentiate between mastery-approach and mastery-avoidance goals, questions were raised if they could differentiate between task and self goals. The subsequent studies distinguished these two elements of mastery goals to see if students of early adolescence could differentiate between the two. Studies two and four revealed that students across all year groups in both primary and secondary schools reported very similar levels of both mastery-task and mastery-self goals, and both goals produced very similar correlations with the measured outcomes. Whilst preliminary analyses showed we can measure these differentiated goals, however, the majority of these students in these studies do not appear to vary in their adoption levels. Whilst Elliot et al. (2011) has proposed a range of different achievement goals to measure, these theoretical developments were created using university-aged students. Findings suggest that these extensions may not be applicable to younger students and that a simpler definition of the goals should be used in research in younger students.

Similarly, the definition and focus of performance goals has varied throughout the years, with many researchers concentrating on different aspects of the goal when creating measurements. Despite reviews calling for the appearance and competition distinction to be made (e.g., Urdan and Mestas 2006; Hulleman et al., 2010; Senko and Dawson, 2017), the majority of instruments only measure one of these aspects. The scoping review investigated these measurements in person-centred studies and found that the type of instrument used, influenced the types of profiles produced. For example, studies that selected the PALS questionnaire, which measured the appearance element of performance goals, were more likely to produce adaptive profiles such as the *High Mastery* and *High All* profiles. In comparison, studies that used the AGQ questionnaire, which measured the competition element of performance goals, were associated with less adaptive profiles such as the *Indifferent* and *Low All* profiles. In addition to producing different profiles, both sets of measures predicted different educational outcomes as a result of the varying operationalisation of performance goals. As a result of these findings, the subsequent studies assessed both appearance and competition components using an adaptation of Warburton and Spray's (2014) scale.

Cross-sectional and longitudinal evidence revealed that certain students were able to differentiate and adopt different levels of appearance and competition goals. For example, in study four, Year 7 students adopted high levels of appearance goals, focusing on wanting to appear competent to their teacher and peers, whilst Year 8 students adopted high levels of competition goals, focusing on trying to outperform their peers. In contrast to the mastery goals, performance-appearance and performance-competition goals were associated with different outcomes. For example, within the whole sample and the female sample, appearance goals were perceived as more adaptive regarding the measured outcomes. Whereas, for primary-aged students and male students, performance-competition goals were perceived as more adaptive. Collectively, students seem to be able to differentiate the competition and appearance distinction more than the task and self distinction of mastery-approach goals, especially in the longitudinal study (study four). Whilst, the competition and appearance distinction is more relevant to sport and PE contexts, researchers need to decide if they wish to measure these more nuanced goals in younger students. It is recommended that future PE studies should include both appearance and competition elements in their measurements to be conceptually consistent. Consistency in goal measurement would allow for greater precision when reporting findings and comparing the effects of these goals on affective, behavioural, and cognitive outcomes.

Limitations and Future Research Directions

The present thesis aimed to identify the multiple goal pursuits expressed by adolescent students, and what antecedents predicts these multiple adoptions and the impact these goal configurations have on their affective, behavioural, and cognitive outcomes. However, there are a number of important limitations that need been to be considered.

Approach Goals

The present thesis focused solely on the approach goals, and the temporal patterns between task, self, appearance, and competition goals. Avoidance goals were not explored due to evidence that they are less relevant to younger students in achievement settings, with some struggling to understand mastery-avoidance goals, making them less likely to adopt them (e.g., Lochbaum and Gottardy, 2015; Karakus, 2016; Lochbaum et al., 2017, 2020). Moreover, research has shown that the adoption of mastery-avoidance goals and performance-avoidance goals lead to maladaptive outcomes such as anxiety, poor achievement, low task interest, and self-handicapping (e.g., Howell and Watson, 2007; Corrion et al., 2010; Hulleman and Senko, 2010; Putwain and Daniels, 2010; Lochbaum and Gottardy, 2015; Wang, Morin, Ryan et al., 2016). Although arguments have been made that younger students tend to endorse more approach-based goals (Sahin et al., 2016; Guan et al., 2020), the scoping review revealed that the majority of goal profiling studies measured avoidance goals based on either the trichotomous or 2x2 model. However, the majority of studies from the scoping review did not report a high avoidance profile from primary or secondary school samples, raising questions if avoidance goals should be measured in younger students. This highlights the challenge of achievement goal research with young students and what goals researchers should explore and measure without overwhelming them with the measures. For example, measuring different types of approach goals (task, self, competition, and appearance) with the different types of avoidance goals (task, self, competition, and appearance) would be challenging with primary-aged students. In contrast, these goals could be explored with older secondary school students who are more likely to differentiate between these nuanced goals without being overwhelmed by the measure. Furthermore, researchers could explore how task, self, competition, and appearance avoidance goals interact with the approach version of the goals, and what prominent profiles will form. Future research could also explore the relationship between the current antecedents and the avoidance goals, especially between need frustration and avoidance goals which has little to no exploration from a person-centred perspective.

The scoping review (study one) revealed the lack of exploration on what predicts a student being in a particular achievement goal profile in the person-centred literature. Whilst implicit theories of ability have consistently shown a strong empirical link between incremental beliefs and mastery goals, and between entity beliefs and performance goals, this relationship from a person-centred perspective was only really explored at the individual-level (e.g., Warburton and Spray, 2017; Mammadov and Hertzog, 2021). Furthermore, despite theoretical predictions, there were no person-centred studies exploring basic psychological needs as antecedents of students' achievement goals. Study three and four revealed that both antecedents were strong predictors of students' initial goal membership and configurations, in addition to predicting change and stability of these configurations and profile membership over time.

To further develop the person-centred literature, other antecedents need to be identified and explored as important predictors of students' achievement goal profiles and the stability of profile membership. For example, environmental factors such as perceived motivational climate can be an important predictor of achievement goal adoption especially during a time when students experience many environmental changes (i.e., transferring into secondary school). Similarly, across the thesis, a selection of student-measured and teacher-measured outcomes were investigated as consequences associated with certain achievement approach goal profiles. Future research may want to explore different educational outcomes from the higher order categories identified in the scoping review. For example, if exploring perceived motivational climate as an antecedent, then outcomes relating to environmental influences and group dynamics could be explored, or well-being/ill-being if investigating basic psychological needs as an antecedent.

Throughout this thesis, students' profiles were created exclusively using achievement goals with the view that students' motivation in PE was based on their striving for competence. However, as revealed in the scoping review, 33% of the sample profiled on achievement goals and other motivational variables such as self-efficacy, perceived competence, work-avoidance goals, and social goals. These are often associated with achievement goals due to students wanting approval, affiliations, and friendships within the school setting. Students' social goals and their relationship with achievement goals has been of a particular interest to some person-centred researchers (e.g., Garn and Sun, 2009; Shim and Finch, 2014; Gonçalves et al., 2017; Ng, 2018; Méndez-Giménez et al., 2018). Showing that students can be motivated to be successful in PE, but also have social reasons to succeed in the PE setting, such as to gain peer attention or approval. Students may show a desire to establish and maintain positive relationships with their peers (relationship goals), or a desire to respect social rules and role expectations (social responsibility goals). These social goals may increase in importance as a student transfers into secondary school, with an increase emphasis on social comparison and peer relationships as students become older. With previous literature (e.g., Garn and Sun, 2009; Shim and Finch, 2014; Gonçalves et al., 2017; Ng, 2018; Méndez-Giménez et al., 2018) exploring social goals with the trichotomous and 2x2 model, future research could investigate how these social goals interact with the task and self aspects of mastery goals, and the performance and competition elements of performance goals, and how these goals effect students' educational outcomes.

Much of the achievement literature in education, including this thesis have focused on achievement motivation at a contextual level and investigated predictors and outcomes associated with achievement goals adopted in a general lesson (e.g., Shen et al., 2009; Conley, 2012; Wang, Morin, Ryan et al., 2016; Lo et al., 2017). Students can hold multiple goals at any particular time, and the configuration of those goals can change dependant on the situation. Subjects such as PE incorporate a variety of tasks and activities which places different demands and attributes on students. As a result, students achievement goal adoption could fluctuate dependant on the types of activities that they are participating in. For example, Spray and Warburton (2003) found students' endorsement of mastery goals increased in more team-based activities, while endorsement of performance goals increased in more individual-based activities. Harackiewicz et al. (2000, 2002, 2003) suggested that the pursuit of mastery goals may be particularly context dependent, whereas the pursuit of performance goals may be more stable across contexts. They argued that the adoption of mastery goals develops out of the desire to develop one's skills in a particular task, and endorsement is likely to be dependent and fluctuate greatly on initial interest for learning the task. In comparison, the adoption of performance goals stems from the desire to do well compared to others, regardless of the actual task. Thus, if students strongly desire to do well compared to others in one specific situation, this desire may generalise to other tasks and situations. Indeed, Harackiewicz et al. (2000, 2002) found that students' specific performance achievement goals predicted both specific and general outcomes. In addition to situation specific achievement goals, situation specific antecedents, and outcomes should be explored to see if certain relationships strengthen or weaken in different PE activities.

The Application of Individual-Level Change

Individual-level research is an important but has largely been overlooked in the achievement goal literature. Analyses such as ipsative continuity provides evidence for the presence of both stability and change of students' goal configurations. However, this type of analysis is unable to identify the direction and intensity of these goal changes. Senko and

Harackiewicz (2005) identified two ways in which achievement goals may be regulated in the academic setting, goal switching and goal intensification. Goal switching is when an individual may switch from a mastery to performance, or approach to avoidance goals (or vice versa). For example, a student may have a dominant goal during one particular PE lesson, but a different dominant goal in a different PE lesson. In comparison, goal intensification is when an individual increases or decreases their level of endorsement of their goals without switching the type of goals pursued. For example, a student going from a *High All* profile to an *Indifferent* or *Low All* profiles (e.g., going from a high endorsement of all four goals to a moderate or low endorsement of all four goals). One such analysis that could track and identify these changes are latent growth curve models (LGCM). LGCM allows researchers to study within-person differences in continuous achievement goal trajectories over time (Burant, 2016). Moreover, the models not only measures change but allows for researchers to investigate the antecedents and consequences of change, which could allow us to answer key questions raised from study three's findings of how and when students' goal configurations change. This type of analysis would allow researchers to identify individual differences in achievement goal changes, but also identify what predicts these changes and the educational outcomes associated with these profile changes.

Transfer and Transitions in School

The research within this thesis offers an insight into students multiple goal pursuits in PE across the transfer from primary to secondary school and subsequent year group transitions. Overall, findings from the studies suggest that less adaptive profiles increase as students transfer into secondary school (e.g., increases in the *Indifferent, Low All,* and *High Performance* profiles). Whilst there were three different cohorts and the use of three measurement occasions in establishing and tracing the stability of students' achievement goal profiles, students achievement goal profiles were only explored once an academic year. An increased number of measurement occasions, especially multiple data collections in the same academic year, would allow researchers a better understanding of when these changes or stability of achievement goal profiles occur and what might predictor them. Tracking these profile movements within an academic year could create more tailored interventions. For example, teaching certain naturally competitive activities in PE could lead certain students to moving from an adaptive profile to a maladaptive profile. These students can be identified and interventions could be put in place so these individuals remain in an adaptive profile.

Furthermore, the longitudinal study (study four) collected data at only one time point at primary school (end of Year 6), therefore it is not possible to determine from the data whether the transfer into secondary school was the catalyst for the decline in adaptive motivation, or if it is just a continuation of a decline that starts earlier in primary school as shown in other research (e.g., Jacobs et al., 2002; Warburton and Spray, 2008, 2009). Future longitudinal research should explore students' achievement goal profiles earlier in primary school years to identify when this decline in motivation begins, what predicts this decline, and if this decline occurs at the same time for male and female students. Study four showed that female students were more likely to hold more maladaptive views of PE in Year 6, with higher representation in the *High Performance* and *Low All* profiles. Future research should explore what leads female and male students to be in particular profiles or change profiles. Different environmental and individual characteristics (e.g., perceived classroom climate, peer relationships, perceived self-efficacy, basic psychological needs, and personal interest) need to be explored especially to promote young female students to adopt more adaptive motivational profiles before they then transfer into secondary school.

The present thesis would have been strengthened by assessing an environmental antecedent such as perceived classroom motivational climate, especially in the longitudinal study (study four). The exploration of only individual difference antecedents such as students' implicit theories and psychological needs, it limits the perspective of exploring changes in students' motivational profiles across primary and secondary school. Students achievement goal adoption is strongly influenced and shaped by how they perceived the motivational climate (Meece et al., 2006; Schwinger and Stiensmeier-Pelster, 2011). Yet, the largest environmental change in a students' school life is the transfer from primary into secondary school. Students shifting to more maladaptive profiles can often be observed after the transfer due to the increase in competition, social comparison, teacher control, class sizes, and normative-based evaluation (e.g., Wigfield et al., 1991; Meece et al., 2006; Akos et al., 2015; Schaffhuser et al., 2016; Evans et al., 2018). The motivational climate is created by the PE teacher, which can influence and promote students' social responsibility, peer relationships, and mastery-approach goals to learning in PE (e.g., Shim and Finch, 2014; Gonçalves et al., 2017; Bae and DeBusk-Lane, 2018). However, there has been limited exploration of this antecedent from a person-centred perspective. In addition, current studies on motivational climate are, however, still predominantly guided by the dichotomous model (e.g., mastery climates and performance climates) in understanding and explaining students' achievement goals and positive outcomes (e.g., Theodosiou et al., 2006; Wang, Liu, Sun et al., 2010; Warburton, 2017). Future researchers should use the 2x2 achievement model as a theoretical framework to examine motivational climates (e.g., mastery-approach climates, mastery-avoidance climates, performance-approach climates, performance-avoidance climates, Papaioannou, et al., 2007; Spray et al., 2013) or the self-task, appearance-competition distinctions to make even more precise motivational climates. This would allow researchers further understand how the motivational climate influences the types of achievement goal profiles produced in both primary and secondary school settings, which in turn impacts on students' motivational outcomes.

Conclusion

PE provides a unique setting in education that encapsulates all children up to the age of 16, and plays an crucial role in influencing students' attitudes towards physical activity and participation beyond school (e.g., Polet et al., 2019; Coulter et al., 2020). Furthermore, years of continuous declining physical activity levels accompanied with increasing sedentary and obesity levels, makes the importance of understanding the motivational processes that direct students behaviours in PE increasingly essential (Department of Health and Social Care, 2019; Park et al., 2020). The present thesis highlights the significant part achievement goal theory (Elliot et al., 1999, 2001, 2011) plays in understanding the motivations expressed by students in the PE setting. It also provides an insight into the multiple goals pursued by early and mid-adolescent students in PE, and how these combinations of achievement goals change throughout key transfers and transitions. These were the first set of studies to explore the more defined mastery-task, mastery-self, performance-competition, and performance-appearance goals from a person-centred perspective, determining the influence of implicit theories of ability and basic psychological needs to change and stability of achievement goal adoption, and the benefits associated with pursuing certain goal combinations. Longitudinal evidence showed that Year 7 is a critical time for students goal adoption, with observed increases in less adaptive profiles especially among female students. However, more longitudinal research on achievement goals is needed which includes other motivational predictors that can predict the change and stability of achievement goal profiles and the impact these have on motivational consequences, thus enhancing our understanding of students motivation in PE. This thesis identified several avenues for future achievement goal research.

Firstly, more defined achievement goal measurements are needed to create more precise results, rather than just focusing on certain elements of the goal (e.g., PALS and AGQ for performance-approach and performance-avoidance goals). This would allow researchers to identify what key aspects of mastery and/or performance goals are being pursued, and what elements of these goals need to be promoted by teachers. Secondly, students' achievement goal motivation needs to be explored several years and timepoints before the transfer into secondary school to identify if their motivation in PE is already declining before the transfer, where this is then accelerated once they enter secondary school. Lastly, in association with the previous point, exploring environmental influences across primary and secondary school would further expose the declining adaptive motivation displayed by students during early adolescence, and aid teachers in promoting adaptive motivation across all year groups. It is anticipated that this thesis has illuminated the types of multiple approach goal pursuit displayed by adolescent students in PE and how these changes across primary and secondary school, and encourages more research to understand and promote adaptive motivation in PE.

References

References marked with an asterisk indicates studies included in study one's scoping review.

Adie, J. W., Duda, J. L., & Ntoumanis, N. (2008). Autonomy support, basic need satisfaction and the optimal functioning of adult male and female sport participants: A test of basic needs theory. *Motivation and Emotion, 32*(3), 189-199. https://doi.org/10.1007/s11031-008-9095-z

Adie, J. W., & Bartholomew, K. J. (2013). The well- and ill-being of participants in competitive sport settings: A review of motivational determinants. In C. Mohiyeddini (Ed.), *Advances in the Psychology of Sports and Exercise,* (pp. 109–140). Nova Science Publishers.

Agbuga, B., & Xiang, P. (2008). Achievement goals and their relations to self-reported persistence/effort in secondary physical education: A trichotomous achievement goal framework. *Journal of Teaching in Physical Education, 27*(2), 179-191. https://doi.org/10.1123/jtpe.27.2.179

Agbuga, B. (2010). Gender differences in achievement goals and their relations to self-reported persistence/effort. *Eurasian Journal of Educational Research, 44,* 1-18.

Akaike, H. (1974) *A new look at the statistical model identification*. IEEE Transactions on Automatic Control, (pp.716-723). IEEE. http://dx.doi.org/10.1109/TAC.1974.1100705

Akos, P., Rose, R. A., & Orthner, D. (2015). Sociodemographic moderators of middle school transition effects on academic achievement. *The Journal of Early Adolescence, 35*(2), 170-198. https://doi.org/10.1177/027243161452

Ames, C. (1984). Competitive, cooperative, and individualistic goal structures: A cognitive-motivational analysis. In C. Ames and R. Ames (Eds.), *Research on motivation in education* (Vol. 3, pp. 177-207). Academic.

Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of Educational Psychology, 80*(3), 260–267. https://doi.org/10.1037/0022-0663.80.3.260

Ames, C. (1992). Achievement goals and the classroom motivational climate. In D. H. Schunk and J. L. Meece (Eds.), *Student perceptions in the classroom* (pp. 327-348). Lawrence Erlbaum Associates.

American College Training. (2013). *Student- and teacher-reported behavioural measures: Do they agree?* IA: American College Training. https://files.eric.ed.gov/fulltext/ED546856.pdf

Anderman, E. M., & Young, A. J. (1994). Motivation and strategy use in science: individual differences and classroom effects. *Journal of Research in Science Teaching, 31*(8), 811-831. https://doi.org/10.1002/tea.3660310805

Anderman, E. M., & Midgley, C. (1997). Changes in achievement goal orientations, perceived academic competence, and grades across the transition to middle-level schools. *Contemporary Educational Psychology, 22*(3)*,* 269-298. https://doi.org/10.1006/ceps.1996.0926

Anderman, E. M., Griesinger, T., & Westfiled, G. (1998). Motivation and cheating during early adolescence. *Journal of Educational Psychology, 90*(1)*,* 84-93. https://doi.org/10.1037/0022-0663.90.1.84

Anderman, L. H., & Anderman, E. M. (1999). Social predictors of changes in students' achievement goal orientation. *Contemporary Educational Psychology, 24*(1), 21-37. https://doi.org/10.1006/ceps.1998.0978

Anderman, E. M., & Patrick, H. (2012). Achievement goal theory, conceptualization of ability/intelligence, and classroom climate. In S.L. Christenson, A.L. Reschly, and C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 173–191). Springer. https://doi.org/10.1007/978-1-4614-2018-7_8

Arens, A. K., & Watermann, R. (2021). Students' achievement goals and belief of causes of success: Temporal relations and gender differences. *Contemporary Educational Psychology, 64,* Article 101941. https://doi.org/10.1016/j.cedpsych.2020.101941

Asparouhov, T. (2005). Sampling weights in latent variable modeling. *Structural Equation Modeling, 12*(3), 411–434. https://doi.org/10.1207/s15328007sem1203_4

Association for Physical Education. (2015). *Health Position Paper.* https://www.afpe.org.uk/physical-education/wp-content/uploads/afPE_Health_Position_Paper_Web_Version2015.pdf

Atkinson, J. (1957). Motivational determinants of risk-taking behaviour. *Psychological Review, 64*(6, Pt.1)*,* 359-372. https://doi.org/10.1037/h0043445

Aubert, S., Barnes, J. D., Abdeta, C., Nader, P. A., Adeniyi, A. F., Aguilar-Farias, N., Tennesaca, D. S. A., Bhawra, J., Brazo-Sayavera, J., Cardon, G., Chang, C-K., Nyström, C.D., Demetriou, Y., Draper, C. E., Edwards, L., Emeljanovas, A., Gába, A., Galaviz, K. I., González, S. A., … Tremblay, M. S. (2018). Global matrix 3.0 physical activity report card grades for children and youth: results and analysis form 49 countries. *Journal of Physical Activity and Health, 15*(2), 251-273. https://doi.org/10.1123/jpah.2018-0472

*Bae, C. L., & DeBusk-Lane, M. (2018). Motivation belief profiles in science: Links to classroom goal structures and achievement. *Learning and Individual Differences, 67,* 91-104. https://doi.org/10.1016/j.lindif.2018.08.003

Bakk, Z., & Vermunt, J. K. (2016). Robustness of stepwise latent class modeling with continuous distal outcomes. *Structural Equation Modeling, 23*(1), 20-31. https://doi.org/10.1080/10705511.2014.955104

Balli, O. M., Ilker, G. E., & Arslan, Y. (2014). Achievement goals in Turkish high school PE setting: The predicting role of social physique anxiety. *International Journal of Educational Research, 67,* 30-39. https://doi.org/10.1016/j.ijer.2014.04.004

Barić, R., Vlašić, J., & Erpič, S. C. (2014). Goal orientation and intrinsic motivation for physical education: Does perceived competence matter? *Kinesiology, 46*(1), 117–126.

Barkoukis, V., & Hagger, M., (2009). A test of the trans-contextual model of motivation in 6 Greek high school pupils. *Journal of Sport Behavior, 32*(2), 152-174. https://psycnet.apa.org/record/2009-06889-002

Barkoukis, V., Tsorbatzoudis, H., Grouios, G., & Rodafinos, A. (2005). The development of a physical state anxiety scale: A preliminary study. *Perceptual and Motor Skills, 100*(1), 118-128. https://doi.org/10.2466/pms.100.1.118-12

Barkoukis, V., Ntoumanis, N., & Thogersen-Ntoumani, C. (2010). Developmental changes in achievement motivation and affect in physical education: Growth trajectories and demographic differences. *Psychology of Sport and Exercise, 11*(2), 83-90. https://doi.org/10.1016/j.psychsport.2009.04.008

Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., Bosch, J. A., & Thøgersen-Ntoumani, C. (2011). Self-determination theory and diminished functioning: The role of interpersonal control and psychological need thwarting. *Personality and Social Psychology Bulletin, 37*(11), 1459-1473. https://doi.org/10.1177/0146167211413125

Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., & Thøgersen-Ntoumani, C. (2011). Psychological need thwarting in the sport context: Assessing the darker side of athletic experience. *Journal of Sport and Exercise Psychology, 33*(1)*,* 75-102. https://doi.org/10.1123/jsep.33.1.75

Bartholomew, K. J., Ntoumanis, N., Cuevas, R., & Lonsdale, C. (2014). Job pressure and ill-health in physical education teachers: The mediating role of psychological need thwarting. *Teaching and Teacher Education, 37,* 101-107. https://doi.org/10.1016/j.tate.2013.10.006.

Barron, K. E., & Harackiewicz, J. M. (2001). Achievement goals and optimal motivation: Testing multiple goal models. *Journal of Personality and Social Psychology, 80*(5), 706-722. https://doi.org/10.1037/0022-3514.80.5.706

Barron, K. E., Benedict, J. O., Savilee, B. K., Serdikoff, S. L., & Zinn, T. E. (2007). Innovative approaches to teaching statistics and research methods: Just-in-time teaching, interteaching, and learning communities. In D.S. Dunn., Smith, R.A., and Beins, B.C. (Eds.), *Best practices for teaching statistics and research methods in the behavioural sciences,* (pp.143-158). Routledge. https://doi.org/10.4324/9780203936603

Berger, J. L. (2012). Uncovering vocational students' multiple goal profiles in the learning of professional mathematics: Differences in learning strategies, motivational beliefs and cognitive abilities. *Educational Psychological, 32*(4)*,* 405-425. https://doi.org/10.1080/01443410.2012.674663

Beyon, J. (1985). *Initial encounters in the secondary school.* Falmer Press.

Biddle, S. J. H., Sallis, J. F., & Cavill, N. A. (1998). *Young and active? Young people and health enhancing physical activity - Evidence and implications.* Health Education Authority.

Biddle, S. J. H. (2001). Enhancing motivation in physical education. In G. C. Roberts (Ed.), *Advances in motivation in sport and exercise* (pp. 101-127). Human Kinetics.

Biddle, S. J. H., Wang, C. K. J., Kavussanu, M., & Spray, C. M. (2003). Correlates of achievement goal orientations in physical activity: A systematic review of research. *European Journal of Sport Science, 3*(5), 1-20. https://doi.org/10.1080/17461390300073504

Biddle, S. J. H., Wang, C. K. J., Chatzisarantis, N. L. D., & Spray, C. M. (2003). Motivation for physical activity in young people: Entity and incremental beliefs about athletic ability. *Journal of Sports Sciences, 21*(12)*,* 973-989. https://doi.org/10.1080/02640410310001641377

Biddle, S. J. H., & Wang, C. K. J. (2003). Motivation and self-perception profiles and links with physical activity in adolescent girls. *Journal of Adolescence, 26*(6), 687-701. https://doi.org/10.1016/j.adolescence.2003.07.003

Biddle, S. J. H., Gorely, T., & Stensel, D. J. (2004). Health-enhancing physical activity and sedentary behaviour in children and adolescents. *Journal of Sports Sciences, 22*(8), 679-701. https://doi.org/10.1080/02640410410001712412

Bjørnebekk, G., & Diseth, A. (2010). Approach and avoidance temperaments and achievement goals among children. *Personality and Individual Differences, 49*(8), 938-943. https://doi.org/10.1016/j.paid.2010.07.034

Blackwell, L. S., Trzesniewski, K. H., & Dweck, C. S. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Society for Research in Child Development, 78*(1), 246-263. https://doi.org/10.1111/j.1467-8624.2007.00995.x

Boekaerts, M. & Niemivirta, M. (2000) Self-Regulated Learning: Finding a Balance between Learning Goals and Ego-Protective Goals. In M. Boekaerts, M., P.R. Pintrich and M. Zeidner (Eds.), *Handbook of self-regulation* (pp.417-450). Academic Press. http://dx.doi.org/10.1016/b978-012109890-2/50042-1

Boiché, J., Sarrazin, P., Grouzet, F. M. E., Pelletier, L., & Chanal, J. (2008). Students' motivational profiles and achievement outcomes in physical education: A self-determination perspective. *Journal of Educational Psychology, 100*(3)*,* 688-701. https://hal.archives-ouvertes.fr/hal-00389858

Bong, M. (2001). Between- and within-domain relations of academic motivation among middle and high school students: Self-efficacy, task value, and achievement goals. *Journal of Educational Psychology, 93*(1), 23-34. https://doi.org/10.1037/0022-0663.93.1.23

Bong, M. (2005). Within-grade changes in Korean girls' motivation and perceptions of the learning environment across domains and achievement levels. *Journal of Educational Psychology, 97*(4)*,* 656-672. https://doi.org/10.1037/0022-0663.97.4.656

Bong, M. (2009). Age-related differences in achievement goal differentiation. *Journal of Educational Psychology, 101*(4), 879-896. https://doi.org/10.1037/a0015945

Bouffard, T., Boisvert, J., Vezeau, C., & Larouche, C. (1995). The impact of goal orientation on self-regulation and performance among college students. *British Journal of Educational Psychology, 65*(3), 317-329. https://doi.org/10.1111/j.2044-8279.1995.tb01152.x

Bouffard, T., Boileau, L., & Vezeau, C. (2001). Students' transition from elementary to high school and changes of the relationship between motivation and academic performance. *European Journal of Psychology of Education, 16*(4), 589-604. https://doi.org/10.1007/BF03173199

Bowden, J. L-H. (2021). Analogues of engagement: Assessing tertiary student engagement in contemporary face-to-face and blended learning contexts. *Higher Education Research and Development, 41*(4), 997-1012. https://doi.org/10.1080/07294360.2021.1901666

Bråten, I., & Olaussen, B. S. (2005). Profiling individual differences in student motivation: A longitudinal cluster-analytic study in different academic contexts. *Contemporary Educational Psychology, 30*(3), 359–396. https://doi.org/10.1016/j.cedpsych.2005.01.003

Brondino, M., Raccanello, D., & Pasini, M. (2014). Achievement goals as antecedents of achievement emotions: The 3x2 achievement goal model as a framework for learning environments design. In T. Mascio, R. Gennari, P. Vitorini, R. Vicari, and F. de la Prieta. (Eds.), *Methodologies and Intelligent Systems for Technology Enhanced Learning* (pp. 121-140). Springer. https://doi.org/10.1007/978-3-319-07698-0_7

Brown, H. E., Pearson, N., Braithwaite, R. E., Brown, W. J., & Biddle, S. J. (2013). Physical activity interventions and depression in children and adolescents. *Sports Medicine, 43*(3)*,* 195-206. https://doi.org/10.1007/s40279-012-0015-8

Brubaker, K.D. (2011). The importance of physical education in today's schools. (Publication No. 3493078) [Doctoral dissertation, Ashland University]. ProQuest Dissertations Publishing.

Bugler, M., McGeown, S. P., & St Clair-Thompson, H. (2015). Gender differences in adolescents' academic motivation and classroom behaviour. *Educational Psychology, 35*(5), 541-556. https://doi.org/10.1080/01443410.2013.849325

Burant, C. J. (2016). Latent growth curve models: Tracking changes over time. *The International Journal of Aging and Human Development, 82*(4), 336-350. https://doi.org/10.1177/0091415016641692

Burnette, J. L., O'Boyle, E. H., VanEpps, E. M., Pollack, J. M., & Finkel, E. J. (2013). Mind-sets matter: A meta-analytic review of implicit theories and self-regulation. *Psychological Bulletin, 139*(3), 655–701. https://doi.org/10.1037/a0029531

Carr, S. & Weigand, D. A. (2001). Parental, peer, teacher and sporting hero influence on the goal orientations of children in physical education. *European Physical Education Review, 7*(3), 305-328. https://doi.org/10.1177/1356336X010073005

*Carr, S. (2006). An examination of multiple goals in children's physical education: Motivational effects of goal profiles and the role of perceived climate in multiple goal development. *Journal of Sports Science, 24*(3), 281-297. https://doi.org/10.1080/02640410500131886

Carr, A., & Marzouq, S. (2012). The 2x2 achievement goal framework in primary school: Do young children pursue mastery avoidance goals? *Psychology of Education Review, 36* (2), 3-8. http://www.bpsshop.org.uk/The-Psychology-of-Education-Review-Vol-36-No-2-Autumn-2012-P2589.aspx

Cecchini Estrada, J. A., González-Mesa, C. G., Méndez-Giménez, A., and Fernández-Río, J. (2011). Achievement goals, social goals, and motivational regulations in physical education settings. *Psicothema, 23*(1), 51-57.

Chalkley, A., & Milton, K. (2021). A critical review of national physical activity policies relating to children and young people in England. *Journal of Sport and Health Science, 10*(3), 255-262. https://doi.org/10.1016/j.jshs.2020.09.010

Chen, J. A., & Usher, E. L. (2013). Profiles of the sources of science self-efficacy. *Learning and Individual Differences, 24,* 11–21. https://doi.org/10.1016/j.lindif.2012.11.002

Chen, B., Vansteenkiste, M., Beyers, W. Beyers, W., Boone, L., Deci., E. L., Van der Kapp-Deeder, J., Duriez, B., Lens, W., Matos, L., Mouratidis, A., Ryan, R. M., Sheldon, K. M., Soenens, B., Van Petegem, S., & Verstuyf, J. (2015). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and Emotion, 39*(2)*,* 216-236. https://doi.org/10.1007/s11031-014-9450-1

Chen, J. A., & Tutwiler, M. S. (2017). Implicit theories of ability and self-efficacy: Testing alternative social cognitive models to science motivation. *Zeitschrift für Psychologie, 225*(2), 127-136. https://doi.org/10.1027/2151-2604/a000289

Chin, E. C. H., Williams, M. W., Taylor, J. E., & Harvey, S. T. (2017). The influence of negative affect on test anxiety and academic performance: An examination of the tripartite model of emotions. *Learning and Individual Differences, 54,* 1-8. https://doi.org/10.1016/j.lindif.2017.01.002

Chouinard, R., Karsenti, T., & Roy, N. (2007). Relations among competence beliefs, utility value, achievement goals, and effort in mathematics. *British Journal of Educational Psychology, 77*(3)*,* 501-517. https://doi.org/10.1348/000709906X133589

Chouinard, R., & Roy, N. (2008). Changes in high-school students' competence beliefs, utility value and achievement goals in mathematics. *British Journal of Educational Psychology, 78*(1), 31–50. https://doi.org/10.1348/000709907X197993

Chung, Y., Bong, M., & Kim, S. (2020). Performing under challenge: the difference effects of ability and normative performance goals. *Journal of Educational Psychology, 112*(4), 823-840. https://doi.org/10.1037/edu0000393

Ciani, K. D., Sheldon, K. M., Hilpert, J. C., & Easter, M. A. (2011). Antecedents and trajectories of achievement goals: A self-determination theory perspective. *British Journal of Educational Psychology, 81* (Pt 2)*,* 223-243. https://doi.org/10.1348/000709910X517399

*Conley, A. M. (2012). Patterns of motivation beliefs: Combining achievement goal and expectancy-value perspectives. *Journal of Educational Psychology, 104*(1), 32-47. https://doi.org/10.1037/a0026042

Conroy, D. E. & Metzler, J. N. (2003). Factorial invariance and latent mean stability of performance failure appraisals. *Structural Equation Modeling, 10*(3), 401-422. https://doi.org/10.1207/S15328007SEM1003_4

Conroy, D. E., & Elliot, A. J. (2004). Fear of failure and achievement goals in sport: Addressing the issue of the chicken and the egg. *Anxiety, Stress and Coping: An International Journal, 17*(3), 271-285. https://doi.org/10.1080/1061580042000191642

Conroy, D. E., Kaye, M. P., & Coatsworth, J. D. (2006). Coaching climates and the destructive effects of mastery-avoidance achievement goals on situational motivation. *Journal of Sport and Exercise Psychology, 28*(1)*,* 69-92. https://doi.org/10.1123/jsep.28.1.69

Conroy, D. E., & Pincus, A. L. (2006). A comparison of mean partialing and dual-hypothesis testing to evaluate stereotype effects when assessing profile similarity. *Journal of Personality Assessment, 86*(2)*,* 142-149. ttps://doi.org/10.1207/s15327752jpa8602_03

Corker, K. S., Donnellan, M. B., & Bowles, R. (2013). The development of achievement goals throughout college: Modeling stability and change. *Personality and Social Psychology Bulletin, 39*(11), 1404-1417. https://doi.org/10.1177/0146167213494243

Corrion, K., D'Arripe-Longueville, F., Chalabaev, A., Schiano-Lomoriello, S., Roussel, P., & Cury, F. (2010). Effect of implicit theories on judgment of cheating acceptability in physical education: The mediating role of achievement goals. *Journal of Sports Sciences, 28*(8)*,* 909-919. https://doi.org/10.1080/02640414.2010.484065

Costa, S., Ntoumanis, N., & Bartholomew, K. J. (2014). Predicting the brighter and darker sides of interpersonal relationships: Does psychological need thwarting matter? *Motivation and Emotion, 39*(1)*,* 11-24. https://doi.org/10.1007/s11031-014-9427-0.

Costa, S., Ingoglia, S., Inguglia, C., Liga, F., Lo Coco, A., & Larcan, R. (2018). Psychometric evaluation of the basic psychological need satisfaction and frustration scale (BPNSFS) in Italy. *Measurement and Evaluation in Counseling and Development. 51*(3), 193–206. https://doi.org/10.1080/07481756.2017.1347021

Costa, A., & Faria, L. (2018). Implicit theories of intelligence and academic achievement: A meta-analytic review. *Frontiers in Psychology, 9,* Article 829. https://doi.org/10.3389/fpsyg.2018.00829

Coulter, M., McGrane, B., & Woods, C. (2020). PE should be an integral part of each school day: parents and their children's attitudes towards primary physical education. *International Journal of Primary, Elementary and Early Years Education, 48*(4), 429-445. https://doi.org/10.1080/03004279.2019.1614644

Cox, A.E., Ullrich-French, S., Madonia, J., & Witty, K. (2011). Social physique anxiety in physical education: Social contextual factors and links to motivation and behaviour. *Psychology of Sport and Exercise, 12*(5), 555-562. https://doi.org/10.1016/j.psychsport.2011.05.001

Crocker, P. R., Bailey, D. A., Faulkner, R. A., Kowalski, K. C., & McGrath, R. (1997). Measuring general levels of physical activity: Preliminary evidence for the physical activity questionnaire for older children. *Medicine and Science in Sports and Exercise, 29*(10), 1344-1349.

Cronbach, L. J., & Gleser, G. C. (1953). Assessing similarity between profiles. *Psychological Bulletin, 50*(6)*,* 456-473. https://doi.org/10.1037/h0057173

Cury, F., Da Fonséca, D., Rufo, M., & Sarrazin, P. (2002). Perceptions of competence, implicit theories of ability, perception of motivational climate, and achievement goals: a test of the trichotomous conceptualisation of endorsement of achievement motivation in the physical education. *Perceptual and Motor Skills, 95*(1), 233-244. https://doi.org/10.2466/pms.2002.95.1.233

Cury, F., Elliot, A. J., Da Fonseca, D., & Moller, A.C. (2006). The social-cognitive model of achievement motivation and the 2x2 achievement goal framework. *Journal of Personality and Social Psychology, 90*(4)*,* 666-679. https://doi.org/10.1037/0022-3514.90.4.666

Daniels, L. M., Haynes, T. L., Stupnisky, R. H., Perry, R. P., Newall, N. E., & Pekrun, R. (2008). Individual differences in achievement goals: a longitudinal study of cognitive, emotional, and achievement outcomes. *Contemporary Educational Psychology, 33*(4), 584-608. https://doi.org./10.1016/j.cedpsych.2007.08.002

Danthony, S., Mascret, N., & Cury, F. (2020). Test anxiety in physical education: the predictive role of gender, age, and implicit theories of athletic ability. *European Physical Education Review, 26*(1), 128-143. https://doi.org/10.1177/1356336X19839408

Danthony, S., Mascret, N., & Cury, F. (2021). The relationships between the 3x2 achievement goal model and test anxiety in physical education. *European Physical Education Review, 27*(3). https://doi.org/10.1177/1356336X20971325

Darnon, C., Harackiewicz, J. M., Butera, F., Mugny, G., & Quiamzade, A. (2007). Performance-approach and performance-avoidance goals: where uncertainty makes a differences. *Personality and Social Psychology Bulletin, 33*(6), 813-827. https://doi.org/10.1177/0146167207301022

Daumiller, M., Dickhäuser, O., & Dresel, M. (2019). University instructors' achievement goals for teaching. *Journal of Educational Psychology, 111*(1), 131-148. https://doi.org/10.1037/edu0000271

Daumiller, M., Rinas, R., & Jaitner, D. (2021). The relevance of stability and change of achievement goals for self-regulated motor learning processes and outcomes. *Sport, Exercise, and Performance Psychology, 10*(4), 519-535. https://doi.org/10.1037/spy0000260

Day, J. (1996). School friendship groups and their impact on learning, *Education 3-13, 24*(1), 51-58.

De Fruyt, F., Bartels, M., Van Leeuwen, K. G., De Clercq, B., Decuyper, M., & Mervielde, I. (2006). Five types of personality continuity in childhood and adolescence. *Journal of Personality and Social Psychology, 91*(3), 538-552. https://doi.org/10.1037/0022-3514.91.3.538

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behaviour.* Plenum Press.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01

Dekker, S., Krabbendam, L., Lee, N. C., Boschloo, A., de Groot, R., & Jolles, J. (2013). Sex differences in goal orientation in adolescents aged 10–19: The older boys adopt work-avoidant goals twice as often as girls. *Learning and Individual Differences*, *26*, 196-200. http://dx.doi.org/10.1016/j.lindif.2012.07.011

Delamont, S., & Galton, M. (1986). *Inside the secondary classroom.* Routledge and Kegan Paul.

Department of Health and Social Care. (2019). Government responses to the house of commons health and social care select committee report on childhood obesity: time for action, eight report of session 2017-2019. https://www.gov.uk/government/publications/childhood-obesity-time-for-action-report-government-response

Dewar, A. J., & Kavussanu, M. (2012). Achievement goals and emotions in team sport athletes. *Sport, Exercise, and Performance Psychology, 1*(4), 254-267. https://doi.org/10.1037/a0028692.

Diener, C. I., & Dweck, C. S. (1978). An analysis of learned helplessness: Continuous changes in performance, strategy and achievement cognitions following failure. *Journal of Personality and Social Psychology, 36*(5), 451-462. https://doi.org/10.1037/0022-3514.36.5.451

Diener, C. I., & Dweck, C. S. (1980). An analysis of learned helplessness: II. The processing of success. *Journal of Personality and Social Psychology, 39*(5), 940-952. https://doi.org/10.1037/0022-3514.39.5.940

Digelidis, N., & Papaioannou, A. (1999). Age-group differences in intrinsic motivation goal orientations and perceptions of athletic competence, physical appearance and motivational climate in Greek physical education. *Scandinavian Journal of Medicine and Science in Sports, 9*(6), 375-380. https://doi.org/10.1111/j.1600-0838.1999.tb00259.x

Diseth, A., Danielsen, A. G., & Samdal, O. (2012). A path analysis of basic need support, self-efficacy, achievement goals, life satisfaction and academic achievement level among secondary school students. *Educational Psychology, 32*(3), 335-354. https://doi.org/10.1080/01443410.2012.657159

Diseth, A. (2015). The advantages of task-based and other-based achievement goals as standards of competence. *International Journal of Educational Research, 72,* 59-69. https://doi.org/10.1016/j.ijer.2015.04.011

*Dina, F., & Efklides, A. (2009). Student profiles of achievement goals, goal instructions and external feedback: Their effect on mathematical task performance and affect. *European Journal of Education and Psychology, 2*(3), 235-262. https://doi.org/10.30552/ejep.v2i3.31

Duchesne, S., & Larose, S. (2007). Adolescent parental attachment and academic motivation and performance in early adolescence. *Journal of Applied Social Psychology, 37*(1), 1501-1521.

Duchesne, S., Larose, S., & Feng, B. (2017). Achievement goals and engagement with academic work in early high school: Does seeking help from teachers matter? *The Journal of Early Adolescence, 39*(2), 222-252. https://doi.org/10.1177/0272431617737

Duchesne, S., Ratelle, C. F., & Feng, B. (2017). Psychological need satisfaction and achievement goals: Exploring indirect effects of academic and social adaption following the transition to secondary school. *The Journal of Early Adolescence, 37*(9), 1280-1308. https://doi.org/10.1177/0272431616659561

Duda, J. L., & Nicholls, J. G. (1992). Dimensions of achievement motivation in schoolwork and sport. *Journal of Educational Psychology, 84*(3), 290-299. https://doi.org/10.1037/0022-0663.84.3.290

Duda, J. L. (1996). Maximising motivation in sport and physical education among children and adolescents: The case for greater task involvement. *Quest, 48*(3), 290-302. https://doi.org/10.1080/00336297.1996.10484198

Duda, J. L. (2001). Achievement goal research in sport: Pushing the boundaries and clarifying some misunderstandings. In G.C. Roberts (Ed.), *Advances in motivation in sport and exercise* (pp. 129–182). Human Kinetics.

Dunn, J. G. H. (1999). A theoretical framework for structuring the content of competitive worry in ice hockey. *Journal of Sport and Exercise Psychology, 21*(3), 259-279. https://doi.org/10.1123/jsep.21.3.259

Dweck, C. S., & Reppucci, N. D. (1973). Learned helplessness and reinforcement responsibility in children. *Journal of Personality and Social Psychology, 25*(1), 109–116. https://doi.org/10.1037/h0034248

Dweck, C. S. (1975). The role of expectations and attributions in the alleviation of learned helplessness. *Journal of Personality and Social Psychology, 31*(4), 674–685. https://doi.org/10.1037/h0077149

Dweck, C. S., & Elliot, E. S. (1983). Achievement motivation. In E.M. Heatherington (Ed.), *Handbook of child psychology: Socialization, personality*, and social development (pp.643-691). Wiley.

Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist, 41*(10), 1040-1048. https://doi.org/10.1037/0003-066X.41.10.1040

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*(2), 256-273. https://doi.org/10.1037/0033-295X.95.2.256

Dweck, C. S. (1989). Motivation. In A. Lesgold and R. Glaser (Eds.), *Foundations for a Psychology of Education* (pp.87-136). Erlbaum.

Dweck, C. (1990). Self-theories and goal: Their role in motivation, personality, and development. In R. Dienstbier (Ed.), *Nebraska Symposium on Motivation: Vol. 38. Perspectives on motivation* (pp.199-288). University of Lincoln press.

Dweck, C. S., Chiu, C-Y., & Hong, Y-Y. (1995). Implicit theories and their role in judgement and reactions: A word from two perspectives. *Psychology Inquiry, 6*(4), 267-285. https://doi.org/10.1207/s15327965pli0604_1

Dweck, C. S., & Sorich, L. A. (1999). Mastery-oriented thinking. In C.R. Snyder (Ed.), *Coping: The psychology of what works* (pp. 232-351). Oxford University Press.

Dweck, C. S. (1999). *Self-theories: Their role in motivation, personality, and development.* Psychology Press.

Dweck, C. S. (2000). Self-Theories: Their role in motivation, personality, and development. Psychology Press.

Dweck, C. S. (2002). The development of ability conceptions. In A. Wigfield and J. S. Eccles (Eds.), *Development of achievement motivation* (pp. 57–88). Academic Press. https://doi.org/10.1016/B978-012750053-9/50005-X

Dweck, C. S. (2017). From needs to goals and representations: Foundations for a unified theory of motivation, personality, and development. *Psychological Review, 124*(6), 689–719. https://doi.org/10.1037/rev0000082

Eccles, J. (1984). Sex differences in achievement patterns. *Nebraska Symposium on Motivation, 32,* 97-132.

Eccles, J. S., & Midgley, C. (1989). Stage/Environment Fit: Developmentally Appropriate Classrooms for Early Adolescence. In R.E. Ames, and Ames, C. (Eds.), *Research on Motivation in Education* (Vol. 3, pp. 139-186). Academic Press.

Eccles, J. S., Lord, S., & Midgley, C. (1991). What are we doing to early adolescents? The impact of educational contexts on early adolescents. *American Journal of Education, 99*(4), 521-542. https://doi.org/10.1086/443996

Eccles, J. S., Midgley, C., Wigfield, A., Buchanan, C. M., Reuman, D., Flanagan, C., & Mac Iver, D. (1993). Development during adolescence: The impact of stage-environment fit on young adolescents' experiences in schools and in families. *American Psychologist, 48*(2), 90–101. https://doi.org/10.1037/0003-066X.48.2.90

Eccles, J. S., & Roeser, R. W. (2009). Schools, academic motivation, and stage-environment fit. In R. M. Lerner and L. Steinberg (Eds.), *Handbook of adolescent psychology: Individual bases of adolescent development* (pp. 404–434). John Wiley and Sons. https://doi.org/10.1002/9780470479193.adlpsy001013

Eccles, J. S., & Roeser, R. W. (2011). Schools as developmental contexts during adolescence. *Journal of Research on Adolescence, 21*(1), 225-241. https://doi.org/10.1111/j.1532-7795.2010.00725.x

Edwards, O. V. (2014). Differentiating performance-approach goals and their effects. *Universal Journal of Educational Research, 2,* 134-145. https://doi.org/10.13189/ujer.2014.020205

Elliot, E. S., & Dweck, C. S. (1988). Goals: An approach to motivation and achievement. *Journal of Personality and Social Psychology, 54*(1), 5-12. https://doi.org/10.1037/0022-3514.54.1.5

Elliot, A. J. (1994). *Approach and avoidance achievement goals: An intrinsic motivation analysis.* [Doctoral dissertation, University of Wisconsin]. ProQuest Dissertations Publishing. https://www.proquest.com/openview/aeefe06e178ce600fcca5a58a231732e/1?cbl=18750&diss=y&pq-origsite=gscholar

Elliot, A. J., & Harackiewicz, J. M. (1996). Approach and avoidance achievement goals and intrinsic motivation: A mediational analysis. *Journal and Social Psychology, 79*(3), 461-475. https://doi.org/10.1037/0022-3514.70.3.461

Elliot, A. J. (1997). Integrating the “classic” and “contemporary” approaches to achievement motivation: A hierarchical model of achievement motivation. In M. Maehr and P. Intrich (Eds.), *Advances in motivation and achievement* (Vol. 10, pp.243-279), JAI Press.

Elliot, A. J., & Church, M. A. (1997). A hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology, 72*(1), 218-232. https://doi.org/10.1037/0022-3514.72.1.218

Elliot, A. J., & Sheldon, K. M. (1997). Avoidance achievement motivation: A personal goals analysis. *Journal of Personality and Social Psychology*, *73*(1), 171–185.

Elliot, A. J. (1999). Approach and avoidance motivation and achievement goals. *Educational Psychologist, 34*(3), 169-189. https://doi.org/10.1207/s15326985ep3403_3

Elliot, A. J., & McGregor, H. A. (1999). Test anxiety and the hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology, 76*(4), 628-644. https://doi.org/10.1037/0022-3514.76.4.628

Elliot, A. J., & McGregor, H. A. (2001). A 2×2 achievement goal framework. *Journal of Personality and Social Psychology, 80*(3), 501–519. https://doi.org/10.1037/0022-3514.80.3.501

Elliot, A. J., & Thrash, T. M. (2001). Achievement goals and the hierarchical model of achievement motivation. *Educational Psychology Review, 13*(2)*,* 139-156. https://doi.org/10.1023/A:1009057102306

Elliot, A. J., McGregor, H. A., & Thrash, T. M. (2002). The need for competence. In E. L. Deci and R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 361–387). University of Rochester Press.

Elliot, A. J., & Moller, A. C. (2003). Performance-approach goals: good or bad forms of regulation? *International Journal of Educational Research, 39*(4-5), 339-356. https://doi.org/10.1016/j.ijer.2004.06.003

Elliot, A. J. (2005). A conceptual history of the achievement goal construct. In A.J. Elliot and C.S. Dweck (Eds.), *Handbook of competence and motivation* (pp.52-72). Guilford Publications.

Elliot, A. J. (2006). The hierarchical model of approach-avoidance motivation. *Motivation and Emotion, 30*(2)*,* 111-116. https://doi.org/10.1007/s11031-006-9028-7

Elliot, A. J., & Pekrun, R. (2007). Emotion in the hierarchical model of approach-avoidance achievement motivation. In P.A. Schutz and R. Pekrun (Eds.), *Emotion in Education* (pp.57-73). Academic Press.

Elliot, A. J., & Murayama, K. (2008). On the measurement of achievement goals: Critique, illustration, and application. *Journal of Educational Psychology, 100*(3), 613-628. https://doi.org/10.1037/0022-0663.100.3.613

Elliot, A. J., Murayama, K., & Pekrun, R. (2011). A 3x2 achievement goal model. *Journal of Educational Psychology, 103*(3), 632-648. https://doi.org/10.1037/a0023952

Elliot, A. J., & Hulleman, C. S. (2017). Achievement goals. In A. J. Elliot, C. S. Dweck, & D. S. Yeager (Eds.), *Handbook of competence and motivation: Theory and application* (pp.43-60). The Guildford Press.

Elliot, E. & Dweck, C. (1988). Goals: An approach to motivation and achievement. *Journal of Personality and Social Psychology, 54*(1)*,* 5-12.

Evans, B. (2006). 'I'd feel ashamed': Girls' bodies and sports participation. *Gender, Place and Culture, 13*(5), 547-561. https://doi.org/10.1080/09663690600858952

Evans, D., Borriello, G. A., & Field, A. P. (2018). A review of the academic and psychological impact of the transition to secondary education. *Frontiers in Psychology, 9*, Article 1482. https://doi.org/10.3389/fpsyg.2018.01482

Fang, J., Huang, X., Zhang, M., Huang, F., Li, Z., & Yuan, Q. (2018). The Big-Fish-Little-Pond Effect on academic concept: A meta-analysis. *Frontiers in Psychology, 9,* Article 1569. https://doi.org/10.3389/fpsyg.2018.01569

Fernández-Bustos, J. G., Infantes-Paniagua, Á., Cuevas, R., & Contreras, O. R. (2019). Effect of physical activity on self-concept: Theoretical model on the mediation of body image and physical self-concept in adolescents. *Frontiers in Psychology, 10*, Article 1537. https://doi.org/10.3389/fpsyg.2019.01537

Flanagan, M. J., Putwain, D. W., & Caltabiano, M. L. (2015). The relationship between goal setting and students' experience of academic test anxiety. *International Journal of School and Educational Psychology, 3*(3), 189-201. https://doi.org/10.1080/21683603.2015.1060910

Flores, J., Salguero, A., & Márquez, S. (2008). Goal orientations and perceptions of the motivational climate in physical education classes among Colombian students. *Teaching and Teacher Education, 24*(6)*,* 1441-1449. http://doi.org/10.1016/j.tate.2007.11.006

Fox, K. R., & Corbin, C. B. (1989). The physical self-perception profile: Development and preliminary validation. *Journal of Sport & Exercise Psychology, 11*(4), 408–430.

Fox, K. R. (1990). *The Physical-Self Perception Profile Manual*. DeKalb.

Fox, K., Goudas, M., Biddle, S., Duda, J., & Armstrong, N. (1994). Children's task and ego goal profiles in sport. *The British Journal of Educational Psychology, 64* (Pt 2), 253-261. https://doi.org/10.1111/j.2044-8279.1994.tb01100.x

Fredricks, J. A. (2015). Academic engagement. *International Encyclopedia of the Social and Behavioural Sciences, 2*(1), 31-36. https://doi.org/10.1016/B978-0-08-097086-8.26085-6

Freedman-Doan, C., Wigfield, A., Eccles, J. S., Blumenfeld, P., Arbreton, A., & Harold, R. D. (2000). What am I best at? Grade and gender differences in children's beliefs about ability improvement. *Journal of Applied Developmental Psychology, 21*(4), 379-402.

Fryer, J. W., & Elliot, A. J. (2007). Stability and change in achievement goals. *Journal of Educational Psychology, 99*(4), 700-714. https://doi.org/10.1037/0022-0663.99.4.700

Furrer, C., & Skinner, E. (2003). Sense of relatedness as a factor in children's academic engagement and performance. *Journal of Educational Psychology, 95*(1), 148-162. http://dio.org/10.1037/0022-0663.95.1.148

Füssel, H. P., Gresch, C., Baumert, J., & Maaz, K. (2010). The institutional context of grouping decisions: Legal regulations and the choice of school from at the end of elementary school. In K.Maaz, J.Baumert, and C.Gresch (Eds.), *The transition from primary to secondary school: Achievement-based equity and regional, social, and ethnic disparities* (pp.87-106). Federal Ministry of Education and Research.

Galton, M., & Willcocks, J. (1983). *Moving from the primary school.* Routledge and Kegan Paul.

Galton, M., Gray, J. M., & Ruddock, J. (1999). The impact of school transition on pupil progress and attainment. In *Depart for Education and Employment Research Report, (pp.1-41).*DfEE. https://www.suffolk.gov.uk/assets/Children-families-and-learning/schools/Policy-Development-Panel-Report-Annex-3.21.pdf

Galton, M., Gray, J. M., & Ruddock, J. (2003). *Transfer and transitions in the middle years of schooling (7-14). Continuities and discontinuities in learning.* Queen's Printer.

*Garn, A., & Sun, H. (2009). Approach-avoidance motivational profiles in early adolescents to the PACER fitness test. *Journal of Teaching in Physical Education, 28*(4), 400-421. https://doi.org/10.1123/jtpe.28.4.400

Garn, A. C., McCaughtry, N., Martin, J., Shen, B., & Fahlman. (2012). A Basic Needs Theory investigation of adolescents' physical self-concept and global self-esteem. *International Journal of Sport and Exercise Psychology, 10*(4), 314-328. https://doi.org/10.1080/1612197X.2012.705521

Georgiadis, M., Biddle, S., & Chatzisarantis, N. (2001). The mediating role of self-determination in the relationship between goal orientations and physical self-worth in

Greek exercisers. *European Journal of Sport Sciences, 1*(5), 1-9. https://doi.org/10.1080/17461390100071502

Gibbons, S. (2014). Relatedness-supportive learning environment for girls in physical education. *Learning Landscapes, 7*(2), 139-150.

*Gonçalves, T., Niemivirta, M., & Lemos, M. S. (2017). Identification of students' multiple achievement and social goal profiles and analysis of their stability and adaptability. *Learning and Individual Differences, 54,* 149-159. https://doi.org/10.1016/j.lindif.2017.01.019

Gonida, E. N., Voulala, K., & Kiosseoglou, G. (2009). Students' achievement goal orientations and their behavioural and emotional engagement: Co-examining the role of perceived school goal structure and parent goals during adolescence. *Learning and Individual Differences, 19*(1), 53-60. https://doi.org/10.1016/j.lindif.2008.04.002

*Gonida, E. N., Karabenick, S. A., Stamovlasis, D., Metallidou, P., & Greece, T. C. (2019). Help seeking as a self-regulated learning strategy and achievement goals: The case of academically talented adolescents. *High Ability Studies, 30*(1/2), 147-166. https://doi.org/10.1080/13598139.2018.1535244

Grant, H., & Dweck, C. S. (2003). Clarifying achievement goals and their impact. *Journal of Personality and Social Psychology, 85*(3), 541–553. https://doi.org/10.1037/0022-3514.85.3.541

Gråstén, A., Yli-Piipari, S., Huhtiniemi, M, Salin, K., Seppälä, S., Lahti, J., Hakonen, H., Jaakkola, T. (2019). Predicting accelerometer-based physical activity in physical education and total physical activity: The self-determination theory approach. *Journal of Human Sport and Exercise, 14*(4), 757-771. https://doi.org/10.14198/jhse.2019.144.05

Gråstén, A., Wang, J. K. C., Huhtiniemi, M., & Jaakkola, T. (2023). Accelerometer-based physical activity in need satisfaction profiles of schoolchildren: A 3-year follow-up. *European Educational Review, 0*(0). https://doi.org/10.1177/1356336X231157331

Green, S. B., & Salkind, N. J. (2003). Using SPSS for Windows and Macintosh: Analyzing and Understanding Data (3rd ed.). Prentice Hall.

Grossbard, J. R., Smith, R. E., Smoll, F. L., & Cumming, S. P. (2009). Competitive anxiety in young athletes: Differentiating somatic anxiety, worry, and concentration disruption. *Anxiety, Stress and Coping, 22*(2), 153-166. ttps://doi.org/10.1080/10615800802020643

Guan, J., Xiang, P., Keating, X. D., & Land, W. M. (2020). Junior high school students' achievement goals, social goals, and self-reported persistence in physical education settings. *European Physical Education Review, 26*(1), 218-230. https://doi.org/10.1177/1356336X198469

Gutman, L. M. (2006). How student and parent goal orientations and classroom goal structures influence the math achievement of African Americans during the high school transition. *Contemporary Educational Psychology, 31*(1)*,* 44-63. https://doi.org/10.1016/j.cedpsych.2005.01.004

Guvenc, H. (2015). The relationship between teachers' motivational support and engagement versus disaffection. *Educational Sciences: Theory and Practice, 15*(3), 647-657.

Hackel, T. S., Jones, M. H., Carbonneau, K. J., & Mueller, C. E. (2016). Re-examining achievement goal instrumentation: Convergent validity of AGQ and PALS. *Contemporary Educational Psychology, 46,* 63-80. https://doi.org/10.1016/j.cedpsych.2016.04.005

Hagger, M. S., Chatzisarantis, N. L. D., Culverhouse, T., & Biddle, S. J. H. (2003). The processes by which perceived autonomy support in physical education promotes leisure-time physical activity intentions and behavior: A trans-contextual model. *Journal of Educational Psychology, 95*(4), 784–795. https://doi.org/10.1037/0022-0663.95.4.784

Hagger, M. S., & Stevenson, A. (2010). Social physique anxiety and physical self-esteem: Gender and age effects. *Psychology and Health, 25*(1), 89-110. https://doi.org/10.1080/08870440903160990

Hagger, M. S., Hein, V., & Chatzisarantis, N. L. D. (2011). Achievement goals, physical self-concept, and social physique anxiety in a physical activity context. *Journal of Applied Social Psychology, 41*(6), 1299-1339. https://doi.org/10.1111/j.1559-1816.2011.00761.x

Harackiewicz, J. M., & Sansone, C. (1991). Goals and intrinsic motivation: You can get there from here. In M.L. Maehr and P.R. Pintrich (Eds.), *Advances in motivation and achievement: Goals and self-regulatory processes* (Vol 7, pp. 21-49). JAI Press.

Harackiewicz, J. M., Barron, K. E., & Elliot, A. J. (1998). Rethinking achievement goals: When are they adaptive for college students and why? *Educational Psychologist, 33*(1), 1-21. https://doi.org/10.1207/s15326985ep3301_1

Harackiewicz, J. M., Barron, K. E., Tauer, J. M., & Elliot, A. J. (2002). Predicting success in college: A longitudinal study of achievement goals and ability measures as predictors of interest and performance from freshman year through graduation. *Journal of Educational Psychology, 94*(3), 562-575. https://doi.org/10.1037/0022-0663.94.3.562

Harackiewicz, J. M., Durik, A. M., Barron, K. E., Linnenbrink-Garcia, L., & Tauer, J. M. (2008). The role of achievement goals in the development of interest: Reciprocal relations between achievement goals, interest, and performance. *Journal of Educational Psychology, 100*(1), 105-122. https://doi.org/10.1037/0022-0663.100.1.105

Hargreaves, A. (1996). Revisiting voice, *Educational Researcher, 25*(1), 12-19.

Hargreaves, L., & Galton, M. (1999). *Moving from the primary classroom: 20 years on.* Routledge.

Harter, S. (1981). A model of mastery motivation in children: Individual differences and developmental change. In W.A. Collins (Ed.), *Aspects of the development of competence: The Minnesota Symposium on Child Psychology* (Vol. 14, pp. 215-255). Erlbaum.

Harter, S. (1998). The development of self-representations. In W. Damon (Series Ed.) and N. Eisenberg (Vol. Ed.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (5th ed., pp. 553–617). Wiley.

Haugen, T., Säfvenbom, R., & Ommundsen, Y. (2011). Physical activity and global self-worth: the role of physical self-esteem indices and gender. *Mental Health and Physical Activity, 4*(2), 49-56. https://doi.org/10.1016/j.mhpa.2011.07.001

Heyder, A., Weidinger, A. F., & Steinmayr, R. (2021). Only a burden for females in math? Gender and domain differences in the relation between adolescents' fixed mindsets and motivation. *Journal of Youth and Adolescence, 50*(1)*,* 177-188. https://doi.org/10.1007/s10964-020-01345-4

Hornstra, L., Van Der Veen, I., Peetsma, T., & Volman, M. (2013). Developments in motivation and achievement during primary school: A longitudinal study on group-specific differences. *Learning and Individual Differences, 23,* 195-204. https://doi.org/10.1016/j.lindif.2012.09.004

*Hornstra, L., Majoor, M., & Peetsma, T. (2017). Achievement goal profiles and developments in effort and achievement in upper elementary school. *British Journal of Educational Psychology, 87*(4), 606-629. https://doi.org/10.1111/bjep.12167

Howell, A. J., & Watson, D. C. (2007). Procrastination: Associations with achievement goal orientation and learning strategies. *Personality and Individual Differences, 43*(1)*,* 167-178.

Hoyle, R. H., & Panter, A. T. (1995). Writing about structural equation models. In R. H. Hoyle (Eds.), *Structural equation modeling: Concepts, issues, and applications* (pp. 158–176). Sage Publications.

Hu, L-T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Huang, C. (2011). Achievement goals and achievement emotions: A meta-analysis. *Educational Psychology Review, 23*(3)*,* 359-388. https://doi.org/10.1007/s10648-011-9155-x

Huang, C. (2012). Discriminant and criterion-related validity of achievement goals in predicting academic achievement: A meta-analysis. *Journal of Educational Psychology, 104*(1), 48-73. https://doi.org/10.1037/a0026223

Hulleman, C. S., Schrager, S. M., Bodmann, S. M., & Harackiewicz, J. M. (2010). A meta-analytic review of achievement goal measures: Different labels for the same constructs or different constructs with similar labels? *Psychological Bulletin, 136*(3), 422-449. https://doi.org/10.1037/a0018947

Hulleman, C. S., & Senko, C. (2010). Up around the bend: forecasts for achievement goal theory and research in 2020. In T.C. Urdan and S.A. Karabenick (Eds.), *The Decade Ahead: Theoretical Perspectives on Motivation and Achievement.* (pp.71-104). Emerald Group Publishing Limited. https://doi.org/10.1108/S0749-7423(2010)000016A006

Hsu, W. T., Li, H-H., & Pan, Y-H. (2017). Student misbehaviour in physical education: The role of 2x2 achievement goals and moral disengagement. *Journal of Science and Medicine in Sport, 16*(3), 302-310.

IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. IBM Corp.

IBM Corp. Released 2020. IBM SPSS Statistics for Windows, Version 27.0. IBM Corp.

Jacobs, J. E., Lanza, S., Osgood, D. W., Eccles, J. S., & Wigfield, A. (2002). Changes in children's self-competence and values: Gender and domain differences across grades one through twelve. *Child Development, 73*(2), 509-527. https://doi.org/10.1111/1467-8624.00421

Jagacinski, C. M., & Nicholls, J. G. (1984). Conceptions of ability and related affects in task involvement and ego involvement. *Journal of Educational Psychology, 76*(5), 909–919. https://doi.org/10.1037/0022-0663.76.5.909

Jaitner, D., Rina, R., Becker, C., Niermann, C., Breithecker, J, & Mess, F. (2019). Supporting subject justification by educational psychology: A systematic review of achievement goal motivation in school physical education. *Frontiers in Education, 4,* Article 70. https://doi.org/10.3389/feduc.2019.00070

*Jang, L. Y., & Liu, W. C. (2012). 2x2 Achievement goals and achievement emotions: A cluster analysis of students' motivation. *European Journal of Psychology of Education, 27,* 59-76. https://doi.org/10.1007/s10212-011-0066-5

Janke, S. (2022). Give me freedom or see my motivation decline: basic psychological needs and the development of students' learning goal orientation. *Learning and Individual Differences, 96,* Article 102158. https://doi.org/10.1016/j.lindif.2022.102158

*Jansen in de Wal, J., Hornstra, L., Prins, F.J., Peetsma, T., & Van der Veen, I. (2016). The prevalence, development and domain specificity of elementary school students' achievement goal profiles. *Educational Psychology, 36*(7), 1303-1322. https://doi.org/10.1080/01443410.2015.1035698

Johnson, M. L., & Kestler, J. L. (2013). Achievement goals of traditional and non-traditional aged college students: Using the 3x2 achievement goal framework. *International Journal of Educational Research, 61,* 48-59. https://doi.org/10.1016/j.ijer.2013.03.010

Jussim, L., & Eccles, J. S. (1992). Teacher expectations: II. Construction and reflection of student achievement. *Journal of Personality and Social Psychology, 63*(6), 947-961. https://doi.org/10.1037/0022-3514.63.6.947

Kahu, E. R., Stephens, C. V., Leach, L., & Zepke, N. (2015). Linking academic emotions and student engagement: mature-aged distance students' transition to university. *Journal of Further and Higher Education, 39*(4), 481-497. http://doi.org/10.1080/0309877X.2014.895305

Kam, C., Morin, A. J. S., Meyer, J. P., & Topolnytsky, L. (2016). Are commitment profiles stable and predictable? A latent transition analysis. *Journal of Management, 42*(6), 1462-1490. https://doi.org/10.1177/0149206313503010

Kantanista, A., Osiński, W., Borowiec, J., Tomczak, M., & Król-Zielińska, M. (2015). Body image, BMI, and physical activity in girls and boys aged 14-16 years. *Body Image, 15,* 40-43. https://doi.org/10.1016/j.bodyim.2015.05.001

Kaplan, A., Middleton, M. J., Urdan, T., & Midgley, C. (2002). Achievement goals and goal structures. In C. Midgley (Ed.), *Goals, goal structures, and patterns of adaptive learning* (pp. 21-53). Lawrence Erlbaum Associates Publishers.

Kaplan, A., & Maehr, M. L. (2007). The contributions and prospects of goal orientation theory. *Educational Psychology Review, 19,* 141-184. https://doi.org/10.1007/s10648-006-9012-5

Karakus, M. (2016). Understanding the mastery-avoidance goals construct: An investigation among middle school students in two domains. [Doctoral dissertation, Temple University]. Temple Repository. http://dx.doi.org/10.34944/dspace/1557

Kavussanu, M., & Roberts, G. C. (2001). Moral functioning in sport: An achievement goal perspective. *Journal of Sport & Exercise Psychology, 23*(1), 37–54.

Kavussanu, M. (2007). Morality in Sport. In S. Jowette and D. Lavallee (Eds.), *Social Psychology in Sport* (pp. 265–277). Human Kinetics. https://doi.org/10.5040/9781492595878.ch-019

Klem, A. M., & Connell, J. P. (2003). Relationships matter: linking teacher support to student engagement and achievement. *Journal of School Health, 74*(7), 262-273. https://doi.org/10.1111/j.1746-1561.2004.tb08283.x

Korn, R. M., & Elliot, A. J. (2016). The 2x2 standpoints model of achievement goals. *Frontiers in Psychology, 7,* Article 742. https://doi.org/10.3389/fpsyg.2016.00742

Korn, R. M., Elliot, A. J., & Daumiller, M. (2019). Back to the roots: The 2x2 standpoints and standards achievement goal model. *Learning and Individual Differences, 72,* 92-102. https://doi.org/10.1016/j.lindif.2019.04.009

Kosmidou, E., Proios, M., & Evgenia, G. (2013). Physical self-worth, athletic engagement and goal orientations in Greek female athletes. *Pamukkale Journal of Sport Science, 4*(2), 79-93.

Kuh, G. D. (2009). The national survey of student engagement: conceptual and empirical foundations. *New Directions for Institutional Research, 141,* 5-20. https://doi.org/10.1002/ir.283

Kumar, B., Robinson, R., & Till, S. (2015). Physical activity and health in adolescence. *Clinical Medicine, 15*(3), 267-272. https://doi.org/10.7861/clinmedicine.15-3-267

Lau, S., & Nie, Y. (2008). Interplay between personal goals and classroom goal structure in predicting student outcomes: A multilevel analysis of person-context interaction. *Journal of Educational Psychology, 100*(1), 15-29. http://doi.org/10.1037/0022-0663.100.1.15

Laursen, B., & Hoff, E. (2006). Person-centered and variable-centered approaches to longitudinal data. *Merrill-Palmer Quarterly, 52*(3), 377-389. https://doi.org/10.1353/mpq.2006.0029

Lee, Y-K., Wormington, S. V., Linnenbrink-Garcia, L., & Roseth, C. J. (2017). A short-term longitudinal study of stability and change in achievement goal profiles. *Learning and Individual Differences, 55*, 49-60. https://doi.org/10.1016/j.lindif.2017.02.002

*Lee, Y-K., Cho, E., & Roseth, C. J. (2020). Interpersonal predictors and outcomes of motivational profiles in middle school. *Learning and Individual Differences, 81,* Article 101905. https://doi.org/10.1016/j.lindif.2020.101905

Lee, M., & Bong, M. (2016). In their own words: reasons underlying the achievement striving of students in schools. *Journal of Educational Psychology, 108*(2), 274–294. https://doi.org/10.1037/edu0000048

Lee, M., & Bong, M. (2021). Patterns of motivation and learning during test-preparation of Korean adolescents: an experience sampling approach. *Educational Psychology, 42*(2), 200-221. https://doi.org/10.1080/01443410.2021.2016634

Lera-López, F., & Marco, R. (2018). Sports participation, physical activity, and health in the European regions. *Journal of Sports Sciences, 36* (15), 1784-1791. https://doi.org/10.1080/02640414.2017.1418810

*Levy-Tossman, I., Kaplan, A., & Assor, A. (2007). Academic goal orientations, multiple goal profiles, and friendship intimacy among early adolescents. *Contemporary Educational Psychology, 32*(2)*,* 231-252. https://doi.org/10.1016/j.cedpsych.2006.06.001

Lewin, K., Dembo, T., Festinger, L., & Sears, P. S. (1944). Level of aspiration. In J.M. Hunt (Ed.), *Personality and the behaviour disorders* (Vol. 1, pp.333-378). Ronald Press.

Liem, A. D., Lau, S., & Nie, Y. (2008). The role of self-efficacy, task value, and achievement goals in predicting learning strategies, task disengagement, peer relationship, and achievement outcome. *Contemporary Educational Psychology, 33*(4), 486-512. https://doi.org/10.1016/j.cedpsych.2007.08.001

Liem, G. A. D. (2016). Academic and social achievement goals: their additive, interactive, and specialized effects on school functioning. *British Journal of Educational Psychology, 86*(1)*,* 37-56. https://doi.org/10.1111/bjep.12085.

Linnenbrink, E. A. (2005). The dilemma of performance-approach goals: The use of multiple goal contexts to promote students' motivation and learning. *Journal of Educational Psychology, 97*(2), 197-213. https://doi.org/10.1037/0022-0663.97.2.197

Linnenbrink-Garcia, L., & Fredricks, J. A. (2008). Developmental perspectives on achievement motivation: Personal and contextual influences. In J.Y. Shah and W.L. Gardner (Eds.), *Handbook of motivation science* (pp. 448-464). The Guildford Press.

Linnenbrink-Garcia, L., Middleton, M. J., Ciani, K. D., Easter, M. A., O'Keefe, P. A., & Zusho, A. (2012). The strength of the relation between performance-approach and performance-avoidance goal orientations: Theoretical, methodological, and instructional implications. *Educational Psychologist, 47*(4), 281-301. https://doi.org/10.1080/00461520.2012.722515

*Linnenbrink-Garcia, L., Wormington, S. V., Snyder, K. E., Riggsbee, J., Perez, T., Ben-Eliyahu, A., & Hill, N. E. (2018). Multiple pathways to success: An examination of integrative motivational profiles among upper elementary and college students. *Journal of Educational Psychology, 110*(7), 1026-1048. https://doi.org/10.1037/edu0000245

Liu, W. C., & Wang, C. K. J. (2005). Academic self-concept: A cross-sectional study of grade and gender differences in a Singapore secondary school. *Asia Pacific Education Review, 6*(1), 20-27. https://doi.org/10.1007/BF03024964

*Liu, W.C., Wang, C.K.J., Tan, O.S., Ee, J., & Koh, C. (2009). Understanding students' motivation in project work: A 2x2 achievement goal approach. *British Journal of Educational Psychology, 79*(1), 87-106. https://doi.org/10.1348/000709908X313767

Liu, H., Yao, M., & Li, J. (2020). Chinese adolescents' achievement goal profiles and their relation to academic burnout, learning engagement, and test anxiety. *Learning and Individual Differences, 83-84*(2), Article 101945. https://doi.org/10.1016/j.lindif.2020.101945

Liu, W.C. (2021). Implicit theories of intelligence and achievement goals: A look at students' intrinsic motivation and achievement in mathematics. *Frontiers in Psychology, 12,* Article 593715. https://doi.org/10.3389/fpsyg.2021.593715

Liukkonen, J., Barkoukis, V., Watt, A., & Jaakkola, T. (2010). Motivational climate and students' emotional experiences and effort in Physical Education. *The Journal of Educational Research, 103*(5), 295-308. http://doi.org/10.1080/00220670903383044

*Lo, M. T., Chen, S. K., & Lin, S. S. J. (2017). Groups holding multiple achievement goals in the math classroom: Profile stability and cognitive and affective outcomes. *Learning and Individual Differences, 57*, 65-76. https://doi.org/10.1016/j.lindif.2017.06.001

Lochbaum, M., & Gottardy, J. (2015). A meta-analytic review of the approach-avoidance achievement goals and performance relationships in the sport psychology literature. *Journal of Sport and Health Science, 4*(2), 164-173. https://doi.org/10.1016/j.jshs.2013.12.004

Lochbaum, M., Jean-Noel, J., Pinar, C., & Gilson, T. (2017). A meta-analytic review of Elliot's (1999) Hierarchical Model of Approach and Avoidance Motivation in the sport, physical activity, and physical education. *Journal of Sport and Health Science, 6*(1)*,* 68-80. https://doi.org/10.1016/j.jshs.2015.07.008

Lochbaum, M., Zanatta, T., & Kazak, Z. (2020). The 2x2 achievement goals in sport and physical activity contexts: A meta-analytic test of context, gender, culture, and socioeconomic status differences, and analysis of motivations, regulations, affect, effort, and physical activity correlates. *European Journal of Investigation in Health, Psychology and Education, 10*(1), 173-205. https://doi.org/10.3390/ejihpe10010015

Lubke, G. H., & Muthén, B. (2005). Investigating population heterogeneity with factor mixture models. *Psychological Methods, 10*(1), 21–39. https://doi.org/10.1037/1082-989X.10.1.21

Lüftenegger, M., Klug, J., Harrer, K., Langer, M., Spiel, C., & Schober, B. (2016). Students' achievement goals, learning-related emotions and academic achievement. *Frontiers in Psychology, 7,* Article 603. https://doi.org/10.3389/fpsyg.2016.00603

*Luo, W., Paris, S. G., Hogan, D., & Luo, Z. (2011). Do performance goals promote learning? A pattern analysis of Singapore students' achievement goals. *Contemporary Educational Psychology, 36,* 165-176. https://doi.org/10.1016/j.cedpsych.2011.02.003

*Mädamürk, K., Tuominen, H., Hietajärvi., & Salmela-Aro, K. (2021). Adolescent students' digital engagement and achievement goal orientation profiles. *Computers and Education, 161,* Article 104058. https://doi.org/10.1016/j.compedu.2020.104058

*Madjar, N., Weinstock, M., & Kaplan, A. (2021). Epistemic beliefs and achievement goal orientations: Relations between constructs vs personal profiles. *The Journal of Educational Research, 110*(1), 32-49. https://doi.org/10.1080/00220671.2015.1034353

Maehr, M. L. (1974). Culture and achievement motivation. *American Psychologist, 29*(12), 887-896. https://doi.org/10.1037/h0037521

Maehr, M. L. (1983). On doing well in science: Why Johnny no longer excels, why Sarah never did. In S. Paris, G. Olson, and H. Stevenson (Eds.), *Learning and motivation in the classroom* (pp.179-210). Lawrence Erlbaum Associates.

Maehr, M. L. (1984). Meaning and motivation. In R. Ames and C. Ames (Eds.), *Research in motivation in education: Student motivation* (Vol. 1, pp.115-144). Academic.

Maehr, M. L. (1989). Thoughts about motivation. In C. Ames and R. Ames (Eds.), *Research on motivation in education: Goals and cognitions* (Vol. 3, pp. 299-315). Academic.

Maehr, M. L., & Zusho, A. (2009). Achievement goal theory: The past, present, and future. In K.R. Wentzel and A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 77-104). Routledge.

Mammadov, S., & Hertzog, N. B. (2021). Changes in students' achievement goals in advanced learning environment: A multivariate multilevel model. *Educational Psychology, 41*(9), 1097-1116. https://doi.org/10.1080/01443410.2021.1975654

Marsh, H. W. (1984). Self-concept: The application of a frame of reference model to explain paradoxical results. *Australian Journal of Education, 28*(2)*,* 165-181. https://doi.org/10.1177/000494418402800

Marsh, H. W. (1988). Influences of internal and external frames of reference on the formation of math and English self-concepts. *Journal of Educational Psychology, 82*(1), 107-116. https://doi.org/10.1037/0022-0663.82.1.107

Marsh, H. W., & Redmayne, R. S. (1994). A multidimensional physical self-concept and its relations to multiple components of physical fitness. *Journal of Sport & Exercise Psychology, 16*(1), 43–55.

Marsh, H. W., Chessor, D., Craven, R., & Roche, L. (1995). The effects of gifted and talented programs on academic self-concept: The big fish strikes again. *American Educational Research Journal, 32*(2), 285-319. https://doi.org/10.3102/000283120320022

Marsh, H. W., Ludtke, O., Trautwein, U., & Morin, A. J. S. (2009). Classical latent profile analysis of academic self-concept dimensions: Synergy of person- and variable-centred approaches to theoretical models of self-concept. *Structural Equation Modelling, 16*(2)*,* 191-225. https://doi.org/10.1080/10705510902751010

Marsh, H. W., Martin, A. J., & Jackson, S. (2010). Introducing a short version of the physical self-description questionnaire: New strategies, short-form evaluative criteria, and applications of factor analyses. *Journal of Sport and Exercise Psychology, 32*(4)*,* 438-482. https://doi.org/10.1123/jsep.32.4.438

Mascret, N., Elliot, A. J., & Cury, F. (2015). Extending the 3x2 achievement goal model to the sport domain: The 3x2 Achievement Goal Questionnaire for Sport. *Psychology of Sport and Exercise, 17,* 7-14. https://doi.org/10.1016/j.psychsport.2014.11.001

Mayo, X., Luque-Casado, A., Jimenez, A., & del Villar, F. (2020). Physical activity levels for girls and young adult women versus boys and young adult men in Spain: A gender gap analysis. *Sustainability, 12*(5), Article 6265. https://doi.org/10.3390/su12156265

McClelland, D., Atkinson, J., Clark, R., & Lowell, E. (1953). *The achievement motive.* Appleton-Century-Crofts.

McGregor, H. A., & Elliot, A. J. (2002). Achievement goals as predictors of achievement-relevant processes prior to task engagement. *Journal of Educational Psychology, 94*(2), 381-395. https://doi.org/10.1037/0022-0663.94.2.381

Measor, L., & Woods, P. (1984). Cultivating the middle ground: teachers and school ethos. *Research in Education, 31*(1), 25-40. https://doi.org/10.1177/003452378403100103

Meece, J. L., & Miller, S. D. (1999). Changes in elementary school children's achievement goals for reading and writing: Results of a longitudinal and an intervention study. *Scientific Studies of Reading, 3*(3), 207-229. https://doi.org/10.1207/s1532799xssr0303_2

Meece, J. L., Anderman, E. M., & Anderman, L. H. (2006). Classroom goal structure, student motivation, and academic achievement. *Annual Review of Psychology, 57*(1), 487-503. https://doi.org/10.1146/annurev.psych.56.091103.070258

*Méndez-Giménez, A., Cecchini-Estrada, J., & Fernández-Río, J. (2014). Motivational profiles and achievement goal dominance in physical education. *Spanish Journal of Psychology, 17*(36), 1-8. http://doi.org/10.1017/sjp.2014.37

Méndez-Giménez, A., Fernández-Río, J., & Cecchini, J-A. (2015). Approach-avoidance motivational profiles in physical education contexts. *Universitas Psychologica, 14*(2), 549-562. http://dx.doi. org.10.11144/Javeriana.upsy14-2.pmae

Méndez-Giménez, A., Cecchini-Estrada, J., Fernández-Río, J., Mendez-Alonso, D., & Prieto-Saborit, J. (2017). 3x2 achievement goals, self-determined motivation and life satisfaction in secondary education. *Revista de Psicodidáctica, 22*(2), 150-156. https://doi.org/10.1016/j.psicoe.2017.05.004

*Méndez-Giménez, A., Cecchini, J-A., Méndez-Alonso, D., Prieto, J-A., & Fernández-Rio, J. (2018). Effect of 3x2 achievement goals and classroom goal structures on self-determined motivation: a multilevel analysis in secondary education. *Anales de Psicología, 34*(1), 52-62. http://dx.doi.org/10.6018/analesps.34.1.262131

Microsoft Corporation. (2018). *Microsoft Excel.* Retrieved from https://office.microsoft.com/excel

Midgley, C., Feldlaufer, H., & Eccles, J. S. (1989). Change in teacher efficacy and student self- and task-related beliefs in mathematics during the transition to junior high school. *Journal of Educational Psychology, 81*(2), 247–258. https://doi.org/10.1037/0022-0663.81.2.247

Midgley, C. (1993). Motivation and middle level schools. In P. Pintrich and M.L. Maehr (Eds.), *Advances in motivation and achievement; Vol. 8. Motivation in the adolescent years* (pp.219-276). JAI Press.

Midgley, C., Arunkumar, R., & Urdan, T. (1996). If I don’t do well tomorrow, there’s a reason. Predictors of adolescents’ use of academic self-handicapping strategies. *Journal of Educational Psychology, 88*(3), 423-434.

Midgley, C., Kaplan, A., Middleton, M., Maehr, M., Urdan, T., Anderman, E., & Roeser, R. (1998). The development and validation of scales assessing students’ achievement goal orientations. *Contemporary Educational Psychology, 23*(2), 113-131. https://doi.org/10.1006/ceps.1998.0965

Midgley, C., Maehr, M. L., Hruda, L. Z., Anderman, E., Anderman, L., Freeman, K.E., & Urdan, T. (2000). *Manual for the patterns of adaptive learning scales (PALS).* University of Michigan.

Midgley, C., & Urdan, T. (2001). Academic self-handicapping and achievement goals: A further examination. *Contemporary Educational Psychology, 26*(1), 61-75. https://doi.org/10.1006/ceps.2000.1041

Midgley, C., Kaplan, A., & Middleton, M. (2001). Performance-approach goals: Good for what, for whom, under what circumstances, and at what cost? *Journal of Educational Psychology, 93*(1), 77-86. https://doi.org/10.1037/0022-0663.93.1.77

Miller, R. B., Green, B. A., Montalvo, G. P., Ravindran, B., & Nichols, J. D. (1996). Engagement in academic work: The role of learning goals, future consequences, pleasing others, and perceived ability. *Contemporary Educational Psychology, 21*(4), 388-422. https://doi.org/10.1006/ceps.1996.0028

Milyavskaya, M., & Koestner, R. (2011). Psychological needs, motivation, and well-being: A test of Self-Determination Theory across multiple domains. *Personality and Individual Differences, 50*(3)*,* 387-391. http://doi.org/10.1016/j.paid.2010.10.029

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *The British Medical Journal, 339*, Article 2535. https://doi.org/10.1136/bmj.b2535

Moller, A. C., & Elliot, A. J. (2006). The 2 × 2 Achievement Goal Framework: An Overview of Empirical Research. In A. V. Mittel (Ed.), *Focus on educational psychology* (pp. 307–326). Nova Science Publishers.

Möller, J., Pohlmann, B., Köller, O., & Marsh, H. W. (2009). A meta-analytic path analysis of the internal/external frame of reference model of academic achievement and academic self-concept. *Review of Educational Research*, *79*(3), 1129-1167. https://doi.org/10.3102/00346543093375

Moreno, J. A. González-Cutre, D., Sicilia, A. (2008). 2x2 achievement goals in Spanish students in physical education. *Revista de Educación, 347,* 299-317. http://doi.org/10.3390/su100

Moreno, J.A., Cervelló, E., & González-Cutre, D. (2010). The achievement goal and self-determination theories as predictors of dispositional flow in young athletes. *Anales de Psicología, 26*(2), 390–399.

Morin, A. J. S., & Wang, C. K. J. (2015). A gentle introduction to mixture modeling using physical fitness performance data. In N. Ntoumanis and N. Myers (Eds.), *An introduction to intermediate and advanced statistical analyses for sport and exercise scientists* (pp. 195–220). Wiley.

Morris, R. L., & Kavussanu, M. (2009). The role of approach-avoidance versus task and ego goals in enjoyment and cognitive anxiety in youth sport. *International Journal of Sport and Exercise Psychology, 7*(2), 185-202. https://doi.org/10.1080/1612197X.2009.9671899

Mouratidis, A., Vansteenkiste, M., Lens, W., & Auweele, Y. V. (2009). Beyond positive and negative affect: Achievement goals and discrete emotions in the elementary physical education classroom. *Psychology of Sport and Exercise, 10*(3), 336-343. https://doi.org/10.1016/j.psychsport.2008.11.004

Mouratidis, A. A., Vansteenkiste, M., Sideridis, G., & Lens, W. (2011). Vitality and interest-enjoyment as a function of class-to-class variation in need-supportive teaching and pupils' autonomous motivation. *Journal of Educational Psychology, 103*(2), 353-366. http://doi.org/10.1037/a0022773

Muis, K. R., & Edwards, O. (2009). Examining the stability of achievement goal orientation. *Contemporary Educational Psychology, 34*(4), 265-277. https://doi.org/10.1016/j.cedpsych.2009.06.003

Mulvenna, M., Adie, J. W., Sage, L. D., Wilson, N. E., & Howat, D. (2020). Approach-achievement goals and motivational context on psycho-physiological functioning and performance among novice basketball players. *Psychology of Sport and Exercise, 51*, Article 101714. https://doi.org/10.1016/j.psychsport.2020.101714

Murayama, K., & Elliot, A. J. (2009). The joint influence of personal achievement goals and classroom goal structures on achievement-relevant outcomes. *Journal of Educational Psychology, 101*(2), 432-447. https://doi.org/10.1037/a0014221

Murdoch, A. (1982). Forty-two children and the transfer to secondary education. [Doctoral dissertation, University of East Anglia]. University of East Anglia Repository.

Murphy, B. Dionigi, R., & Litchfield, C. (2014). Physical education and female participation: A case study of teachers' perspectives and strategies. *Issues in Educational Research, 24*(3), 241-259.

Muthén, L.K., & Muthén, B.O. (1998–2017). Mplus user's guide (8th Ed.). Muthén and Muthén.

Ng, C-H. (2009). "Learning for achievement" as a collective motive in re-culturing learning and teaching in Hong Kong classrooms. In C-H. Ng and P.D. Renshaw (Eds.), *Reforming learning: Concepts, issues and practice in the Asia-pacific region* (pp. 255–276). Springer.

*Ng, C-H. C. (2018). High school students' motivation to learn mathematics: The role of multiple goals. *International Journal of Science and Mathematics Education, 16*(2), 357-375. https://doi.org/10.1007/s10763-016-9780-4

Nicholls, J. G. (1976). Effort is virtuous, but it's better to have ability: Evaluative responses to perceptions of effort and ability. *Journal of Research in Personality, 10*(3), 306-315. https://doi.org/10.1016/0092-6566(76)90020-9

Nicholls, J. G. (1978). The development of the concepts of effort and ability, perceptions of academic attainment, and the understanding that difficult tasks require more ability. *Child Development, 49*(3), 800-814. https://doi.org/10.2307/1128250

Nicholls. J. G. (1980). The development of the concept of difficulty. *Merill-Palmer Quarterly, 26*(33)*,* 271-281.

Nicholls, J. G. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Performance Review, 91*(3), 328-346. https://doi.org/10.1037/0033-295X.91.3.328

Nicholls, J. (1989). *The competitive ethos and democratic education.* Harvard University Press.

Niemivirta, M. (2002). Motivation and performance in context: The influence of goal orientations and instructional setting on situational appraisals and task performance. *Psychologia, 45*(4)*,* 250-270. https://doi.org/10.2117/psysoc.2002.250

Niemivirta, M., Pulkka, A. T., Tapola, A., & Touminen, H. (2019). Achievement goal orientations: A person-oriented approach. In K.A. Renninger and S.E. Hidi (Eds.), *Cambridge handbook of motivation and learning* (pp.566-616). Cambridge University Press. https://doi.org/10.1017/9781316823279.025

Niepel, C., Brunner, M., & Preckel, F. (2014). The longitudinal interplay of students' academic self-concepts and achievements within the across domains: Replicating and extending the reciprocal internal/external frame of reference model. *Journal of Educational Psychology, 106*(4), 1170-1191. https://doi.org/10.1037/a0036307

*Ning, H. K. (2018). Singapore primary students' pursuit of multiple achievement goals: A latent profile analysis. *Journal of Early Adolescence, 38*(2), 220-237. https://doi.org/10.1177/0272431616665214

Ntoumanis , N., Barkoukis, V., & Thogersen-Ntoumani, C. (2009). Developmental trajectories of motivation in physical education: Course, demographic differences, and antecedents. *Journal of Educational Psychology, 101*(3), 717-728. https://doi.org/10.1037/a0014696

Nylund, K. L., Asparouhov, T., & Mutheen, B. O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A monte carlo simulation study. *Structural Equation Modeling, 14*(4), 535-569. https://doi.org/10.1080/10705510701575396

Ommundsen, Y. (2004). Self-handicapping related to task and performance-approach and avoidance goals in physical education. *Journal of Applied Sport Psychology, 16*(2), 183-197. https://doi.org/10.1080/10413200490437660

Ommundsen, Y. (2006). Pupils' self-regulation in physical education: The role of motivational climates and differential achievement goals. *European Physical Education Review, 12*(3), 289-315. https://doi.org/10.1177/1356336X06069275

Otis, N., Frouzet, F. M. E., & Pelletier, L. G. (2005). Latent motivational change in an academic setting: A 3-year longitudinal study. *Journal of Educational Psychology, 97*(2), 170-183. http://doi.org/10.1037/0022-0663.97.2.170

Owens, M., Stevenson, J., Hadwin, J., & Norgate, R. (2012). Anxiety and depression in academic performance: An exploration of the mediating factors of worry and working memory. *School Psychology International, 33*(4)*,* 433-449. https://doi.org/10.1177/014303431142743

Ozer, D. J. (1993). The Q-sort method and the study of personality development. In D.Funder, R.Parke, C.Tomlinson-Keasey, and K.Widaman (Eds.), *Studying lives through time: Personality and development* (pp. 147-168). American Psychological Association.

Pajares, F., Britner, S. L., & Valiante, G. (2000). Relation between achievement goals and self-beliefs of middle school students in writing and science. *Contemporary Educational Psychology, 25*(4), 406-422. https://doi.org/10.1006/ceps.1999.1027

Papaioannou, A., Bebetsos, E., Theodorakis, Y., Christodoulidis, T., & Kouli, O. (2006). Causal relationships of sport and exercise involvement with goals orientations, perceived competence and intrinsic motivation in physical education: A longitudinal study. *Journal of Sports Sciences, 24*(4), 367-382. https://doi.org/10.1080/02640410400022060

Park, J. H., Moon, J. H., Kim, H. J., Kong, M. H., & Oh, Y. H. (2020). Sedentary lifestyle: Overview of updated evidence of potential health risks. *Korean Journal of Family Medicine, 41*(6), 365-373. https://doi.org/10.4082/kjfm.20.0165

Parker, P. D., Marsh, H. W., Lüdtke, O., & Trautwein, U. (2013). Differential school contextual effects for math and English: Integrating the big-fish-little-pond affect and the internal/external framework of reference. *Learning and Instruction, 23*, 78-80. https://doi.org/10.1016/j.learninstruc.2012.07.001

Pastor, D. A., Barron, K. E., Miller, B. J., & Davis, S. L. (2007). A latent profile analysis of college students' achievement goal orientation. *Contemporary Educational Psychology, 32*(1), 8-47. https://doi.org/10.1016/j.cedpsych.2006.10.003

Pate, R. R., Ward, D. S., Saunders, R. P., Felton, G., Dishman, R., & Dowda, M. (2005). Promotion of physical activity among high-school girls: A randomised controlled trial. *American Journal of Public Health, 95,* 1582-1587. https://doi.org/10.2105/AJPH.2004.045807

*Paul, N., Lin, T-J., Ha, S. Y., Chen, J., & Newell, G. E. (2021). The role of achievement goal orientations in the relationships between high school students' anxiety, self-efficacy, and perceived use of revision strategies in argumentative writing. *Journal of Writing Research, 12*(3), 657-684. https://doi.org/10.17239/jowr-2021.12.03.05

Paulick, I., Watermann, R., & Nückles, M. (2013). Achievement goals and school achievement: the transition to different school tracks in secondary school. *Contemporary Educational Psychology, 38*(1), 75-86. https://doi.org/10.1016/j.cedpsych.2012.10.003

Pintrich, P. R., Smith, D. A. F., Garcia, T., & Mckeachie, W. J. (1993). Reliability and predictive validity of the motivated strategies for learning questionnaire (MSLQ). *Educational and Psychological Measurement, 53*(3), 801-813. https://doi.org/10.1177/0013164493053003024

Pintrich, P. R. (2000a) The role of goal orientation in self-regulated learning. In M. Boekaerts, P.R. Pintrich, and M. Zeidner (Eds.), *Handbook of self-regulation* (pp.451-502). Academic Press. https://doi.org/10.1016/B978-012109890-2/50043-3

Pintrich, P. R. (2000b). An achievement goal theory perspective on issues in motivation terminology, theory, and research. *Contemporary Educational Psychology, 25*(1)*,* 92-104. https://doi.org/10.1006/ceps.1999.1017

Pintrich, P. R. (2000c). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. *Journal of Educational Psychology, 92*(3), 544-555. https://doi.org/10.1037/0022-0663.92.3.544

Polet, J., Hassandra, M., Lintunen, T., Laukkanen, A., Hankonen, N., Hirvensalo, M., Tammelin, T., & Hagger, M. S. (2019). Using physical education to promote out-of-school physical activity in lower secondary school students – A randomised controlled trial protocol. *BMC Public Health, 19,* Article 157. https://doi.org/10.1186/s12889-019-6478-x

Pratt, M., Macera, C. A., & Blanton, C. (1999). Levels of physical activity and inactivity in children and adults in the United States: Current evidence and research issues. *Medicine and Science in Sports and Exercise, 31*(11), 526-533. https://doi.org/0.1097/00005768-199911001-00007

Preckel, F., Goetz, T., Pekrun, R., & Kleine, M. (2008). Gender differences in gifted and average-ability students comparing girls' and boys' achievement, self-concept, interest, and motivation in mathematics. *Gifted Child Quarterly, 52*(2), 146-159. https://doi.org/10.1177/0016986208315834

Pulkka, A-T., & Niemivirta, M. (2013a). In the eye of the beholder: Do adult students' achievement goal orientation profiles predict their perceptions of instruction and studying? *Studies in Educational Evaluation, 39*(3), 133-143. http://dx.doi.org/10.1016/j.stueduc.2013.06.002

Pulkka, A-T., & Niemivirta, M. (2013b). Adult students' achievement goal orientations and evaluations of the learning environment: A person-centred longitudinal analysis. *Educational Research and Evaluation, 19*(4), 297-322. http://dx.doi.org/10.1080/13803611.2013.767741

Putwain, D. W. (2007). Test anxiety in UK schoolchildren: Prevalence and demographic patterns. *British Journal of Educational Psychology, 77*(Pt 3), 579-593. http://doi.org/10.1348/000709906X161704

Putwain, D. W., Woods, K. A., & Symes, W. (2010). Personal and situational predictors of test anxiety of students in post-compulsory education. *British Journal of Educational Psychology, 80*(1), 137-160. https://doi.org/10.1348/000709909X466082

Putwain, D. W., & Daniels, R. A. (2010). Is the relationship between competence beliefs and test anxiety influenced by goal orientation? *Learning and Individual Differences, 20*(1)*,* 8-13. https://doi.org/10.1016/j.lindif.2009.10.006

Putwain, D. W., & Symes, W. (2012). Achievement goals as mediators of the relationship between competence beliefs and test anxiety. *British Journal of Educational Psychology, 82*(2), 207-224. https://doi.org/10.1111/j.2044-8279.2011.02021.x

Putwain, D. W., & Daly, A. L. (2014). Test anxiety prevalence and gender differences in a sample of English secondary school students. *Educational Studies, 40*(5), 554–570. https://doi.org/10.1080/03055698.2014.953914

Putwain, D.W., Symes, W., Nicholson, L., & Becker, S. (2018). Achievement goals, behavioural engagement, and mathematics achievement: A mediational analysis. *Learning and Individual Differences, 68*, 12-19. https://doi.org/10.1016/j.lindif.2018.09.006

Quested, E., & Duda, J. (2010). Exploring the social-environmental determinants of well- and ill-being in dancers: A test of basic needs theory. *Journal of Sport and Exercise Psychology, 32*(1), 39-60. https://doi.org/10.1123/jsep.32.1.39

Rawsthorne, L. J., & Elliot, A. J. (1999). Achievement goals and intrinsic motivation: A meta-analytic review. *Personality and Social Psychology Review, 3*(4), 326-344. https://doi.org/10.1207/s15327957pspr0304_3

Reeve, J., & Jang, H. (2006). What teachers say and do to support students' autonomy during a learning activity. *Journal of Educational Psychology, 98,* 209-218. http://doi.org/10.1037/0022-0663.98.1.209

Reeve, J. (2009). Why teachers adopt a controlling motivating style toward students and how they can become more autonomy supportive. *Educational Psychologist, 44*(3), 159-175.

Reinboth, M., & Duda, J. L. (2006). Perceived motivational climate, need satisfaction and indices of well-being in team sports: A longitudinal perspective. *Psychology of Sport and Exercise, 7*(3), 269–286. https://doi.org/10.1016/j.psychsport.2005.06.002

Riou, F., Boiché, J., Doron, J., Romain, A-J., Corrion, K., Ninot, G., d-Arripe-Longueville, F., & Gernigon, C. (2012). Development and validation of the French achievement goals questionnaire for sport and exercise (FAGQSE). *European Journal of Psychological Assessment, 28*(4), 313-320. https://doi.org/10.1027/1015-5759/a000112.

Roberts, B. W., Caspi, A., & Moffitt, T. E. (2001). The kids are alright: Growth and stability in personality development from adolescence to adulthood. *Journal of Personality and Social Psychology, 81*(4)*,* 670-683. https://doi.org/10.1037/0022-3514.81.4.670

Robins, R. W., & Pals, J. L. (2002). Implicit self-theories in the academic domain: Implications for goal orientation, attributions, affect, and self-esteem change. *Self and Identity, 1*(4)*,* 313-336. https://doi.org/10.1080/15298860290106805

Rodríguez, S., Regueiro, B., Piñeiro, I., Estévez, I., & Valle, A. (2020). Gender differences in mathematics motivation: Differential effects on performance in primary education. *Frontiers in Psychology, 10,* Article: 03050. https://doi.org/10.3389/fpsyg.2019.03050

Roeser, R. W., Midgley, C., & Urdan, T. C. (1996). Perceptions of the school psychological environment and early adolescents' psychological and behavioural functioning in school: The mediating role of goals and belonging. *Journal of Educational Psychology, 88*(3), 408-422. https://doi.org/10.1037/0022-0663.88.3.408

Ruddock, J., Wilson, E., & Flutter, J. (1998). *Sustaining pupils' commitment to learning: The challenge of year 8* (A report for Lincolnshire LEA), Homerton Research Unit.

Ruzek, E. A., Hafen, C. A., Allen, J. P., Gregory, A., Mikami, A. Y., & Pianta, (2016). How teacher emotional support motivates students: The mediating roles of perceived peer relatedness, autonomy support, and competence. *Learning and Instruction, 42,* 95-103. https://doi.org/10.1016/j.learninstruc.2016.01.004

Ryan, A. M., Hicks, L., & Midgley, C. (1997). Social goals, academic goals, and avoiding help in the classroom. *Journal of Early Adolescence, 17*(2)*,* 152-171. https://doi.org/10.1177/0272431697017002

Ryan, R. M. (1995). Psychological needs and the facilitations of integrative processes. *Journal of Personality, 63*(3), 397-427. https://doi.org/10.1111/j.1467-6494.1995.tb00501.x

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68–78. https://doi.org/10.1037/0003-066X.55.1.68

Ryan, R. M., & Deci, E. L. (2002). Overview of self-determination theory: An organismic-dialectical perspective. In E. L. Deci and R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 3–33). University of Rochester Press.

Ryan, R. M., Deci, E. L., & Vansteenkiste, M. (2016). Autonomy and autonomy disturbances in self-development and psychopathology: Research on motivation, attachment, and clinical process. In D. Cicchetti (Ed.), *Developmental psychopathology: Theory and method* (pp. 385–438). John Wiley and Sons. https://doi.org/10.1002/9781119125556.devpsy109

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness.* The Guilford Press. https://doi.org/10.1521/978.14625/28806

Sahin, E., Topkaya, N., & Kurkcu, R. (2016). Sex and age differences in achievement goal orientations in Turkish adolescents. *Journal of Education and Practice, 27*(7), 149-156.

Sallis, J. F., Simons-Mortin, B. G., Stone, E. J., Corbin, C. B., Epstein, L. H., Faucette, N., Iannotti, R. J., Killen, J. D., Klesges, R. C., Petray, C. K., Rowland, T. W., & Taylor, W. C. (1992). Determinants of physical activity and interventions in youth. *Medicine and Science in Sports and Exercise, 24*(6), 248-257.

Sarrazin, P., Biddle, S. K., Famose, J-P., Cury, F., Fox, K., & Durand, M. (1996). Goal orientations and conceptions of the nature of sport ability in children: A social cognitive approach. *British Journal of Social Psychology, 35*(3), 399-414. https://hal.archives-ouvertes.fr/hal-00387221

Schaffhuser, K., Allemand, M., & Schwartz, B. (2017). The development of self-representations during the transition to early adolescence: The role of gender, puberty, and school transition. *Journal of Early Adolescence, 37*(6)*,* 774-804. https://doi.org/10.1177/027243161452

Schaufeli, W. B., Salanova, M., González-Romá, V., & Bakker, A. B. (2002). The measurement of engagement and burnout: A confirmatory factor analytic approach. *Journal of Happiness Studies, 3*(1)*,* 71-92. https://doi.org/10.1023/A:1015630930326

Scherrer, V., & Preckel, F. (2019). Development of motivational variables and self-esteem during the school career: A meta-analysis of longitudinal studies. *Review of Educational Research, 89*(2), 211–258. https://doi.org/10.3102/0034654318819127

Schwarz, G. (1978). Estimating the dimension of a model. *Annals of Statistics, 6*(2), 461-464. https://doi.org/10.1214/aos/1176344136

Schwinger, M., & Stiensmeier-Pelster, J. (2011). Performance-approach and performance-avoidance classroom goals and the adoption of personal achievement goals. *British Journal of Educational Psychology, 81*(4), 680–699. https://doi.org/10.1111/j.2044-8279.2010.02012.x

*Schwinger, M., & Wild, E. (2012). Prevalence, stability, and functionality of achievement goal profiles in mathematics from third to seventh grade. *Contemporary Educational Psychology, 37*(1)*,* 1-13. https://doi.org/10.1016/j.cedpsych.2011.08.001

*Schwinger, M., Steinmayr, R., & Spinath, B. (2016). Achievement goal profiles in elementary school: Antecedents, consequences, and longitudinal trajectories. *Contemporary Educational Psychology, 46,* 164-179. https://doi.org/10.1016/j.cedpsych.2016.05.006

Senko, C., & Harackiewicz, J. M. (2005). Regulation of achievement goals: The role of competence feedback. *Journal of Educational Psychology, 97*(3), 320–336. https://doi.org/10.1037/0022-0663.97.3.320

Senko, C., Hulleman, C. S., & Harackiewicz, J. M. (2011). Achievement goal theory at the crossroads: Old controversies, current challenges, and new directions. *Educational Psychologist, 46*(1), 26-47. https://doi.org/10.1080/00461520.2011.538646

Senko, C., Hama, H., & Belmonte, K. (2013). Achievement goals, study strategies, and achievement: A test of the "learning agenda" framework. *Learning and Individual Differences, 24,* 1-10. https://doi.org/10.1016/j.lindif.2012.11.003

Senko, C., Durik, A. M., Patel, L., Lovejoy, C. M., Valentiner, D., & Stang, M. (2013). Performance-approach goal effects on achievement under low versus high challenge conditions. *Learning and Instruction, 23,* 60-68. http://dx.doi.org/10.1016/j.learninstruc.2012.05.006

Senko, C., & Freund, A. M. (2015). Are mastery-avoidance achievement goals always detrimental? An adult development perspective. *Motivation and Emotion, 39*(4)*,* 477-488. https://doi.org/10.1007/s11031-015-9474-1

Senko, C., & Tropiano, K. L. (2016). Comparing three models of achievement goals: Goal orientations, goal standards, and goal complexes. *Journal of Educational Psychology, 108*(8), 1178–1192. https://doi.org/10.1037/edu0000114

Senko, C. (2016). Achievement goal theory: a short of early promises, eventual discords, and future possibilities. In K. Wentzel and D. Miele (Eds.), *Handbook of Motivation at School:* Vol.2 (pp.75-95). Routledge.

Senko, C., & Dawson, B. (2017). Performance-approach goal effects depend on how they are defined: Meta-analytic evidence from multiple educational outcomes. *Journal of Educational Psychology, 109*(4), 574-598. https://doi.org/10.1037/edu0000160

Senko, C. (2019). When do mastery and performance goals facilitate academic achievement? *Contemporary Educational Psychology, 59,* Article 101795. https://doi.org/10.1016/j.cedpsych.2019.101795

Sheldon, K. M., & Hilpert, J. C. (2012). The balanced measure of psychological needs (BMPN) scale: An alternative domain general measure of need satisfaction. *Motivation and Emotion, 36*(4), 439-451. https://doi.org/10.1007/s11031-012-9279-4

*Shen, B., McCaughtry, N., Martin, J. J., & Fahlman, M. (2009). Motivational profiles and their associations with achievement outcomes. *Journal of Teaching in Physical Education, 28*(4)*,* 441-460. https://doi.org/10.1123/jtpe.28.4.441

Shim, S. S., Ryan, A. M., & Anderson, C. J. (2008). Achievement goals and achievement during early adolescence: Examining time-varying predictor and outcome variables in growth-curve analysis. *Journal of Educational Psychology, 100*(3), 655–671. https://doi.org/10.1037/0022-0663.100.3.655

*Shim, S. S., & Finch, W. H. (2014). Academic and social achievement goals and early adolescents' adjustment: A latent class approach. *Learning and Individual Differences, 30,* 98-105. https://doi.org/10.1016/j.lindif.2013.10.015

Sideridis, G. D. (2008). The regulation of affect, anxiety, and stressful arousal from adopting mastery-avoidance goal orientations. *Stress and Health, 24*(1), 55-69. https://doi.org/10.1002/smi.1160

Skinner, E. A., Kindermann, T. A., Connell, J. P., & Wellborn, J. G. (2009). Engagement as an organizational construct in the dynamics of motivational development. In K.Wentzel and A.Wigfield (Eds.), *Handbook of Motivation in school* (pp. 223-245). Erlbaum.

Skinner, E. A., & Pitzer, J. R. (2012). Developmental dynamics of student engagement, coping, and everyday resilience. In S.L. Christenson, A.L. Reschly, and C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 21–44). Springer. https://doi.org/10.1007/978-1-4614-2018-7_2

Slutzky, C., & Simpkins, S. (2009). The link between children's sport participation and self-esteem: Exploring the mediating role of sport self-concept. *Psychology of Sport and Exercise, 10*(3)*,* 381-389.

Smith, R. E., Smoll, F. L., Cumming, S. P., & Grossbard, J. R. (2006). Measurement of multidimensional sport and performance anxiety in children and adults: The sport anxiety scale-2. *Journal of Sport and Exercise Psychology, 28*(4)*,* 479-501. https://doi.org/10.1123/jsep.28.4.479

Spray, C. M., & Warburton, V. E. (2003). Ability beliefs, achievement goals and motivation in physical education classes. In: R. Stelter (Ed) *New Approaches to Exercise and Sport Psychology: Theories, Methods and Applications. Proceedings of the 11th European Congress of Sport Psychology.* FEPSAC.

Spray, C. M., Wang, C. K. J., Biddle, S. J. H., & Chatzisarantis, N. L. D. (2006). Understanding motivation in sport: An experimental test of achievement goal and self-determination theories. *European Journal of Sport Science, 6*(1)*,* 43-51. https://doi.org/10.1080/17461390500422879

Spray, C. M., Wang, C. K. J., Biddle, S. J. H., Chatzisarantis, N. L. D., & Warburton, V. E. (2006). An experimental test of self-theories of ability in youth sport. *Psychology of Sport and Exercise, 7*(3)*,* 255-267. https://doi.org/10.1016/j.psychsport.2005.05.001

Spray, C. M., Warburton, V. E., & Stebbings, J. (2013). Change in physical self-perceptions across the transition to secondary school: Relationships with perceived teacher-emphasised achievement goals in physical education. *Psychology of Sport and Exercise, 14*(5), 662-669. https://doi.org/10.1016/j.psychsport.2013.05.001

Spurk, D., Hirschi, A., Wang, M., Valero, D., & Kauffeld, S. (2020). Latent profile analysis: A review and "how to" guide of its application within vocational behavior research. *Journal of Vocational Behavior, 120,* Article: 103445. https://doi.org/10.1016/j.jvb.2020.103445

Standage, M., Duda, J. L., & Ntoumanis, N. (2003). A model of contextual motivation in physical education: Using constructs from self-determination and achievement goal theories to predict physical activity intentions. *Journal of Educational Psychology, 95*(1), 97-110. https://doi.org/10.1037/0022-0663.95.1.97

Stebbings, J., Taylor, I., Spray, C., & Ntoumanis, N. (2012). Antecedents of perceived coach interpersonal behaviourals: The coach environment and coach psychological well- and ill-being. *Journal of Sport and Exercise Psychology, 34*(4), 481-502. https://doi.org/10.1123/jsep.33.2.255

Steinmayr, R., Crede, J., McElvany, N., & Wirthwein, L. (2016). Subjective well-being, test anxiety, academic achievement: Testing for reciprocal effects. *Frontiers Psychology, 6*, Article: 1994. https://doi.org/10.3389/fpsyg.2015.01994

Steinmayr, R., Weidinger, A. F., Schwinger, M., & Spinath, B. (2019). The importance of students' motivation for their academic achievement – replicating and extending previous findings. *Frontiers in Psychology,* 10, Article 1730. https://doi.org/10.3389/fpsyg.2019.01730

Stephenson, W. (1952). Some observations on Q technique. *Psychological Bulletin, 49*(5), 483-498. https://doi.org/10.1037/h0057171

Stenling, A., Hassmén, P., & Holmström, S. (2014). Implicit beliefs of ability, approach-avoidance goals and cognitive anxiety among team sport athletes. *European Journal of Sport Science, 14*(7), 720-729. https://doi.org/10.1080/17461391.2014.901419

Stevenson, S. J., & Lochbaum, M. R. (2008). Understanding exercise motivation: Examining the revised social-cognitive model of achievement motivation. *Journal of Sport Behavior, 31*(4), 389–412.

Stipek, D., & Mac Iver, D. (1989). Developmental change in children's assessment of intellectual competence. *Child Development, 60*(3), 521-538. https://doi.org/10.2307/1130719

*Tapola, A., Jaakkola, T., & Niemivirta, M. (2013). The influence of achievement goal orientations and task concreteness on situational interest. *The Journal of Experimental Education, 82*(4), 455-479. http://dx.doi.org/10.1080/00220973.2013.813370

Taylor, I. M., Spray, C. M., & Pearson, N. (2014). The influence of the physical education environment on children's well-being and physical activity across the transition from primary to secondary school. *Journal of Sport and Exercise Psychology, 36*(6), 574-583. https://doi.org/10.1123/jsep.2014-0038

Teixeira, D. S., Silva, M. N., & Palmeira, A. L. (2018). How does frustration make you feel? A motivational analysis in exercise context. *Motivation and Emotion*, *42*(3), 419-428. https://doi.org/10.1007/s11031-018-9690-6.

Theis, D., Sauerwein, M., & Fischer, N. (2020). Perceived quality of instruction: The relationship among indicators of students' basic needs, mastery goals, and academic achievement. *British Journal of Educational Psychology, 90*(1), 176-192. https://doi.org/10.1111/bjep.12313

Theodosiou, A., & Papaioannou, A. (2006). Motivational climate, achievement goals and metacognitive activity in physical education and exercise involvement in out-of-school settings. *Psychological of Sport and Exercise, 7*(4), 361-379. https://doi.org/10.1016/j.psychsport.2005.10.002

Theodosiou, A., Mantis, K., & Papaioannou, A. (2008). Student self-reports of metacognitive activity in physical education classes. Age-group differences and the effect of goal orientations and perceived motivational climate. *Educational Research and Reviews, 3*(12), 353–365.

Thomas, E., & Upton, D. (2014). Psychometric properties of the physical activity questionnaire for older children (PAQ-C) in the UK. *Psychology of Sport and Exercise, 15*(3), 280-287. https://doi.org/10.1016/j.psychsport.2014.02.002

Torrano, R., Ortigosa, J. M., Riquelme, A., Méndez, F. J., & López-Pina, J. A. (2020). Test anxiety in adolescent students: Different response according to the components of anxiety as a function of sociodemographic and academic variables. *Frontiers in Psychology, 11*, Article 612270. https://doi.org/10.3389/fpsyg.2020.612270

Tremblay, M.S., & Willms, J.D. (2003). Is the Canadian childhood obesity epidemic related to physical activity? *International Journal of Obesity, 27*(9), 1100-1105. https://doi.org/10.1038/sj.ijo.0802376

Tricco, A. C., Lillie, E., Zarin, W., O'Brien, K.K., Colquhoun, H., Levac, D., Moher, D., Peters, M. D. J., Horsley, T., Weeks, L., Hempel, S., Akl, E.A., Chang, C., McGowan, J., Stewart, L., Hartling., Aldcroft, A., Wilson, M. G., Garritty, C., … Straus, S. E. (2018). PRISMA extension for scoping reviews (PRISMA-ScR): Checklist and explanation. *Annals of Internal Medicine, 169*(7), 467-473. https://doi.org/10.7326/M18-0850

Trouilloud, D. O., Sarrazin, P. G., Martinek, T.J., & Guillet, E. (2002). The influence of teacher expectations on student achievement in physical education classes: Pygmalion revisited. *European Journal of Social Psychology, 32*(5), 591-607. https://doi.org/10.1002/ejsp.109

*Tuominen-Soini, H., Salmela-Aro, K., & Niemivirta, M. (2008). Achievement goal orientations and subjective well-being: A person-centred analysis. *Learning and Instruction, 18*(3), 251-266. https://doi.org/10.1016/j.learninstruc.2007.05.003

*Tuominen-Soini, H., Salmela-Aro, K., & Niemivirta, M. (2011). Stability and change in achievement goal orientations: A person-centred approach. *Contemporary Educational Psychology, 36*(2), 82-100. https://doi.org/10.1016/j.cedpsych.2010.08.002

*Tuominen-Soini, H., Salmela-Aro, K., & Niemivirta, M. (2012). Achievement goal orientations and academic well-being across the transition to upper secondary education. *Learning and Individual Differences, 22*(3), 290-305. https://doi.org/10.1016/j.lindif.2012.01.002

*Tuominen, H., Juntunen, H., & Niemivirta, M. (2020). Striving for success but at what cost? Subject-specific achievement goal orientation profiles, perceived cost, and academic well-being. *Frontiers in Psychology, 11*, Article 557445. https://doi.org/10.3389/fpsyg.2020.557445

*Tuominen, H., Niemivirta, M., Lonka, K., & Samela-Aro, K. (2020). Motivation across a transition: Changes in achievement goal orientations and academic well-being from elementary to secondary school. *Learning and Individual Differences, 79*, Article 101854. https://doi.org/10.1016/j.lindif.2020.101854

Tzetzis, G., Goudas, M., Thomas, K., & Zisi, V. (2002). The relation of goal orientation to physical activity in physical education. *European Physical Education Review, 8*(2), 177-188. https://doi.org/10.1177/1356336X0200820

Urdan, T. (2000). The intersection of self-determination and achievement goal theories: Do we need to have goals? *Paper presented at the Meeting of the American Educational Research Association*.

Urdan, T., & Midgley, C. (2003). Changes in the perceived classroom goal structure and pattern of adaptive learning during early adolescence. *Contemporary Educational Psychology, 28*(4), 524-551. https://doi.org/10.1016/S0361-476X(02)00060-7

Urdan, T., & Mestas, M. (2006). The goals behind performance goals. *Journal of Educational Psychology, 98*(2), 354-365. https://doi.org/10.1037/0022-0663.98.2.354

Usher, E. L., & Pajares, F. (2009). Sources of self-efficacy in mathematics: A validation study. *Contemporary Educational Psychology, 34*(1), 89–101. https://doi.org/10.1016/j.cedpsych.2008.09.002

Van der Veen, I., & Peetsma, T. (2009). The development in self-regulated learning behaviour of first-year students in the lowest level of secondary school in the Netherlands. *Learning and Individual Differences, 19*(1), 34-46. https://doi.org/10.1016/j.lindif.2008.03.001

Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration, 23*(3), 263–280. https://doi.org/10.1037/a0032359

Vansteenkiste, M., Ryan, R. M., & Soenens, B. (2020). Basic psychological need theory: Advancements, critical themes and future directions. *Motivation and Emotion, 44*(1), 1-31. https://doi.org/10.1007/s11031-019-09818-1

Van Yperen, N. W., Blaga, M., & Postmes, T. (2014). A meta-analysis of self-reported achievement goals and nonself-reported performance across three achievement domains (work, sport, and education). *PLOS ONE, 9*(4), Article 93594. https://doi.org/10.1371/journal.pone.0093594

Van Yperen, N. W., Blaga, M., & Postmes, T. (2015). A meta-analysis of the impact of situationally induced achievement goals on task performance. *Human Performance, 28*(2), 165-182. https://doi.org/10.1080/08959285.2015.1006772

Van Wersch, A., Trew, K., & Turner, I. (1992). Post-primary school pupils' interest in physical education: Age and gender differences. *British Journal of Educational Psychology, 62*(1), 56-72. https://doi.org/10.1111/j.2044-8279.1992.tb00999.x

Vermunt, J. K. (2010). Latent class modeling with covariates: Two improved three-step approaches. *Political Analysis, 18*(4)*,* 450-469. http://www.jstor.org/stable/25792024

Vrugt, A., & Oort, F. J. (2008). Metacognition, achievement goals, study strategies and academic achievement: Pathways to achievement. *Metacognition and Learning, 3*(2), 123-146. https://doi.org/10.1007/s11409-008-9022-4

Wallace, L., Buchan, D., & Sculthorpe, N. (2020). A comparison of activity levels of girls in single-gender and mixed-gender physical education. *European Physical Education Review, 26*(1), 231-240. https://doi.org/10.1177/1356336X19849456

Walling, M. D., & Duda, J. L. (1995). Goals and their associations with beliefs about success in and perceptions of the purposes of physical education. *Journal of Teaching in Physical Education, 14*(2), 140-156.

Wang, C. K. J., Chatzisarantis, N. L. D., Spray, C. M., & Biddle, S. J. H. (2002). Achievement goal profiles in school physical education: Differences in self-determination, sport ability beliefs, and physical activity. *British Journal of Educational Psychology, 72*(Pt 3)*,* 433-445. https://doi.org/10.1348/000709902320634401

*Wang, C. K. J., & Liu, W. C. (2007). Promoting enjoyment in girls' physical education: The impact of goals, beliefs, and self-determination. *European Physical Education Review, 13*(2), 145-164. https://doi.org/10.1177/1356336X07076875

*Wang, C. K. J., Lim, B. S. C., Aplin, N. G., Chia, M., McNeill, M., & Tan, W. K. C. (2008). Students' attitudes and perceived purposes of physical education in Singapore: Perspectives from a 2x2 achievement goal framework. *European Physical Education Review, 14*(1)*,* 51-70. http://dx.doi.org/10.1177/1356336X07085709.

Wang, C. K. J., Liu, W. C., Lochbaum, M. R., & Stevenson, S. J. (2009). Sport ability beliefs, 2x2 achievement goals, and autonomy: The moderating role of perceived competence in the exercise domain. *Research Quarterly for Exercise and Sport, 80*(2), 303-312. https://doi.org/10.1080/02701367.2009.10599565

Wang, C. K. J., Liu, W. C., Chatzisarantis, N. L., & Lim, B. S. C. (2010). Influence of perceived motivational climate on achievement goals in physical education: A structural equation mixture modeling analysis. *Journal of Sport and Exercise Psychology, 32*(3), 324-338. https://doi.org/10.1123/jsep.32.3.324

Wang, C. K. J., Liu, W. C., Sun, Y., Lim, B. S. C., & Chatzisarantis, N. L. D. (2010). Chinese students' motivation in physical activity: Goal profile analysis using Nicholl's achievement goal theory. *International Journal of Sport and Exercise Psychology, 8*(3)*,* 284-301. https://doi.org/10.1080/1612197X.2010.9671954

*Wang, C. K. J., Morin, A. J. S., Ryan, R. M., & Liu, W. C. (2016). Students' motivational profiles in the physical education context. *Journal of Sport and Exercise Psychology, 38*(6), 612-630. https://doi.org/10.1123/jsep.2016-0153

Wang, C. K. J., Morin, A. J. S., Liu, W. C., & Chian, L. K. (2016). Predicting physical activity intention and behaviour using achievement goal theory: A person-centred analysis. *Psychology of Sport and Exercise, 23,* 13-20. http://dx.doi.org/10.1016/j.psychsport.2015.10.004

Wang, M. T., & Holcombe, R. (2010). Adolescents' perceptions of school environment, engagement, and academic achievement in middle school. *American Educational Research Journal, 47*(3), 633-662. https://doi.org/10.3102/0002831209361209

Wang, M. T., & Eccles, J. S. (2012). Adolescent behavioral, emotional, and cognitive engagement trajectories in school and their differential relations to educational success. *Journal of Research on Adolescence, 22*(1), 31–39. https://doi.org/10.1111/j.1532-7795.2011.00753.x

Warburton, V. E. (2008). *Approach-avoidance motivation in physical education.* [Doctoral dissertation, Loughborough University]. Loughborough Repository. https://repository.lboro.ac.uk/account/articles/9610181

Warburton, V. E., & Spray, C. M. (2008). Motivation in physical education across primary-secondary school transition. *European Physical Education Review, 14*(2), 157-178. https://doi.org/10.1177/1356336X08090704

Warburton, V. E., & Spray, C. M. (2009). Antecedents of approach-avoidance achievement goal adoption in physical education: A longitudinal perspective. *Journal of Teaching in Physical Education, 28*(2), 214-232. https://doi.org/10.1123/jtpe.28.2.214

Warburton, V. E., & Spray, C. M. (2013). Antecedents of approach-avoidance achievement goal adoption: An analysis of two physical education activities. *European Physical Education Review, 19*(2), 215-231. https://doi.org/10.1177/1356336X13486055

Warburton, V. E., & Spray, C. M. (2014). Appearance- and competition-focused performance goals: Examining their links with performance in physical education. *European Physical Education Review, 20*(3), 305-318. https://doi.org/10.1177/1356336X14524112

Warburton, V. E. (2017). Peer and teacher influences on motivational climate in physical education: A longitudinal perspective on achievement goal adoption. *Contemporary Educational Psychology, 51,* 303-314. https://doi.org/10.1016/j.cedpsych.2017.08.001

Warburton, V. E., & Spray, C. M. (2017). Individual-level change in achievement goals in physical education. *International Journal of Research Studies in Education, 6*(1), 75-90. https://doi.org/10.5861/ijrse.2016.1418

Warburton, V. E., Wang, J. C. K., Bartholomew, K. J., Tuff, R. L., & Bishop, K. C. M. (2020). Need satisfaction and need frustration as distinct and potentially co-occurring constructs: Need profiles examined in physical education and sport. *Motivation and Emotion, 44*(1), 54-66. https://doi.org/10.1007/s11031-019-09798-2

Weiner, B. (1992). *Human motivation: Metaphors, theories, and research.* Sage Publications.

Welk, G. J., Corbin, C. B., & Lewis, L. A. (1995). Physical self-perceptions of high school athletes. *Pediatric Exercise Science, 7*(2), 152-161. https://doi.org/10.1123/pes.7.2.152

Weller, B. E., Bowen, N. K., & Faubert, S. J. (2020). Latent Class Analysis: A guide to best practice. *Journal of Black Psychology, 46*(4), 287-311. https://doi.org/10.1177/0095798420930

Wentzel, K. R. (1991). Relations between social competence and academic achievement in early adolescence. *Child Development, 62*(5), 1066-1078. https://doi.org/10.2307/1131152

Wentzel, K. R. (1992). Motivation and achievement in adolescence: A multiple goals perspective. In D. H. Schunk and J. L. Meece (Eds.), *Student perceptions in the classroom* (pp. 287–306). Lawrence Erlbaum Associates.

Wentzel, K. R. (1993). Motivation and achievement in early adolescence: The role of multiple classroom goals. *The Journal of Early Adolescence, 13*(1), 4-20. https://doi.org/10.1177/0272431693013001001

White, R., Bennie, A., Vasconcellos, D., Cinelli, R., Hilland, T., Owen, K. B., & Lonsdale, C. (2020). Self-determination theory in physical education: A systematic review of qualitative studies. *Teaching and Teacher Education, 99*(1), Article: 103247. https://doi.org/10.1016/j.tate.2020.1003247

Whitehead, J. R. (1993). Physical activity and intrinsic motivation. *Research digest* (Series 1, No: 2). President's Council on Physical Fitness and Sports.

Wigfield, A., Eccles, J., MacIver, D., Reuman, D., & Midgley, C. (1991). Transitions during early adolescence, *Developmental Psychology, 27*(4), 552-565.

Wigfield, A., & Eccles, J. S. (2002). The development of competence beliefs, expectancies for success, and achievement values from childhood through adolescence. In A. Wigfield and J. S. Eccles (Eds.), *Development of achievement motivation* (pp. 91-120). Academic Press. https://doi.org/10.1016/B978-012750053-9/50006-1

Wigfield, A., & Cambria, J. (2010). Students' achievement values, goal orientations, and interest: Definitions, development, and relations to achievement outcomes. *Developmental Review, 30*(1), 1-35. https://doi.org/10.1016/j.dr.2009.12.001

Wigfield, A., Eccles, J. S., Fredricks, J. A., Simpkins, S., Roeser, R. W., & Schiefele, U. (2015). Development of achievement motivation and engagement. In M.E. Lamb and

R.M. Lerner (Eds.), *Handbook of child psychology and developmental science: Socioemotional processes* (Vol. 3, 7th ed., pp.657-700). John Wiley and Sons. https://doi.org/10.1002/9781118963418.childpsy31

Williams, G. C., Patrick, H., Niemiec, C. P., Ryan, R. M., Deci., E. L., & Lavigne, H. M. (2011). The Smoker's Health Project: A self-determination theory intervention to facilitate maintenance of tobacco abstinence. *Contemporary Clinical Trials, 32*(4), 535-543. http://doi.org/10.1016/j.cct.2011.03.002

Wirthwein, L., Sparfeldt, J. R., Pinquart, M., Wegerer, J., & Steinmayr, R. (2013). Achievement goals and academic achievement: A closer look at moderating factors. *Educational Research Review, 10,* 66-89. https://doi.org/10.1016/j.edurev.2013.07.001

Wirthwein, L., & Steinmayr, R. (2020). Performance-approach goals: The operationalization makes the difference. *European Journal of Psychology of Education, 36*, 1199-1220. https://doi.org/10.1007/s10212-020-00520-2

World Health Organisation (2010). Global recommendations on physical activity for health. https://www.who.int/publications/i/item/9789241599979

World Health Organisation (2022). Adolescent Health. https://www.who.int/health-topics/adolescent-health#tab=tab_1

World Health Organisation (2022). Physical activity. https://www.who.int/news-room/fact-sheets/detail/physical-activity

Wolters, C. A. (2004). Advancing achievement goal theory: Using goal structures and goal orientations to predict students' motivation, cognition, and achievement. *Journal of Educational Psychology, 96*(2), 236-250. https://doi.org/10.1037/0022-0663.96.2.236

Wormington, S. V., & Linnenbrink-Garcia, L. (2017). A new look at multiple goal pursuit: The promise of a person-centred approach. *Educational Psychology Review, 29*(3), 407-445. https://doi.org/10.1007/s10648-016-9358-2

Wu, C. (2012). The cross-cultural examination of 3x2 achievement goals in Taiwan. *Procedia - Social and Behavioural Sciences, 69*, 422-427. https://doi.org/10.1016/j.sbspro.2012.11.429

Wu, X. Y., Han, L. H., Zhang, J. H., Luo, S., Hu, J. W., & Sun, K. (2017). The influence of physical activity, sedentary behaviour on health-related quality of life among the general population of children and adolescents: A systematic review. *PLoS one, 12*(11), Article 0187668. https://doi.org/10.1371/journal.pone.0187668

Yeager, D. S., & Dweck, C. S. (2012). Mindsets that promote resilience: When students believe that personal characteristics can be developed. *Educational Psychologist, 47*(4), 302–314. https://doi.org/10.1080/00461520.2012.722805

Youngman, M. B. (1978). Six reactions to school transfer. *British Journal of Educational Psychology, 48*(3), 280-289. https://doi.org/10.1111/j.2044-8279.1978.tb03014.x

Xiang, P., & Lee, A. (1998). The development of the self-perceptions of ability and achievement goals and their relations in physical education. *Research Quarterly for Exercise and Sport, 69*(3), 231-241. http://dx.doi.org/10.1080/02701367.1998.10607690

*Yu, J., & Mclellan, R. (2020). Same mindset, different goals and motivational frameworks: Profiles of mindset-based meaning systems. *Contemporary Educational Psychology, 62,* Article 101901. https://doi.org/10.1016/j.cedpsych.2020.101901

Zeedyk, M. S., Gallacher, J., Henderson, M., Hope, G., Husband, B., & Lindsay, K. (2003). Negotiating the transition from primary to secondary school: Perceptions of parents and teachers. *School Psychology International, 24*(1), 67-79. https://doi.org/10.1177/0143034303024001010

Zepke, N. (2014). Student engagement research in higher education: Questioning an academic orthodoxy. *Teaching in Higher Education, 19*(6), 697-708. https://doi.org/10.1080/13562517.2014.901956

*Zhang, Y., Watermann, R., & Daniel, A. (2016). Are multiple goals in elementary students beneficial for their school achievement? A latent class analysis. *Learning and Individual Differences, 51,* 100-110. http://dx.doi.org/10.1016/j.lindif.2016.08.023

Zimmerman, B.J., & Risemberg, R. (1997). Becoming a self-regulated writer: A social cognitive perspective. *Contemporary Educational Psychology, 22*(1), 73-101. https://doi.org/10.1006/ceps.1997.0919

Appendices

Appendix 1 – Articles in scoping review (Study One).

Study	Sample	Goal Measures	Analysis	No. of Profiles	Original Profile Description	Outcomes Measured
1. Carr (2006)	193 Year 7 secondary school PE students (*M*=11.17)	Mastery, Performance-Approach, Performance-Avoidance (PALS by Midgley et al., 2000).	Cluster Analysis (cross-sectional)	4	High Approach, High All, High Performance, High Mastery.	Self-determined motivation, positive and negative affect, extracurricular school sport.
2. Wang et al. (2007)	647 secondary school PE students (*M*=13.52)	Mastery-Approach, Mastery-Avoidance, Performance-Approach, Performance-Avoidance (AGPEQ by Elliot & McGregor, 2001).	Cluster Analysis (cross-sectional)	4	Moderate All, Low All, High All, High Mastery.	Relatedness, perceived competence, perceived locus of causality, enjoyment, effort, boredom, physical activity participation.
3. Levy-Tossman et al. (2007)	203 7th grade junior high school students (*M*=N/A)	Mastery, Performance-Approach, Performance-Avoidance (PALS by Midgley et al., 2000).	Cluster Analysis (cross-sectional)	6*	Moderate Low All, Moderate Mastery, Moderate All, High Performance, High Mastery, High Approach.	Intimacy, mistrust.
4. Tuominen-Soini et al. (2008)	1321 secondary school students (*M*=15.97)	Mastery-Intrinsic, Mastery-Extrinsic, Performance-Approach, Performance-Avoidance, Work-Avoidance (By Niemivirta, 2002).	Latent Profile Analysis (cross-sectional)	6	Moderate, High Mastery, High Performance-Appearance, High Performance, Low All, High Avoidance.	Well-being, burnout, personal goal appraisals, academic achievement.
5. Wang et al. (2008)	493 Secondary school PE students (*M*=14.32)	Mastery-Approach, Mastery-Avoidance, Performance-Approach, Performance-Avoidance (AGPEQ by Wang et al., 2007).	Cluster Analysis (cross-sectional)	3	High Mastery, Moderate Mastery, Low All.	Perceived climate, perceived competence, purposes of PE, enjoyment, perceptions of teachers, intentions to exercise.
6. Liu et al. (2009)	491 secondary school students (*M*=13.78)	Mastery-Approach, Mastery-Avoidance, Performance-Approach, Performance-Avoidance (AGQ by Elliot & McGregor, 2001).	Cluster Analysis (cross-sectional)	4	Moderate Low All, High All, High Mastery, Very Low All.	IMI, communication skills, collaborative skills, problem-solving.
7. Dina and Efklides (2009)	870 secondary school mathematics students (*M*=13.55)	Mastery, Performance-Approach, Performance-Avoidance (PALS by Midgley et al., 2000).	Cluster Analysis (cross-sectional, experimental)	8*	High Approach, Moderate All, High Performance (x2), Low Mastery, Low Performance, Low all, Moderate Low Performance.	Metacognitive experiences and emotions.
8. Garn and Sun (2009)	214 high school PE students (*M*=N/A)	Mastery-Approach, Mastery-Avoidance, Performance-Approach, Performance-Avoidance (AGQ-S by Conroy et al., 2003).	Cluster Analysis (cross-sectional)	3*	High All, Low All, Moderate Low All.	Effort, aerobic fitness.
9. Shen et al. (2009)	603 high school PE students (*M*=12.60)	Mastery, Performance-Approach, Performance-Avoidance (GOS by Midgley et al., 1998).	Cluster Analysis (cross-sectional)	3*	High Mastery, High Performance, Low All.	Effort, knowledge, leisure-time exercise behaviour, fitness.
10. Tuominen-Soini et al. (2011) Study one	530 9th grade secondary school students (*M*=15)	Mastery-Intrinsic, Mastery-Extrinsic, Performance-Approach, Performance-Avoidance, Work-Avoidance (By Niemivirta, 2002).	Latent profile analysis (longitudinal)	4	Moderate All, High Performance, High Mastery, High Avoidance.	School value, fear of failure, academic withdrawal, academic achievement.
11. Tuominen-Soini et al. (2011) Study Two	519 11th grade secondary school students (*M*=17.05)	Mastery-Intrinsic, Mastery-Extrinsic, Performance-Approach, Performance-Avoidance, Work-Avoidance (By Niemivirta, 2002).	Latent profile analysis (longitudinal)	4	Moderate All, High Performance, High Mastery, High Avoidance.	School value, fear of failure, academic withdrawal, academic achievement.
12. Luo et al. (2011)	1697 secondary school mathematics students (*M*=15.51)	Mastery, Performance-Approach, Performance-Avoidance (PALS by Midgley et al., 2000).	Latent class cluster analysis (cross-sectional)	4	Moderate All, Moderate Mastery, High Performance, High Approach.	Self-efficacy and subjective task values, learning activities, affective outcomes, achievement.
13. Jang and Liu (2012)	480 secondary school mathematics students (*M*=N/A)	Mastery-Approach, Mastery-Avoidance, Performance-Approach, Performance-Avoidance (AGQ by Elliot & McGregor, 2001).	Cluster Analysis (cross-sectional)	5	High All, High Mastery Approach, Low All, High Mastery-Avoidance, Low Performance.	Strategies for learning, achievement emotions, mathematics performance.

14. Schwinger and Wild (2012)	302 elementary school mathematics students (*M*=N/A)	Mastery, Performance-Approach, Performance-Avoidance (MOS adapted by Nicholls et al., 1985).	Latent profile analysis (longitudinal)	3	High All, Moderate All, High Mastery.	Interest, effort, test performance, grades.
15. Conley (2012)	1870 7th grade high school mathematics students (*M*=N/A)	Mastery, Performance-Approach, Performance-Avoidance (PALS by Midgley et al., 2000).	Cluster Analysis (cross-sectional)	7*	Low All, Moderate Mastery, Moderate All, High Approach, High Mastery, High All.	Positive and negative affect, achievement.
16. Tuominen-Soini et al. (2012)	579 secondary school students (*M*=15.01)	Mastery-Intrinsic, Mastery-Extrinsic, Performance-Approach, Performance-Avoidance, Work-Avoidance (By Niemivirta, 2002).	Latent profile analysis (longitudinal)	4	Moderate All, High Performance, High Mastery, High Avoidance.	School value, burnout, engagement, satisfaction.
17. Tapola et al. (2013)	140 primary school science students (*M*=N/A)	Mastery-Intrinsic, Mastery-Extrinsic, Performance-Approach, Performance-Avoidance, Work-Avoidance (By Niemivirta, 2002).	Latent class clustering analysis	3	High All, High Mastery, High Avoidance.	Interest in physics, pre-test achievement, situational interest.
18. Shim and Finch (2014)	446 middle school students (*M*=N/A)	Mastery, Performance-Approach, Performance-Avoidance (PALS by Midgley et al., 2000).	Latent class analysis (cross-sectional)	6*	High Mastery, High All, Moderate All (x2), Low All (x2).	Engagement, learning strategies, help seeking, beliefs and perceptions, social adjustment, social perceptions.
19. Mendez-Gimenez et al. (2014)	351 secondary school PE students (*M*=14.25)	Mastery-Approach, Mastery-Avoidance, Performance-Approach, Performance-Avoidance (AGQ-PE by Guan et al., 2006).	Cluster Analysis (cross-sectional)	4	Moderate All, Low All, High Mastery, High All.	Motivational regulations, positive affect.
20. De Wal et al. (2016)	722 elementary school mathematics and language students (*M*=10.64)	Mastery, Performance-Approach, Performance-Avoidance (GOS by Seegers et al., 2002).	Latent profile analysis and latent transition analysis (longitudinal)	3	High All, High Approach, Moderate All.	No outcomes measured.
21. Schwinger et al. (2016)	542 elementary school students (*M*=N/A)	Mastery, Performance-Approach, Performance-Avoidance (GSALPG by Spinath et al., 2002).	Latent profile analysis (longitudinal)	4	High All, Moderate All, High Mastery, Moderate Performance.	Intrinsic motivation, school grades.
22. Zhang et al. (2016)	4387 elementary school mathematics and language students (*M*=10.42)	Mastery, Performance-Approach, Performance-Avoidance (PALS, 2000, MOS, 1998 and Schwinger and Wild, 2006).	Latent class analysis (cross-sectional)	3	High Mastery, High All, Low Mastery.	Achievement, intrinsic motivation, self-concept, test anxiety.
23. Wang et al. (2016)	1810 secondary school PE students (*M*=N/A)	Mastery-Approach, Mastery-Avoidance, Performance-Approach, P-Av (AGPEQ by Wang et al., 2007).	Latent profile analysis (cross-sectional)	4	Low All, High All, Moderate Low All, Moderate All.	Intention, participation.
24. Gonçalves et al. (2017)	780 9th & 10th secondary school students (*M*=N/A)	Mastery, Performance-Approach (self-presentation), Performance-Approach (competitive), Performance-Avoidance (PALS by Midgley et al., 2000).	Latent class clustering analysis (longitudinal)	6*	Moderate All, Low All, High Performance, High Mastery, High All (except Performance-Approach-Competition), High Mastery and Performance.	Control beliefs, engagement and academic achievement.
25. Hornstra et al. (2017)	722 5th and 6th grade Primary school mathematics and language students (*M*=10.64)	Mastery-Approach, Performance-Approach, Performance-Avoidance (GOQ by Seegers et al., 2002).	Latent profile analysis and latent transition analysis (longitudinal)	3	High Approach, Moderate All, High All.	Mathematics achievement, language achievement, self-reported effort, teacher-reported effort, cognitive ability.
26. Lo et al. (2017)	1332 7th and 8th grade secondary school mathematics students (*M*=N/A)	Mastery-Approach, Mastery-Avoidance, Performance-Approach, Performance-Avoidance (AGQ by Elliot and McGregor, 2001).	Latent profile analysis (longitudinal)	3	Low All, Moderate All, High Performance.	Self-esteem, self-concept, self-efficacy, mathematics metacognition, achievement.
27. Madjar et al. (2017) study one	256 junior high/high school mathematics and history students (*M*=N/A)	Mastery-Approach, Performance-Approach, Performance-Avoidance (PALS by Midgley et al., 2000).	Cluster analysis (cross-sectional)	5	High Performance, High Performance-Approach, High Mastery and Performance-Avoidance, High Performance-Avoidance, High Mastery.	Epistemic beliefs, goal structure, fear of failure.
28. Madjar et al. (2017) study two	149 10th grade high school history students (*M*=N/A)	Mastery-Approach, Performance-Approach, Performance-Avoidance (PALS by Midgley et al., 2000).	Cluster analysis (cross-sectional)	5	High Performance, High Performance-Approach, High Mastery and Performance-Avoidance, High Performance-Avoidance, High Mastery.	Epistemic beliefs, goal structure, fear of failure, learning strategies.
29. Madjar et al. (2017) study three	250 10th grade high school mathematics and history students (*M*= N/A)	Mastery-Approach, Performance-Approach, Performance-Avoidance (PALS by Midgley et al., 2000).	Cluster analysis (longitudinal)	5	High Performance, High Performance-Approach, High Mastery and Performance-Avoidance, High Performance-Avoidance, High Mastery.	Epistemic beliefs, goal structure, fear of failure, learning strategies.

30. Bae and DeBusk-Lane (2018)	1443 middle school science students (*M*= N/A)	Mastery, Performance-Approach, Performance-Avoidance adapted (PALS by Midgley et al., 2000; Lee et al., 2016).	Latent transition analysis (longitudinal)	Grade 6: 3/4* Grade 7: 3/4* Grade 8: 5*	High Mastery, High All, Low Mastery, Moderate All, High Performance (8th grade profile).	Classroom goal structure, science achievement.
31. Linnenbrink-Garcia et al. (2018)	160 5th grade elementary school mathematics and reading students (*M*= N/A)	Mastery-Approach, Performance-Approach, Performance-Avoidance (PALS by Midgley et al., 2000).	Latent profile analysis (cross-sectional)	4*	Moderate High All, High Mastery, Moderate All, High All.	Engagement, achievement.
32. Mendez-Gimenez et al. (2018)	516 secondary school PE students (*M*=14.48)	Mastery-Approach, Mastery-Avoidance, Performance-Approach, Performance-Avoidance (AGQ-PE by Guan et al., 2006).	Cluster analysis (cross-sectional)	4*	High Mastery, Low All, High All, Moderate All.	Motivational regulations.
33. Ning (2018)	819 Primary school students (*M*=11.39)	Mastery-Approach, Mastery-Avoidance, Performance-Approach, Performance-Avoidance (AGQ-R by Elliot and Murayama, 2008).	Latent profile analysis (cross-sectional)	6	High All, High Performance and Approach, High Mastery, High Approach, Moderate All, Low All.	Deep and surface learning strategies, metacognitive strategies, mathematics test.
34. Ng (2018)	310 Year 10 secondary school mathematics students (*M*=15.33)	Mastery, Performance-Approach, Performance-Avoidance (PALS by Midgley et al., 2000).	Cluster analysis (cross-sectional)	4*	High Performance, High All, High Approach, High Performance-Avoidance.	Perceived classroom structures, perceived teacher support, learning strategies and motives, attitudes, grade aspiration and past achievement, self-assessed mathematics identity.
35. Gonida et al. (2019)	207 secondary school students (*M*=14.15)	Mastery-Approach, Mastery-Avoidance, Performance-Approach, P-Av (PALS by Midgley et al., 2000).	Latent class analysis (cross-sectional)	4	High Performance, High Mastery, Low All, High All.	Help seeking.
36. Lee et al. (2020)	301 middle school students (*M*=11.54)	Mastery, Performance-Approach, Performance-Avoidance (AGQ-R by Elliot and Murayama, 2008).	Latent profile analysis (longitudinal)	4*	Low Mastery, High All, High Mastery, Moderate All.	Social interdependence attitudes, socio-cognitive conflict regulation, achievement.
37. Liu et al. (2020)	1518 secondary school students (*M*=13.86)	Mastery, Performance-Approach, Performance-Avoidance (AGQ by Elliot and Church, 1997).	Latent profile analysis (cross-sectional)	5	High All, Low All, High Mastery, Moderate All, High Approach.	Burnout, learning engagement, test anxiety.
38. Tuominen et al. (2020a)	419 elementary/secondary school students (*M*= N/A)	Mastery-Intrinsic, Mastery-Extrinsic, Performance-Approach, Performance-Avoidance, Work-Avoidance (by Niemivirta 2002, 2019).	Latent profile analysis and latent transition analysis (longitudinal)	4	Moderate All, High Performance, High Mastery, High Avoidance.	Academic well-being, academic achievement.
39. Tuominen et al. (2020b)	434 secondary school English and mathematics students (*M*=16.70)	Mastery-Intrinsic, Mastery-Extrinsic, Performance-Approach, Performance-Avoidance, Work-Avoidance (by Niemivirta 2002, 2019).	Latent profile analysis (cross-sectional)	5	Moderate All, High Performance, High Mastery, High Avoidance (High English, Mathematics Avoidant).	Subject-specific cost, school engagement and school burnout.
40. Yu and Mclellan (2020)	535 secondary school English and mathematics students (*M*= N/A)	Mastery, Performance-Approach, Performance-Avoidance (PALS by Midgley et al., 2000).	Latent profile analysis (cross-sectional)	4*	High Mastery, High Performance, High All, Low All.	Achievement.
41. Madamurk et al. (2021)	1482 secondary school students (*M*= N/A)	Mastery-Intrinsic, Mastery-Extrinsic, Performance-Approach, Performance-Avoidance, Work-Avoidance (by Niemivirta 2002, 2019).	Latent profile analysis and latent transition analysis (longitudinal)	4	High Mastery, High Performance, Moderate All, High Avoidance.	Digital engagement, grade point average.
42. Paul et al. (2021)	307 high school English students (*M*= N/A)	Mastery, Performance-Approach, Performance-Avoidance (PALS by Midgley et al., 2000).	Latent profile analysis (cross-sectional)	3	High All, Moderate All, Low All.	Writing anxiety, writing self-efficacy, perception of revision strategies.

Appendix 2 – Educational outcomes from scoping review (Study One).

Eight studies examined self-perceptions in relation to students achievement goal profiles. Students in the *High Approach* (36%), *High Mastery* (29%) and *High All* (14%) profiles reported the highest levels for adaptive forms of self-perception, such as self-efficacy, self-esteem, self-concept and positive perceptions, whilst those in the *Low All* profile reported the highest mean scores for negative self-esteem. Attitudes and values was explored by six studies investigating six different outcomes. Students in profiles *High All* (38%), *High Mastery* (38%) and *High Approach* (12%) were associated with high scores in task value, positive attitudes, intrinsic value and school value. In contrast, students in the *High Performance* profile reported high levels of negative attitudes. Five studies investigated hedonic and eudaimonic well-being, specifically positive affect and enjoyment, and its relationship with achievement goal profiles. The profiles displaying *High Mastery* and *High All* produced the highest mean scores for both outcomes. Four studies explored 11 different outcomes for the environmental influences and group dynamics category. Students in the adaptive profiles of *High All* (45%), *High Mastery* (35%) and *High Approach* (9%) reported the highest scores for perceived mastery and performance structures, perceived peer support, satisfaction with peers, mastery and performance climate. While those in the *Low Performance profile reported* negative associations with friendship intimacy, and students in the *High Performance profile reported higher levels of* friendship mistrust. Four studies investigated students' physical activity, measuring five different outcomes. Students in the *High All* (40%), *High Mastery* (40%) and *High Performance* (20%) profiles reported the highest levels for participation in extra-curricular school sport, leisure-time exercise, fitness and physical activity. Beliefs about the purpose of education were explored by two studies. Students exhibiting high levels of mastery goals (*High Mastery* profile), reported the highest scores for social status, socioeconomic status and being a good citizen.

Appendix 3 – Ethics approval letter

EDU ETHICS APPROVAL LETTER 2018-2019

APPLICANT DETAILS	
Name:	Krystal Bishop
School:	EDU
Current Status:	PGR
UEA Email address:	K.Bishop@uea.ac.uk
EDU REC IDENTIFIER:	**2019/03/KB_VW**

Approval details	
Approval start date:	05 April 2019
Approval end date:	31 December 2021
Specific requirements of approval:	

Please note that your project is only given ethical approval for the length of time identified above. Any extension to a project must obtain ethical approval by the EDU REC before continuing. Any amendments to your project in terms of design, sample, data collection, focus etc. should be notified to the EDU REC Chair as soon as possible to ensure ethical compliance. If the amendments are substantial a new application may be required.

Appendix 4 – School invitation letter.

University of East Anglia

Faculty of Social Sciences
School of Education

University of East Anglia
Norwich Research Park
Norwich NR4 7TJ

Email: K.Bishop@uea.ac.uk
Web: www.uea.ac.uk

Dear (Insert Name of Head Teacher here),

My name is Krystal Bishop and I am currently a PhD student at UEA.

I am enquiring to see if you would be interested in your school and students participating in my PhD thesis project. My research project focuses on children's motivation in Physical Education and looks at exploring several motivational variables (e.g. psychological needs satisfaction/frustration, perceived ability, goal orientation, anxiety and physical activity levels) in order to create motivational profiles. These motivational profiles will allow us to look at how young people's motivation is influenced by a range of factors including any gender and age differences and the transition into secondary school.

Data will be collected through a questionnaire which will measure each of the motivational variables using a 1 to 5 or 1 to 7 scale ranging from strongly disagree to strongly agree. As this is longitudinal research, data will be collected on three separate occasions during the course of one year. In order to track each individual participant, students will be given unique participant ID numbers making their data anonymous after data entry. Students should be able to complete the questionnaire within 15 minutes at the beginning or end of a lesson. Teachers are also asked to complete a short questionnaire about each participating student regarding their effort, progress, attainment and behavioural engagement and disaffection. These will also be anonymous after each data entry.

I have received ethical clearance from UEA to start conducting my study and have created information sheets and consent forms for the participants. The ethics committee has approved the seeking of parental consent via an opt-out procedure, whereby students will be participating in the study unless their parent/guardian does not wish them to take part and opt-in consent from the school teachers. I hope that these procedures for consent are acceptable with you and suitable for any memorandum of understanding that you have with parents/guardians.

Please find attached the participant information sheet that discusses the study in more depth to assist in your decision. If you require any further information, please contact me at the above email address.

Kind Regards,

Krystal Bishop.

Appendix 5 – Parental information statement and opt-out form.

University of East Anglia

Faculty of Social Sciences
School of Education
University of East Anglia
Norwich Research Park
Norwich NR4 7TJ

Krystal Bishop
PhD Student
Email: K.Bishop@uea.ac.uk
Web: www.uea.ac.uk

Children's Motivation Profiles in Physical Education: A Longitudinal Multi-Perspective View of Motivation

PARENTAL INFORMATION STATEMENT

(1) What is this study about?

The continued concern over declining physical activity levels, rising sedentary behaviours and obesity levels highlights the importance of understanding the motivational processes that direct young people's behaviours. Numerous studies have shown that experiences in PE (both positive and negative), plays an essential role in influencing attitudes towards physical activity and participation beyond school, making it a crucial setting for researchers to better understand these young people's motivation and experiences. The purpose of this study is to draw together different perspectives to explore the motivational profiles and outcomes of young people in PE from primary school through the transition to secondary school.

Your child has been invited to participate in this study because h/she is attending the participating primary/secondary school, is taking part in PE and is in a particular year groups of interest. This Participant Information Statement tells you about the research study. Knowing what is involved will help you decide if you want to let your child take part in the research or not. Please read this sheet carefully and ask questions about anything that you don't understand or want to know more about. Consent is assumed for participant in this research study ***UNLESS*** you tell us otherwise by opting out of the process. If we do not receive an indication from you that you ***do not want*** your child to be part of this research we take that you are giving your consent and you are telling us that you:

- ✓ Understand what you have read.
- ✓ Agree for your child to take part in the research as outlined below.
- ✓ Agree to the use of your child's personal information as described.
- ✓ You have received a copy of this Parental Information Statement to keep.

(2) Who is running the study?

Krystal Bishop is conducting this study as the basis for the research degree of Doctor of Philosophy at the University of East Anglia. This will take place under the supervision of Dr Victoria Warburton, Lecturer, School of Education and Lifelong Learning, University of East Anglia.

(3) What will the study involve?

Your child's participation in this study will involve her/him completing a questionnaire booklet which will have a total of six sections to be completed at three different time points over the course of one year. All questionnaires are answered in a scale and require your child to select a number on the scale which is indicative of their opinion, e.g. 1 being strongly disagree and 5 being strongly agree. There are no right or wrong answers, I am interested in what your child thinks. Questionnaires will be completed either before or after a regular PE lesson and a PE teacher will be with the researcher at all times. All questionnaire booklets are anonymous so your child and their answers cannot be identified as each student will be given a participant id number. If you do not want your child to participate, they will remain in the lesson and will be asked to complete other tasks set by the teacher while participating students complete the questionnaire booklet.

(4) How much of my child's time will the study take?

It should take between 10 and 15 minutes to complete the questionnaire booklet and it will be completed in a regular PE lesson.

(5) Does my child have to be in the study? Can they withdraw from the study once they've started?

Consent to being in this study is assumed unless you tell us otherwise but your child does not have to take part. Your decision whether to let them participate will not affect your current or future relationship with the researchers or anyone else at the University of East Anglia. If you do decide to let your child take part in the study and then change your mind later (or they no longer wish to take part), they are free to withdraw at any time. You can do this by emailing the researcher Krystal Bishop (K.Bishop@uea.ac.uk) with your child's initials, age, gender, year group and class to locate their data and be removed.

(6) Are there any risks or costs associated with being in the study?

Aside from giving up your time, we do not expect that there will be any risks or costs associated with taking part in this study for your child.

(7) Are there any benefits associated with being in the study?

We hope that by completing the questionnaires, that the children will be able to reflect on their experiences in PE and how this has developed and influenced their current motivation. Creating these motivational profiles can lead to the development of teaching strategies, increase and maintain motivation in PE and inform the literature to help create interventions for students to enjoy their PE experiences during their time at primary and secondary school.

(8) What will happen to information that is collected during the study?

By providing your consent, you are agreeing to us collecting personal information about your child for the purposes of this research study. Your information will only be used for the purposes outlined in this Participant Information Statement, unless you consent otherwise. Data management will follow the 2018 General Data Protection Regulation Act and the University of East Anglia Research Data Management Policy (2015). Your child's information will be stored securely and their identity/information will be kept strictly confidential, except as required by law. Study findings will be used for my PhD thesis and may be future publishing, but your child will not be individually identifiable. Data will be stored for a period of 10 years and then destroyed.

(9) What if we would like further information about the study?

When you have read this information, Krystal will be available to discuss it with you further and answer any questions you may have. If you would like to know more at any stage during the study, please feel free to contact Krystal on K.Bishop@uea.a.c.uk or her primary supervisor Dr Victoria Warburton, Lecturer, V.Warburton@uea.ac.uk or 01603 592636.

(10) Will I be told the results of the study?

You and your child have a right to receive feedback about the overall results of this study. A one-page feedback summary will be given to the school teachers about the overall results of the study. The teachers can then display or hand out a copy to the children that they can then take home. Children do not have to explicitly give their details to the researcher in order to obtain results of the study.

(11) What if we have a complaint or any concerns about the study?

The ethical aspects of this study have been approved under the regulations of the University of East Anglia's School of Education and Lifelong Learning Research Ethics Committee.

If there is a problem please let me know. You can contact me via the University at the following address:

Krystal Bishop
School of Education and Lifelong Learning
University of East Anglia
NORWICH NR4 7TJ
K.Bishop@uea.ac.uk

If you would like to speak to someone else you can contact my supervisor:

Victoria Warburton, V.Warburton@uea.ac.uk or 01603 592636

If you (or your child) are concerned about the way this study is being conducted or you wish to make a complaint to someone independent from the study, please contact the Head of the School of Education and Lifelong Learning, Professor Richard Andrews at Richard.Andrews@uea.ac.uk.

(12) OK, I'm happy for my child to take part – what do I do next?

You don't need to do anything if you are happy for your child to participate. Please keep the information sheet for your details regarding the project and how to get in touch with the researcher if you need to.

(13) OK, I don't want my child to take part – what do I do next?

You need to fill in one copy of the consent form and return to your child's PE teacher before the study commences on 10th June. Please keep the letter, information sheet and the 2nd copy of the consent form for your information.

This information sheet is for you to keep

PARENT/CARER CONSENT FORM (1st Copy to Researcher)

I, ... [PRINT PARENT'S/CARER'S NAME], **am not willing** for my child ……………………………………………………………………………………….[PRINT CHILD'S NAME] to take part in this research study.

....

Signature

....

PRINT name

....

Date

Appendix 6 – Child information sheet and consent form.

University of East Anglia

Faculty of Social Sciences
School of Education
University of East Anglia
Norwich Research Park
Norwich NR4 7TJ

Krystal Bishop
PhD Student
Email: K.Bishop@uea.ac.uk
Web: www.uea.ac.uk

Study Information Sheet: Children's Motivational Profiles in Physical Education: A Multi-Perspective View of Motivation.

Hello, my name is Krystal Bishop. I am doing a research study to find out more about how you view your ability and psychological needs in PE, how this influences your goals you set yourselves, your physical activity levels and anxiety felt when participating in PE. I am asking you to be in my study because your school would like to participate in the study.

You can decide if you want to take part in the study or not. You don't have to - it's up to you.

This sheet tells you what we will ask you to do if you decide to take part in the study. Please read it carefully so that you can make up your mind about whether you want to take part.

If you decide you want to be in the study and then you change your mind later, that's ok. All you need to do is tell us that you don't want to be in the study anymore.

If you have any questions, you can ask us or your family or someone else who looks after you. If you want to, you can email me any time on the email address provided.

What will happen if I say that I want to be in the study?

If you decide that you want to be in our study, we will ask you to do these things:

- Turn up to your regular PE lesson with a pen.
- Complete a questionnaire booklet, where for each question you select a number on a scale (e.g. 1= strongly disagree, 5= strongly agree) to indicate your opinion.
- Give Krystal your questionnaire booklet once you have finished.

Remember there are no right or wrong answers, I am interested in your thoughts and opinions about PE.

Will anyone else know what I say in the study?

No, all your answers you will put in your questionnaire booklet will be anonymous as you do not need to put your name in the booklet. All I need is your gender, age, year group and class. This will allow me to create a unique ID code for you to track your answers throughout the year.

How long will the study take?

It should take between 10 and 15 minutes to complete the questionnaire booklet.

Are there any good things about being in the study?

You won't get anything for being in the study, but you will be helping us do our research.

Are there any bad things about being in the study?

This study will take up some of your time, but we don't think it will be bad for you or cost you anything.

Will you tell me what you learnt in the study at the end?

Yes, I will give your teacher a one-page summary of the findings at the end of the study which they can show you and give you a copy if you would like one.

What if I am not happy with the study or the people doing the study?

If you are not happy with how we are doing the study or how we treat you, then you or the person who looks after you can:

- **Call** the university on 01603 592636
- Write an **email** to either V.Warburton@uea.ac.uk or Richard.Andrews@uea.ac.uk

This sheet is for you to keep.

Study Information Sheet: Children's Motivational Profiles in Physical Education: A Multi-Perspective View of Motivation.

Consent Form 1

If you are happy to be in the study, please

- **write** your **name** in the space below
- **sign** your **name** at the bottom of the next page
- put the **date** at the bottom of the next page.

You should only say 'yes' to being in the study if you know what it is about and you want to be in it. If you don't want to be in the study, don't sign the form.

I, ...[PRINT NAME], am happy to be in this research study.

In saying yes to being in the study, I am saying that:

✓ I know what the study is about.

✓ I know what I will be asked to do.

✓ Someone has talked to me about the study.

✓ My questions have been answered.

✓ I know that I don't have to be in the study if I don't want to.

✓ I know that I can pull out of the study at any time if I don't want to do it anymore.

✓ I know that I don't have to answer any questions that I don't want to answer.

✓ I know that the researchers won't tell anyone what I say when we talk to each other, unless I talk about being hurt by someone or hurting myself or someone else.

……….. ……………………………………………………….

Signature **Date**

Appendix 7 – Student questionnaire for study two.

Questionnaire Booklet

Children's Motivational Profiles in Physical Education: A Longitudinal Multi-Perspective View of Motivation

Please put an X or the relevant information next to the category.

This page will be removed once I have given you a unique identification code..

Name: …………………………………………………

Sex: Male……….. Female……….

What is your date of birth?

a. Write the date you were born on the dotted line below (e.g. 1st, 14th, 23rd)

…………………………

b. Please circle the month that you were born.

January	July
February	August
March	September
April	October
May	November
June	December

c. What year were you born? (e.g. 2005, 2007, 2009)

………………………………………..

Year Group: 5……. 6……. 7……. 8……. 9…….

PE Class: …………..

Section A

Please answer each statement below.
Circle one number that best represents your opinion for each statement.
There are no right or wrong answers as we are interested in your thoughts towards PE.
For each question use the following wording before answering the question…

In my PE class…

	Not at all true				Strongly Agree
1. It is important to me to understand how to do new techniques.	1	2	3	4	5
2. I want to gain a broader and deeper knowledge of the activities we do.	1	2	3	4	5
3. I try to perform better than most other students.	1	2	3	4	5
4. I want to show the teacher and my classmates that I am good at PE.	1	2	3	4	5
5. It is important to me to learn to solve problems I am faced with.	1	2	3	4	5
6. I strive to constantly learn and improve.	1	2	3	4	5
7. My goal is to perform better than most other students.	1	2	3	4	5
8. I want my teacher and classmates to think I am good at PE.	1	2	3	4	5
9. It is important to me to do the activities correctly.	1	2	3	4	5
10. An important reason why I participate in the activities is that I want to get better.	1	2	3	4	5
11. I want to perform the skills and activities better than most other students.	1	2	3	4	5
12. It is important to me that others know I am good at PE.	1	2	3	4	5

Section B

Please answer each statement below.
Circle one number that best represents your opinion for each statement.
There are no right or wrong answers as we are interested in your thoughts towards PE.
For each question use the following wording before answering the question…

In PE…

	Strongly Disagree					Strongly Agree
1. Physically, I am happy with myself.	1	2	3	4	5	6
2. Physically, I feel good about myself.	1	2	3	4	5	6
3. I feel good about who I am physically.	1	2	3	4	5	6

Section C

Please answer each statement below.
Circle one number which best represents your opinion for each statement.
There are no right or wrong answers as we are interested in your thoughts towards PE.
For each question use the following wording before answering the question…

In my PE class…

	Not at all			Very much
1. I worry that I won't perform well.	1	2	3	4
2. It is hard to concentrate in the lesson.	1	2	3	4
3. I worry that I will let my teacher and classmates down.	1	2	3	4
4. It is hard for me to focus on what I am supposed to do.	1	2	3	4
5. I worry that I will not perform my best.	1	2	3	4
6. I lose focus in the lesson.	1	2	3	4
7. I worry that I will perform badly.	1	2	3	4
8. I cannot think clearly during the lesson.	1	2	3	4
9. I worry that I will mess up during the lesson.	1	2	3	4
10. I have a hard time focusing on what my teacher tells me to do.	1	2	3	4

Section D

Please answer each statement below.
Circle one number which best represents your opinion for each statement.
There are no right or wrong answers as we are interested in your thoughts towards PE.

1. In the last 7 days, during your PE classes, how often were you very active (e.g., playing hard, running, jumping, throwing)? Please select one only.				
I don't do PE	Hardly ever	Sometimes	Quite often	Always
2. In the last 7 days, what did you do most of the time at *break/lunch time?* Please select one only.				
Sat down (talking, reading, doing schoolwork)	Stood around or walking around	Ran or played a little bit	Ran around and played quite a bit	Ran and played hard most of the time
3. In the last 7 days, on how many days *right after school,* did you do sports, dance, or play games in which you were very active? Please select one only.				
None	1 time last week	2 or 3 times last week	4 times last week	5 times last week
4. In the last 7 days, on how many *evenings* did you do sports, dance, or play games in which you were very active? Please select one only.				
None	1 time last week	2 or 3 times last week	4 or 5 times last week	6 or 7 times last week
5. On the *last weekend,* how many times did you do sports, dance, or play games in which you were very active? Please select one only.				
None	1 time	2 or 3 times	4 or 5 times	6 or more times

Appendix 8 – Teacher questionnaire for study two.

Student Name:

Teacher Questionnaire

Children's Motivational Profiles in Physical Education: A Longitudinal Multi-Perspective View of Motivation

Section A:

Please select one that best describes the student's effort in PE.

1	Always works hard in PE class making the best possible use of time and strives to do his/her best.
2	Usually works well in PE class making good use of time and tries to do his/her best.
3	Generally works well in PE class performing to a satisfactory standard.
4	Works well some of the time but can often be distracted losing concentration and performing below his/her capabilities.
5	Too often makes very little effort and is content with doing the minimum possible.

Please select one that best describes the student's attainment in PE.

Above Average	Student is attaining significantly above the standard expected of students their age.
Good Average	Student is attaining slightly better than the standard expected of students their age.
Average	Student is attaining in line with the standard expected of students their age.
Low Average	Student is attaining just within the average range expected of students their age.
Below Average	Student is attaining below the standard expected of students their age.

Section B:

Please answer each statement below.
Circle one number that best represents the student's engagement and disaffection in PE.

	Not at all true			Very true
1. In my PE class, this student works as hard as he/she can.	1	2	3	4
2. When we start something new in PE class, this student thinks about other things.	1	2	3	4
3. When participating in activities in my PE class, this student appears involved.	1	2	3	4
4. In my PE class, this student comes unprepared.	1	2	3	4
5. When I explain new activities, this student listens carefully.	1	2	3	4
6. When faced with a difficult assignment, this student doesn't even try.	1	2	3	4
7. In my PE class, this student does more than required.	1	2	3	4
8. In my PE class, this student does just enough to get by.	1	2	3	4
9. When this student doesn't do well, he/she works harder.	1	2	3	4
10. When we start something new in PE class, this student doesn't pay attention.	1	2	3	4

Appendix 9 – Student questionnaire for study three.

Questionnaire Booklet

Children's Motivational Profiles in Physical Education: A Longitudinal Multi-Perspective View of Motivation

Please put an X or the relevant information next to the category.

This page will be removed once I have given you a unique identification code..

Name: …………………………………………………

Sex: Male……….. Female……….

What is your date of birth?

a. Write the date you were born on the dotted line below (e.g. 1st, 14th, 23rd)

…………………………

b. Please circle the month that you were born.

January	July
February	August
March	September
April	October
May	November
June	December

c. What year were you born? (e.g. 2005, 2007, 2009)

………………………………………..

Year Group: 5……. 6……. 7……. 8……. 9…….

PE Class: …………..

Section A

Please answer each statement below.
Circle one number that best represents your opinion for each statement.
There are no right or wrong answers as we are interested in your thoughts towards PE.
For each question use the following wording before answering the question…

In my PE class…

	Strongly Disagree				Strongly Agree
1. I feel a sense of choice and freedom in the activities I do.	1	2	3	4	5
2. I feel confident that I can do the activities well.	1	2	3	4	5
3. I feel that the classmates I care about also care about me.	1	2	3	4	5
4. I feel that my decisions reflect what I really want.	1	2	3	4	5
5. I feel capable doing the activities.	1	2	3	4	5
6. I feel connected with other classmates who are important to me.	1	2	3	4	5
7. I feel my choices express who I really am.	1	2	3	4	5
8. I feel competent to achieve my goals.	1	2	3	4	5
9. I feel close and connected with other classmates who are important to me.	1	2	3	4	5
10. I feel I have been doing what really interests me.	1	2	3	4	5
11. I feel I can successfully complete difficult tasks.	1	2	3	4	5
12. I feel happy when I spend time with my classmates.	1	2	3	4	5

Section B

Please answer each statement below.
Circle one number that best represents your opinion for each statement.
There are no right or wrong answers as we are interested in your thoughts towards PE.
For each question use the following wording before answering the question…

In PE…

	Strongly Disagree					Strongly Agree
1. You have a certain amount of ability, and you really can't do much to change it.	1	2	3	4	5	6
2. Your ability is something about you that you can't change very much.	1	2	3	4	5	6
3. You can learn new things, but you can't really change your basic ability.	1	2	3	4	5	6

	Strongly Disagree					Strongly Agree
1. Physically, I am happy with myself.	1	2	3	4	5	6
2. Physically, I feel good about myself.	1	2	3	4	5	6
3. I feel good about who I am physically.	1	2	3	4	5	6

Section C

Please answer each statement below.
Circle one number that best represents your opinion for each statement.
There are no right or wrong answers as we are interested in your thoughts towards PE.
For each question use the following wording before answering the question…

In my PE class…

	Strongly Disagree				Strongly Agree
1. Most of the activities I do feel like 'I have to'.	1	2	3	4	5
2. I have serious doubts about whether I can do the activities well.	1	2	3	4	5
3. I feel ignored from the group I want to belong to.	1	2	3	4	5
4. I feel forced to do many activities I wouldn't choose to do.	1	2	3	4	5
5. I feel disappointed with many of my performances.	1	2	3	4	5
6. I feel that classmates who are important to me are cold and distant towards me.	1	2	3	4	5
7. I feel pressured to do too many activities.	1	2	3	4	5
8. I feel insecure about my abilities.	1	2	3	4	5
9. I feel that classmates I spend time with dislike me.	1	2	3	4	5
10. I feel I have to do the activities.	1	2	3	4	5
11. I feel like a failure because of the mistakes I make.	1	2	3	4	5
12. I feel the friendships I have with my classmates are fake.	1	2	3	4	5

Section D

Please answer each statement below.
Circle one number that best represents your opinion for each statement.
There are no right or wrong answers as we are interested in your thoughts towards PE.
For each question use the following wording before answering the question…

In my PE class…

	Not at all true				Strongly Agree
1. It is important to me to understand how to do new techniques.	1	2	3	4	5
2. I want to gain a broader and deeper knowledge of the activities we do.	1	2	3	4	5
3. I try to perform better than most other students.	1	2	3	4	5
4. I want to show the teacher and my classmates that I am good at PE.	1	2	3	4	5
5. It is important to me to learn to solve problems I am faced with.	1	2	3	4	5
6. I strive to constantly learn and improve.	1	2	3	4	5
7. My goal is to perform better than most other students.	1	2	3	4	5
8. I want my teacher and classmates to think I am good at PE.	1	2	3	4	5
9. It is important to me to do the activities correctly.	1	2	3	4	5
10. An important reason why I participate in the activities is that I want to get better.	1	2	3	4	5
11. I want to perform the skills and activities better than most other students.	1	2	3	4	5
12. It is important to me that others know I am good at PE.	1	2	3	4	5

Section E

Please answer each statement below.
Circle one number which best represents your opinion for each statement.
There are no right or wrong answers as we are interested in your thoughts towards PE.
For each question use the following wording before answering the question…

In my PE class…

	Not at all			Very much
1. I worry that I won't perform well.	1	2	3	4
2. It is hard to concentrate in the lesson.	1	2	3	4
3. I worry that I will let my teacher and classmates down.	1	2	3	4
4. It is hard for me to focus on what I am supposed to do.	1	2	3	4
5. I worry that I will not perform my best.	1	2	3	4
6. I lose focus in the lesson.	1	2	3	4
7. I worry that I will perform badly.	1	2	3	4
8. I cannot think clearly during the lesson.	1	2	3	4
9. I worry that I will mess up during the lesson.	1	2	3	4
10. I have a hard time focusing on what my teacher tells me to do.	1	2	3	4

Section F

Please answer each statement below.
Circle one number which best represents your opinion for each statement.
There are no right or wrong answers as we are interested in your thoughts towards PE.

1. In the last 7 days, during your PE classes, how often were you very active (e.g., playing hard, running, jumping, throwing)? Please select one only.				
I don't do PE	Hardly ever	Sometimes	Quite often	Always
2. In the last 7 days, what did you do most of the time at *break/lunch time?* Please select one only.				
Sat down (talking, reading, doing schoolwork)	Stood around or walking around	Ran or played a little bit	Ran around and played quite a bit	Ran and played hard most of the time
3. In the last 7 days, on how many days *right after school,* did you do sports, dance, or play games in which you were very active? Please select one only.				
None	1 time last week	2 or 3 times last week	4 times last week	5 times last week
4. In the last 7 days, on how many *evenings* did you do sports, dance, or play games in which you were very active? Please select one only.				
None	1 time last week	2 or 3 times last week	4 or 5 times last week	6 or 7 times last week
5. On the *last weekend,* how many times did you do sports, dance, or play games in which you were very active? Please select one only.				
None	1 time	2 or 3 times	4 or 5 times	6 or more times

Appendix 10 – Student questionnaire for study four.

Questionnaire Booklet

Children's Motivational Profiles in Physical Education: A Longitudinal Multi-Perspective View of Motivation

Please put an X or the relevant information next to the category.

This page will be removed once I have given you a unique identification code..

Name: …………………………………………………

Sex: Male……….. Female……….

What is your date of birth?

a. Write the date you were born on the dotted line below (e.g. 1st, 14th, 23rd)

…………………………

b. Please circle the month that you were born.

January	July
February	August
March	September
April	October
May	November
June	December

c. What year were you born? (e.g. 2005, 2007, 2009)

………………………………………..

Year Group: 5……. 6……. 7……. 8……. 9…….

PE Class: …………..

Section A

Please answer each statement below.
Circle one number that best represents your opinion for each statement.
There are no right or wrong answers as we are interested in your thoughts towards PE.
For each question use the following wording before answering the question…

In my PE class…

	Strongly Disagree				Strongly Agree
1. I feel a sense of choice and freedom in the activities I do.	1	2	3	4	5
2. I feel confident that I can do the activities well.	1	2	3	4	5
3. I feel that the classmates I care about also care about me.	1	2	3	4	5
4. I feel that my decisions reflect what I really want.	1	2	3	4	5
5. I feel capable doing the activities.	1	2	3	4	5
6. I feel connected with other classmates who are important to me.	1	2	3	4	5
7. I feel my choices express who I really am.	1	2	3	4	5
8. I feel competent to achieve my goals.	1	2	3	4	5
9. I feel close and connected with other classmates who are important to me.	1	2	3	4	5
10. I feel I have been doing what really interests me.	1	2	3	4	5
11. I feel I can successfully complete difficult tasks.	1	2	3	4	5
12. I feel happy when I spend time with my classmates.	1	2	3	4	5

Section B

Please answer each statement below.
Circle one number that best represents your opinion for each statement.
There are no right or wrong answers as we are interested in your thoughts towards PE.
For each question use the following wording before answering the question…

In PE…

	Strongly Disagree					Strongly Agree
1. You have a certain amount of ability, and you really can't do much to change it.	1	2	3	4	5	6
2. Your ability is something about you that you can't change very much.	1	2	3	4	5	6
3. You can learn new things, but you can't really change your basic ability.	1	2	3	4	5	6

Section C

Please answer each statement below.
Circle one number that best represents your opinion for each statement.
There are no right or wrong answers as we are interested in your thoughts towards PE.
For each question use the following wording before answering the question…

In my PE class…

	Strongly Disagree				Strongly Agree
1. Most of the activities I do feel like 'I have to'.	1	2	3	4	5
2. I have serious doubts about whether I can do the activities well.	1	2	3	4	5
3. I feel ignored from the group I want to belong to.	1	2	3	4	5
4. I feel forced to do many activities I wouldn't choose to do.	1	2	3	4	5
5. I feel disappointed with many of my performances.	1	2	3	4	5
6. I feel that classmates who are important to me are cold and distant towards me.	1	2	3	4	5
7. I feel pressured to do too many activities.	1	2	3	4	5
8. I feel insecure about my abilities.	1	2	3	4	5
9. I feel that classmates I spend time with dislike me.	1	2	3	4	5
10. I feel I have to do the activities.	1	2	3	4	5
11. I feel like a failure because of the mistakes I make.	1	2	3	4	5
12. I feel the friendships I have with my classmates are fake.	1	2	3	4	5

Section D

Please answer each statement below.
Circle one number that best represents your opinion for each statement.
There are no right or wrong answers as we are interested in your thoughts towards PE.
For each question use the following wording before answering the question…

In my PE class…

	Not at all true				Strongly Agree
1. It is important to me to understand how to do new techniques.	1	2	3	4	5
2. I want to gain a broader and deeper knowledge of the activities we do.	1	2	3	4	5
3. I try to perform better than most other students.	1	2	3	4	5
4. I want to show the teacher and my classmates that I am good at PE.	1	2	3	4	5
5. It is important to me to learn to solve problems I am faced with.	1	2	3	4	5
6. I strive to constantly learn and improve.	1	2	3	4	5
7. My goal is to perform better than most other students.	1	2	3	4	5
8. I want my teacher and classmates to think I am good at PE.	1	2	3	4	5
9. It is important to me to do the activities correctly.	1	2	3	4	5
10. An important reason why I participate in the activities is that I want to get better.	1	2	3	4	5
11. I want to perform the skills and activities better than most other students.	1	2	3	4	5
12. It is important to me that others know I am good at PE.	1	2	3	4	5

Appendix 11 – Confirmatory factor analysis models for achievement goals (Study Two).

Model	df	Satorra-Bentler χ^2	Scaled χ^2/df	AIC	CFI	TLI	SRMR	RMSEA	RMSEA (90% CI)
M1. Uni-dimensional	54	1946.469*	1.3510	26184.047	.580	.487	.186	.209	.202-.217
M2. Two factor model (Mastery-Performance)	53	417.400*	1.3646	24125.957	.919	.899	.049	.093	.085-.101
M3. Four factor model (M-S, M-T, P-A, P-C)	48	232.296*	1.3489	23879.740	.959	.944	.038	.069	.061-.078

Model Comparisons

Models	Δ Scaled χ^2	Δ *df*
M1 vs M2	3268.96*	1
M1 vs M3	1693.48*	6
M2 vs M3	169.10*	5

Note: M-S: mastery-self, M-T: mastery-task, P-A: performance-appearance, P-C: performance-competition, AIC: Akaike Information Criterion, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, SRMR: Standardised Root Mean Square Residual, RMSEA: Root Mean Square Error of Approximation, CI: Confidence Interval.*p<.05.

Appendix 12 – Latent profile fit statistics (Study Two).

Model	Log likelihood	No. of free parameters	BIC	p LRT	Entropy	Sample proportion per class
2 Class LPA	-4167.651	13	8422.185	.0000	.761	333(42%) 466(58%)
3 Class LPA	-4037.667	18	8138.475	.1043	.804	79(10%) 383(48%) 337(42%)
4 Class LPA	-3941.283	23	8036.284	.0343	.833	363(46%) 40(5%) 75(9%) 321(40%)
5 Class LPA	-3836.336	28	7859.805	.0084	.830	320(40%) 132(17%) 252(31%) 73(9%) 22(3%)
6 Class LPA	-3770.634	33	7657.025	.2808	.811	18(2%) 78(10%) 122(15%) 140(18%) 197(25%) 244(31%)

Note: LPA = latent profile analysis, BIC = Bayesian information criterion, p LRT = likelihood ratio test.

Appendix 13 – Mean scores for Study Two.

Variable	Male Sample Mean	Female Sample Mean	Primary School Mean	Year 7 Mean	Year 8 Mean
Mast-Task	3.74	3.61	3.78	3.68	3.52
Mast-Self	3.62	3.55	3.76	3.54	3.43
Perf-Comp	3.29	2.79	2.88	3.16	3.07
Perf-App	3.40	3.14	3.33	3.31	3.14
Phys S-W	4.13	3.58	4.02	3.81	3.69
PA Levels	2.07	1.86	2.20	1.86	1.80
Conc Dis	1.90	2.06	1.96	1.90	2.11
Worry	1.92	2.36	2.31	2.02	2.09
Effort	3.96	4.14	3.85	4.18	4.15
Attainment	3.74	3.78	3.50	3.89	3.92
Engagement	3.35	3.47	3.12	3.56	3.58
Disaffect	1.56	1.44	1.64	1.41	1.44

Note: Mast-Task = mastery-task, Mast-Self = mastery-self, Perf-Comp = performance-competition, Perf-App = performance-appearance, Phy-S-W = physical self-worth, PA Levels = physical activity levels, Conc Dis = concentration disruption.

Appendix 13a – Confirmatory factor analysis at time point 1 (Study Three).

Model	df	Satorra-Bentler χ^2	Scaled χ^2/df	AIC	CFI	TLI	SRMR	RMSEA	RMSEA (90% CI)
M1. Uni-dimensional	54	499.299*	1.19	5120.41	.44	.32	.20	.23	.21-.25
M2. Two factor model (Mastery-Performance)	53	148.703*	1.19	4715.46	.88	.83	.08	.12	.09-.14
M3. Four factor model (M-S, M-T, P-A, P-C)	48	78.27*	1.21	4648.31	.95	.93	.07	.08	.05-.10

Model Comparisons

Models	Δ Scaled χ^2	Δ *df*
M1 vs M2	350.60*	1
M1 vs M3	484.91*	6
M2 vs M3	82.41*	5

Note: M-S: mastery-self, M-T: mastery-task, P-A: performance-appearance, P-C: performance-competition, AIC: Akaike Information Criterion, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, SRMR: Standardised Root Mean Square Residual, RMSEA: Root Mean Square Error of Approximation, CI: Confidence Interval.*p<.05.

Appendix 13b – Confirmatory factor analysis at time point 2 (Study Three).

Model	df	Satorra-Bentler χ^2	Scaled χ^2/df	AIC	CFI	TLI	SRMR	RMSEA	RMSEA (90% CI)
M1. Uni-dimensional	54	681.88*	1.42	4375.44	.43	.31	.30	.28	.26-.29
M2. Two factor model (Mastery-Performance)	53	129.64*	1.41	3594.79	.93	.91	.05	.10	.08-.12
M3. Four factor model (M-S, M-T, P-A, P-C)	48	55.10*	1.37	3497.45	.99	.99	.02	.03	.00-.06

Model Comparisons

Models	Δ Scaled χ^2	Δ *df*
M1 vs M2	434.23*	1
M1 vs M3	489.35*	6
M2 vs M3	58.91*	5

Note: M-S: mastery-self, M-T: mastery-task, P-A: performance-appearance, P-C: performance-competition, AIC: Akaike Information Criterion, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, SRMR: Standardised Root Mean Square Residual, RMSEA: Root Mean Square Error of Approximation, CI: Confidence Interval.*p<.05.

Appendix 13c – Confirmatory factor analysis at time point 3 (Study Three).

Model	df	Satorra-Bentler χ^2	Scaled χ^2/df	AIC	CFI	TLI	SRMR	RMSEA	RMSEA (90% CI)
M1. Uni-dimensional	54	1225.10*	1.38	4369.74	.47	.36	.36	.38	.36-.39
M2. Two factor model (Mastery-Performance)	53	198.55*	1.36	2957.45	.93	.92	.03	.13	.11-.15
M3. Four factor model (M-S, M-T, P-A, P-C)	48	45.11*	1.30	2755.45	1.00	1.00	.01	.00	.00-.05

Model Comparisons

Models	Δ Scaled χ^2	Δ *df*
M1 vs M2	686.91*	1
M1 vs M3	810.86*	6
M2 vs M3	106.27*	5

Note: M-S: mastery-self, M-T: mastery-task, P-A: performance-appearance, P-C: performance-competition, AIC: Akaike Information Criterion, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, SRMR: Standardised Root Mean Square Residual, RMSEA: Root Mean Square Error of Approximation, CI: Confidence Interval.*p<.05.

Appendix 14a – Testing the longitudinal invariance for mastery-approach goals (Study Three).

Model	df	Satorra-Bentler χ^2	Scaled χ^2/df	AIC	CFI	TLI	SRMR	RMSEA	RMSEA (90% CI)
Mastery-Task Goals									
Configural	15	28.56*	1.07	2673.63	.99	.97	.03	.07	.03-.12
Metric	19	32.02*	1.06	2668.90	.99	.98	.05	.06	.02-.10
Scalar	25	47.45*	1.04	2674.57	.98	.97	.06	.06	.04-.09
Model comparisons	Δ Scaled χ²		Δ *df*						
Metric - Configural	3.31		4						
Scalar – Metric	15.77*		6						
Mastery-Self Goals									
Configural	15	29.75*	1.07	2606.88	.99	.97	.04	.08	.04-.12
Metric	19	46.28*	1.02	2614.01	.97	.95	.08	.06	.03-.09
Scalar	25	72.80*	.98	2626.65	.96	.94	.09	.05	.02-.07
Model comparison	Δ Scaled χ²		Δ *df*						
Metric-Configural	18.47*		4						
Scalar-Metric	28.29*		6						

Note: AIC: Akaike Information Criterion, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, SRMR: Standardised Root Mean Square Residual, RMSEA: Root Mean Square Error of Approximation, CI: Confidence Interval.*p<.05.

Appendix 14b – Testing the longitudinal invariance for performance-approach goals (Study Three).

Model	df	Satorra-Bentler χ^2	Scaled χ^2/df	AIC	CFI	TLI	SRMR	RMSEA	RMSEA (90% CI)
Performance-Competition Goals									
Configural	15	30.31*	.96	2821.27	.99	.97	.04	.06	.02-.08
Metric	19	32.58*	.94	2814.81	.99	.98	.04	.06	.03-.08
Scalar	25	88.91*	.96	2857.41	.95	.92	.05	.05	.02-.08
Model comparisons	Δ Scaled χ²		Δ *df*						
Metric - Configural	1.77		4						
Scalar – Metric	53.48*		6						
Performance-Appearance Goals									
Configural	15	18.59*	.92	2732.05	.99	.99	.02	.04	.00-.09
Metric	19	30.59*	.92	2735.14	.99	.98	.06	.06	.01-.10
Scalar	25	92.85*	.93	2781.40	.95	.92	.10	.05	.01-09
Model comparison	Δ Scaled χ²		Δ *df*						
Metric-Configural	12.00*		4						
Scalar-Metric	60.53*		6						

Note: AIC: Akaike Information Criterion, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, SRMR: Standardised Root Mean Square Residual, RMSEA: Root Mean Square Error of Approximation, CI: Confidence Interval.*p<.05.

Appendix 15a – Confirmatory factor analysis at time point 1 for Year 6 in Year 6 cohort (Study Four).

Model	df	Satorra-Bentler χ^2	Scaled χ^2/df	AIC	CFI	TLI	SRMR	RMSEA	RMSEA (90% CI)
M1. Uni-dimensional	54	700.86*	1.73	7744.56	.58	.49	.23	.22	.21-.24
M2. Two factor model (Mastery-Performance)	53	212.61*	1.66	6887.74	.90	.87	.05	.11	.10-.13
M3. Four factor model (M-S, M-T, P-A, P-C)	48	123.61*	1.47	6726.77	.95	.93	.04	.08	.06-.10
Model Comparisons									
Models	Δ Scaled χ^2	Δ *df*							
M1 vs M2	158.00*	1							
M1 vs M3	270.55*	6							
M2 vs M3	49.15*	5							

Note: AIC: Akaike Information Criterion, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, SRMR: Standardised Root Mean Square Residual, RMSEA: Root Mean Square Error of Approximation, CI: Confidence Interval.*p<.05.

Appendix 15b - Confirmatory factor analysis at time point 2 for Year 7 in Year 6 cohort (Study Four).

Model	df	Satorra-Bentler χ^2	Scaled χ^2/df	AIC	CFI	TLI	SRMR	RMSEA	RMSEA (90% CI)
M1. Uni-dimensional	54	1369.27*	1.69	8804.33	.40	.27	.32	.32	.30-.33
M2. Two factor model (Mastery-Performance)	53	480.63*	1.52	7221.88	.81	.76	.07	.18	.17-.20
M3. Four factor model (M-S, M-T, P-A, P-C)	48	97.91*	1.49	6648.74	.98	.97	.02	.06	.04-.08
Model Comparisons									
Models	Δ Scaled χ^2	Δ *df*							
M1 vs M2	147.99*	1							
M1 vs M3	659.02*	6							
M2 vs M3	323.38*	5							

Note: AIC: Akaike Information Criterion, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, SRMR: Standardised Root Mean Square Residual, RMSEA: Root Mean Square Error of Approximation, CI: Confidence Interval.*p<.05.

Appendix 15c - Confirmatory factor analysis at time point 3 for Year 8 in Year 6 cohort (Study Four).

Model	df	Satorra-Bentler χ^2	Scaled χ^2/df	AIC	CFI	TLI	SRMR	RMSEA	RMSEA (90% CI)
M1. Uni-dimensional	54	1570.99*	1.62	8563.95	.40	.26	.32	.34	.32-.35
M2. Two factor model (Mastery-Performance)	53	499.68*	1.53	6785.16	.82	.78	.05	.19	.17-.20
M3. Four factor model (M-S, M-T, P-A, P-C)	48	108.04*	1.39	6180.60	.98	.97	.02	.07	.05-.09
Model Comparisons									
Models		Δ Scaled χ^2	Δ *df*						
M1 vs M2		278.64*	1						
M1 vs M3		692.15*	6						
M2 vs M3		213.76*	5						

Note: AIC: Akaike Information Criterion, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, SRMR: Standardised Root Mean Square Residual, RMSEA: Root Mean Square Error of Approximation, CI: Confidence Interval.*p<.05.

Appendix 16a - Confirmatory factor analysis at time point 1 for Year 7 in Year 7 cohort (Study Four).

Model	df	Satorra-Bentler χ^2	Scaled χ^2/df	AIC	CFI	TLI	SRMR	RMSEA	RMSEA (90% CI)
M1. Uni-dimensional	54	1147.32*	1.28	9072.42	.45	.33	.24	.27	.26-.29
M2. Two factor model (Mastery-Performance)	53	242.98*	1.28	7913.95	.91	.88	.05	.11	.10-.13
M3. Four factor model (M-S, M-T, P-A, P-C)	48	121.06*	1.19	7755.85	.96	.95	.03	.08	.06-.09
Model Comparisons									
Models		Δ Scaled χ^2	Δ *df*						
M1 vs M2		904.34*	1						
M1 vs M3		662.25*	6						
M2 vs M3		77.87*	5						

Note: AIC: Akaike Information Criterion, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, SRMR: Standardised Root Mean Square Residual, RMSEA: Root Mean Square Error of Approximation, CI: Confidence Interval.*p<.05.

Appendix 16b - Confirmatory factor analysis at time point 2 for Year 8 in Year 7 cohort (Study Four).

Model	df	Satorra-Bentler χ^2	Scaled χ^2/df	AIC	CFI	TLI	SRMR	RMSEA	RMSEA (90% CI)
M1. Uni-dimensional	54	1929.36*	1.28	9072.42	.45	.33	.24	.27	.26-.29
M2. Two factor model (Mastery-Performance)	53	664.42*	1.20	7571.65	.81	.77	.06	.21	.19-.22
M3. Four factor model (M-S, M-T, P-A, P-C)	48	54.80*	1.10	6842.34	.99	.99	.01	.02	.00-.05
Model Comparisons									
Models		Δ Scaled χ^2	Δ *df*						
M1 vs M2		302.95*	1						
M1 vs M3		885.77*	6						
M2 vs M3		341.21*	5						

Note: AIC: Akaike Information Criterion, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, SRMR: Standardised Root Mean Square Residual, RMSEA: Root Mean Square Error of Approximation, CI: Confidence Interval.*p<.05.

Appendix 16c - Confirmatory factor analysis at time point 3 for Year 9 in Year 7 cohort (Study Four).

Model	df	Satorra-Bentler χ^2	Scaled χ^2/df	AIC	CFI	TLI	SRMR	RMSEA	RMSEA (90% CI)
M1. Uni-dimensional	54	1977.16*	1.54	9507.68	.41	.28	.34	.36	.35-.37
M2. Two factor model (Mastery-Performance)	53	640.14*	1.36	7347.46	.82	.78	.04	.20	.18-.22
M3. Four factor model (M-S, M-T, P-A, P-C)	48	80.31*	1.28	6586.99	.99	.98	.01	.05	.05-.07
Model Comparisons									
Models		Δ Scaled χ^2	Δ *df*						
M1 vs M2		196.23*	1						
M1 vs M3		812.72*	6						
M2 vs M3		360.81*	5						

Note: AIC: Akaike Information Criterion, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, SRMR: Standardised Root Mean Square Residual, RMSEA: Root Mean Square Error of Approximation, CI: Confidence Interval.*p<.05.

Appendix 17a - Confirmatory factor analysis at time point 1 for Year 8 in Year 8 cohort (Study Four).

Model	df	Satorra-Bentler χ^2	Scaled χ^2/df	AIC	CFI	TLI	SRMR	RMSEA	RMSEA (90% CI)
M1. Uni-dimensional	54	1010.42*	1.24	7641.38	.53	.43	.21	.27	.26-.29
M2. Two factor model (Mastery-Performance)	53	253.18*	1.19	6795.82	.90	.88	.04	.13	.11-.14
M3. Four factor model (M-S, M-T, P-A, P-C)	48	85.23*	1.15	6601.26	.98	.98	.02	.06	.04-.08
Model Comparisons									
Models	Δ Scaled χ^2	Δ *df*							
M1 vs M2	244.64*	1							
M1 vs M3	589.24*	6							
M2 vs M3	129.14*	5							

Note: AIC: Akaike Information Criterion, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, SRMR: Standardised Root Mean Square Residual, RMSEA: Root Mean Square Error of Approximation, CI: Confidence Interval.**p*<.05.

Appendix 17b - Confirmatory factor analysis at time point 2 for Year 9 in Year 8 cohort (Study Four).

Model	df	Satorra-Bentler χ^2	Scaled χ^2/df	AIC	CFI	TLI	SRMR	RMSEA	RMSEA (90% CI)
M1. Uni-dimensional	54	1379.94*	1.17	7694.21	.42	.30	.27	.32	.30-.33
M2. Two factor model (Mastery-Performance)	53	257.57*	1.14	6418.91	.91	.89	.04	.13	.11-.14
M3. Four factor model (M-S, M-T, P-A, P-C)	48	82.68*	1.11	6219.37	.99	.98	.03	.06	.03-.07
Model Comparisons									
Models	Δ Scaled χ^2	Δ *df*							
M1 vs M2	478.59*	1							
M1 vs M3	922.88*	6							
M2 vs M3	141.36*	5							

Note: AIC: Akaike Information Criterion, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, SRMR: Standardised Root Mean Square Residual, RMSEA: Root Mean Square Error of Approximation, CI: Confidence Interval.**p*<.05.

Appendix 17c - Confirmatory factor analysis at time point 3 for Year 10 in Year 8 cohort (Study Four).

Model	df	Satorra-Bentler χ^2	Scaled χ^2/df	AIC	CFI	TLI	SRMR	RMSEA	RMSEA (90% CI)
M1. Uni-dimensional	54	1589.58*	1.39	7769.52	.46	.34	.30	.34	.33-.36
M2. Two factor model (Mastery-Performance)	53	352.49*	1.25	5999.99	.89	.87	.04	.15	.14-.17
M3. Four factor model (M-S, M-T, P-A, P-C)	48	61.06*	1.25	5644.32	.99	.99	.02	.03	.00-.06
Model Comparisons									
Models		Δ Scaled χ^2	Δ *df*						
M1 vs M2		200.78*	1						
M1 vs M3		849.88*	6						
M2 vs M3		291.43*	5						

Note: AIC: Akaike Information Criterion, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, SRMR: Standardised Root Mean Square Residual, RMSEA: Root Mean Square Error of Approximation, CI: Confidence Interval.*p<.05.

Appendix 18a – Testing the longitudinal invariance for mastery-approach goals in Year 6 cohort (Study Four).

Model	df	Satorra-Bentler χ^2	Scaled χ^2/df	AIC	CFI	TLI	SRMR	RMSEA	RMSEA (90% CI)
Mastery-Task Goals									
Configural	15	50.90*	1.11	4965.40	.97	.94	.05	.06	.04-.08
Metric	19	61.39*	1.07	4961.05	.97	.95	.06	.05	.03-.07
Scalar	23	70.77*	1.08	4965.45	.97	.95	.05	.05	.03-.07
Model comparisons		Δ Scaled χ^2	Δ *df*						
Metric - Configural		9.99*	4						
Scalar – Metric		9.53*	4						
Mastery-Self Goals									
Configural	15	57.99*	1.09	5155.97	.97	.93	.04	.06	.03-.08
Metric	19	66.17*	1.03	5152.14	.97	.94	.05	.06	.03-.08
Scalar	23	77.68*	1.03	5145.50	.97	.95	.04	.05	.02-.08
Model comparison		Δ Scaled χ^2	Δ *df*						
Metric-Configural		6.14	4						
Scalar-Metric		11.51*	4						

Note: AIC: Akaike Information Criterion, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, SRMR: Standardised Root Mean Square Residual, RMSEA: Root Mean Square Error of Approximation, CI: Confidence Interval.*p<.05.

Appendix 18b – Testing the longitudinal invariance for performance-approach goals in Year 6 cohort (Study Four).

Model	df	Satorra-Bentler χ^2	Scaled χ^2/df	AIC	CFI	TLI	SRMR	RMSEA	RMSEA (90% CI)
Performance-Competition Goals									
Configural	15	23.17*	1.04	4805.64	.99	.98	.02	.06	.02-.09
Metric	19	32.26*	.99	4799.95	.99	.99	.03	.05	.02-.08
Scalar	23	43.69*	1.00	2793.63	.99	.99	.03	.04	.00-.07
Model comparisons	Δ Scaled χ^2		Δ *df*						
Metric - Configural	9.77*		4						
Scalar – Metric	11.22*		4						
Performance-Appearance Goals									
Configural	15	24.10*	1.13	5247.20	.99	.98	.02	.06	.02-.09
Metric	19	32.73*	1.03	5242.21	.99	.99	.03	.05	.02-.09
Scalar	23	45.94*	1.02	5237.35	.99	.99	.03	.05	.01-.08
Model comparison	Δ Scaled χ^2		Δ *df*						
Metric-Configural	9.89*		4						
Scalar-Metric	13.52*		4						

Note: AIC: Akaike Information Criterion, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, SRMR: Standardised Root Mean Square Residual, RMSEA: Root Mean Square Error of Approximation, CI: Confidence Interval.*p<.05.

Appendix 19a – Testing the longitudinal invariance for mastery-approach goals in Year 7 cohort (Study Four).

Model	df	Satorra-Bentler χ^2	Scaled χ^2/df	AIC	CFI	TLI	SRMR	RMSEA	RMSEA (90% CI)
Mastery-Task Goals									
Configural	15	18.63*	1.17	5315.16	.99	.99	.02	.04	.00-.08
Metric	19	26.48*	1.07	5308.81	.99	.99	.02	.04	.00-.07
Scalar	23	41.39*	1.05	5307.45	.99	.99	.02	.04	.00-.07
Model comparisons	Δ Scaled χ^2		Δ *df*						
Metric - Configural	9.41*		4						
Scalar – Metric	15.84*		4						
Mastery-Self Goals									
Configural	15	11.93*	1.16	5410.01	.99	.99	.02	.01	.00-.05
Metric	19	21.05*	1.09	5403.55	.99	.99	.02	.01	.00-.04
Scalar	23	33.40*	1.08	5398.95	.99	.99	.02	.01	.00-.03
Model comparison	Δ Scaled χ^2		Δ *df*						
Metric-Configural	11.00*		4						
Scalar-Metric	12.71*		4						

Note: AIC: Akaike Information Criterion, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, SRMR: Standardised Root Mean Square Residual, RMSEA: Root Mean Square Error of Approximation, CI: Confidence Interval.*p<.05.

Appendix 19b – Testing the longitudinal invariance for performance-approach goals in Year 7 cohort (Study Four).

Model	df	Satorra-Bentler χ^2	Scaled χ^2/df	AIC	CFI	TLI	SRMR	RMSEA	RMSEA (90% CI)
Performance-Competition Goals									
Configural	15	20.57*	1.13	5141.12	.99	.99	.01	.04	.00-.07
Metric	19	23.73*	1.05	5134.90	.99	.99	.02	.03	.00-.06
Scalar	23	34.99*	1.04	5138.29	.99	.99	.02	.04	.00-.07
Model comparisons	Δ Scaled χ^2		Δ *df*						
Metric - Configural	2.23		4						
Scalar – Metric	11.56*		4						
Performance-Appearance Goals									
Configural	15	33.04*	1.08	5466.83	.99	.98	.03	.07	.04-.10
Metric	19	38.57*	1.02	5459.25	.99	.98	.03	.06	.03-.09
Scalar	23	54.41*	1.02	5467.62	.99	.98	.03	.07	.05-.10
Model comparison	Δ Scaled χ^2		Δ *df*						
Metric-Configural	4.60		4						
Scalar-Metric	15.84*		4						

Note: AIC: Akaike Information Criterion, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, SRMR: Standardised Root Mean Square Residual, RMSEA: Root Mean Square Error of Approximation, CI: Confidence Interval.*p<.05.

Appendix 20a – Testing the longitudinal invariance for mastery-approach goals in Year 8 cohort (Study Four).

Model	df	Satorra-Bentler χ^2	Scaled χ^2/df	AIC	CFI	TLI	SRMR	RMSEA	RMSEA (90% CI)
Mastery-Task Goals									
Configural	15	22.88*	1.08	4761.47	.99	.99	.02	.05	.00-.08
Metric	19	34.97*	1.05	4755.02	.99	.99	.02	.04	.00-.07
Scalar	23	46.29*	1.04	4754.18	.99	.99	.03	.04	.00-.07
Model comparisons	Δ Scaled χ^2		Δ *df*						
Metric - Configural	12.81*		4						
Scalar – Metric	11.51*		4						
Mastery-Self Goals									
Configural	15	15.48*	1.08	4772.27	.99	.99	.02	.01	.00-.06
Metric	19	18.50*	1.05	4766.98	.99	.99	.03	.02	.00-.06
Scalar	23	28.43*	1.04	4766.96	.99	.99	.03	.03	.00-.06
Model comparison	Δ Scaled χ^2		Δ *df*						
Metric-Configural	2.89		4						
Scalar-Metric	10.22*		4						

Note: AIC: Akaike Information Criterion, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, SRMR: Standardised Root Mean Square Residual, RMSEA: Root Mean Square Error of Approximation, CI: Confidence Interval.*p<.05.

Appendix 20b – Testing the longitudinal invariance for performance-approach goals in Year 8 cohort (Study Four).

Model	df	Satorra-Bentler x^2	Scaled χ^2/df	AIC	CFI	TLI	SRMR	RMSEA	RMSEA (90% CI)
Performance-Competition Goals									
Configural	15	11.93*	.98	4635.38	.99	.99	.01	.02	.00-.05
Metric	19	15.22*	.95	4630.18	.99	.99	.02	.02	.00-.04
Scalar	23	25.15*	.97	4631.99	.99	.99	.02	.02	.00-.06
Model comparisons	Δ Scaled χ^2		Δ *df*						
Metric - Configural	3.34		4						
Scalar – Metric	9.33*		4						
Performance-Appearance Goals									
Configural	15	26.29*	1.01	4747.29	.99	.99	.03	.06	.02-.09
Metric	19	30.40*	1.00	4743.16	.99	.99	.03	.05	.00-.08
Scalar	23	41.75*	1.00	4746.25	.99	.98	.03	.06	.03-.09
Model comparison	Δ Scaled χ^2		Δ *df*						
Metric-Configural	3.99		4						
Scalar-Metric	11.35*		4						

Note: AIC: Akaike Information Criterion, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, SRMR: Standardised Root Mean Square Residual, RMSEA: Root Mean Square Error of Approximation, CI: Confidence Interval.*p<.05.

Appendix 21 – Latent profile analyses for Year 6 cohort (Study Four).

Model	Log likelihood	No. of free parameters	BIC	p LMR	Entropy	Sample proportion per class
TP 1						
2 Class LPA	-1262.42	13	2596.36	.00	.80	133 (54%), 112 (46%)
3 Class LPA	-1190.09	18	2479.20	.00	.86	34 (14%), 108 (44%), 103 (42%)
4 Class LPA	-1148.70	23	2423.02	.02	.87	58 (24%), 34 (14%), 99 (40%), 54 (22%)
5 Class LPA	-1116.54	28	2387.12	.08	.85	32 (13%), 53 (22%), 55 (22%), 59 (24%), 46 (19%)
6 Class LPA	-1087.11	33	2355.76	.17	.90	70 (28%), 17 (7%), 48 (20%), 33 (13%), 26 (11%), 51 (21%)
TP 2						
2 Class LPA	-1247.87	13	2567.26	.00	.91	83 (34%), 162 (66%)
3 Class LPA	-1174.74	18	2385.48	.00	.87	85 (35%), 58 (24%), 102 (41%)
4 Class LPA	-1102.67	23	2331.88	.07	.91	40 (16%), 53 (22%), 46 (19%), 106 (43%)
5 Class LPA	-1035.56	28	2225.16	.00	.93	35 (14%), 47 (19%), 36 (15%), 71 (29%), 56 (23%)
6 Class LPA	-1004.77	33	2191.08	.02	.94	62 (25%), 47 (19%), 36 (15%), 30 (12%), 60 (24%), 10 (5%)
TP3						
2 Class LPA	-1248.16	13	2567.83	.00	.87	116 (47%), 129 (53%)
3 Class LPA	-1166.11	18	2431.24	.00	.92	42 (17%), 83 (34%), 120 (49%)
4 Class LPA	-1084.35	23	2295.23	.01	.94	41 (17%), 112 (46%), 70 (28%), 22 (9%)
5 Class LPA	-1003.49	28	2161.02	.01	.94	22 (9%), 21 (9%), 42 (17%), 90 (37%), 70 (28%)
6 Class LPA	-955.59	33	2092.72	.04	.92	21 (9%), 21 (9%), 50 (20%), 43 (18%), 55 (22%), 55 (22%)

Note: TP = time point, LPA = latent profile analysis, BIC = Bayesian information criterion, p LRT = likelihood ratio test.

Appendix 22 – Latent transition probabilities based on the estimated model for Year 6 cohort (Study Four).

T1 Profiles (Rows) by T2 Profiles (Columns)	**Profile 1**	**Profile 2**	**Profile 3**	**Profile 4**	**Profile 5**
Profile 1	.22	.25	.45	.00	.08
Profile 2	.00	.64	.14	.20	.04
Profile 3	.26	.50	.18	.06	.00
Profile 4	.00	.00	.44	.23	.33
Profile 5	.44	.00	.20	.08	.28

T2 Profiles (Rows) by T3 Profiles (Columns)	**Profile 1**	**Profile 2**	**Profile 3**	**Profile 4**	**Profile 5**
Profile 1	.77	.02	.21	.00	.00
Profile 2	.05	.83	.09	.00	.03
Profile 3	.09	.36	.52	.00	.04
Profile 4	.03	.15	.02	.80	.00
Profile 5	.000	.04	.47	.00	.49

Appendix 23 - Latent profile analyses for Year 7 cohort (Study Four).

Model	Log likelihood	No. of free parameters	BIC	p LMR	Entropy	Sample proportion per class
TP 1						
2 Class LPA	-1420.59	13	2914.15	.00	.84	114 (42%), 160 (58%)
3 Class LPA	-1374.55	18	2850.13	.03	.86	107 (39%), 143 (52%), 24 (9%)
4 Class LPA	-1321.45	23	2772.01	.43	.82	108 (39%), 64 (24%) 75 (27%), 27 (10%)
5 Class LPA	-1286.69	28	2730.55	.03	.83	65 (24%), 33 (12%), 72 (26%), 81 (30%), 23 (8%)
6 Class LPA	-1265.98	33	2717.21	.27	.83	32 (12%), 22 (8%), 64 (23%), 68 (25%), 26 (9%), 62 (23%)
TP 2						
2 Class LPA	-1553.15	13	2748.01	.00	.91	104 (38%), 170 (62%)
3 Class LPA	-1292.35	18	2685.73	.00	.91	72 (26%), 73 (27%), 129 (47%)
4 Class LPA	-1186.05	23	2501.21	.02	.91	61 (22%), 85 (31%), 35 (13%), 93 (34%)
5 Class LPA	-1126.70	28	2410.56	.09	.91	33 (12%), 76 (28%), 57 (21%), 47 (17%), 61 (22%)
6 Class LPA	-1092.03	33	2369.29	.02	.94	62 (23%), 57 (21%), 36 (14%), 35 (13%), 78 (29%)
TP3						
2 Class LPA	-1361.87	13	2796.70	.00	.89	83 (30%), 191 (70%)
3 Class LPA	-1273.97	18	2648.98	.00	.93	65 (24%), 65 (24%), 144 (52%)
4 Class LPA	-1162.48	23	2454.05	.00	.94	36 (13%), 109 (40%), 39 (14%), 90 (33%)
5 Class LPA	-1086.21	28	2329.58	.03	.94	36 (13%), 46 (17%), 51 (19%), 35 (13%), 106 (38%)
6 Class LPA	-1046.08	33	2277.38	.00	.92	42 (15%), 72 (26%), 35 (13%), 40 (15%), 34 (12%), 51 (19%)

Note: TP = time point, LPA = latent profile analysis, BIC = Bayesian information criterion, p LRT = likelihood ratio test.

Appendix 24 – Latent transition probabilities based on the estimated model for Year 7 cohort (Study Four).

T1 Profiles (Rows) by T2 Profiles (Columns)					
	Profile 1	**Profile 2**	**Profile 3**	**Profile 4**	**Profile 5**
Profile 1	.77	.12	.00	.08	.03
Profile 2	.06	.81	.04	.05	.04
Profile 3	.00	.09	.70	.04	.17
Profile 4	.00	.04	.24	.57	.15
Profile 5	.12	.02	.00	.09	.77

T2 Profiles (Rows) by T3 Profiles (Columns)					
	Profile 1	**Profile 2**	**Profile 3**	**Profile 4**	**Profile 5**
Profile 1	.67	.13	.00	.18	.02
Profile 2	.03	.80	.03	.10	.04
Profile 3	.00	.12	.82	.06	.00
Profile 4	.07	.49	.04	.40	.00
Profile 5	.06	.03	.05	.27	.59

Appendix 25 - Latent profile analyses for Year 8 cohort (Study Four).

Model	Log likelihood	No. of free parameters	BIC	p LMR	Entropy	Sample proportion per class
TP 1						
2 Class LPA	-1250.08	13	2571.51	.04	.78	164 (68%), 78 (32%)
3 Class LPA	-1191.08	18	2480.97	.05	.83	33 (14%), 103 (42%), 106 (44%)
4 Class LPA	-1150.94	23	2428.88	.14	.87	10 (4%), 93 (38%), 31 (13%), 108 (45%)
5 Class LPA	-1108.98	28	2371.65	.06	.87	31 (13%), 5 (2%), 35 (14%), 86 (36%), 85 (35%)
6 Class LPA	-1083.93	33	2348.99	.11	.85	25 (10%), 5 (2%), 37 (16%), 73 (30%), 49 (20%), 53 (22%)
TP 2						
2 Class LPA	-1262.18	13	2595.72	.00	.79	138 (57%), 104 (43%)
3 Class LPA	-1211.17	18	2521.14	.42	.82	41 (17%), 122 (50%), 79 (33%)
4 Class LPA	-1158.93	23	2444.11	.03	.85	44 (18%), 26 (11%), 119 (49%), 53 (22%)
5 Class LPA	-1105.56	28	2364.82	.26	.86	48 (20%), 13 (5%), 80 (33%), 54 (22%), 47 (20%)
6 Class LPA	-1075.94	33	2333.02	.10	.87	53 (22%), 15 (6%), 45 (19%), 74 (30%), 14 (6%), 41 (17%)
TP3						
2 Class LPA	-1224.24	13	2519.84	.00	.85	127 (52%), 115 (48%)
3 Class LPA	-1153.81	18	2406.42	.00	.88	100 (41%), 41 (17%), 101 (42%)
4 Class LPA	-1062.95	23	2252.15	.00	.91	40 (17%), 30 (12%), 110 (45%), 62 (26%)
5 Class LPA	-1001.68	28	2157.06	.01	.91	28 (12%), 46 (19%), 54 (22%), 40 (17%), 74 (30%)
6 Class LPA	-966.11	33	2113.36	.08	.91	34 (14%), 31 (13%), 25 (10%), 40 (17%), 40 (17%), 72 (29%)

Note: TP = time point, LPA = latent profile analysis, BIC = Bayesian information criterion, p LRT = likelihood ratio test

Appendix 26 – Latent transition probabilities based on the estimated model for Year 8 cohort (Study Four).

T1 Profiles (Rows) by T2 Profiles (Columns)					
	Profile 1	**Profile 2**	**Profile 3**	**Profile 4**	**Profile 5**
Profile 1	.58	.05	.06	.18	.13
Profile 2	.15	.40	.05	.34	.06
Profile 3	.20	.00	.60	.21	.00
Profile 4	.17	.13	.07	.44	.18
Profile 5	.18	.00	.05	.09	.68

T2 Profiles (Rows) by T3 Profiles (Columns)					
	Profile 1	**Profile 2**	**Profile 3**	**Profile 4**	**Profile 5**
Profile 1	.84	.04	.00	.11	.01
Profile 2	.00	.91	.04	.05	.00
Profile 3	.00	.00	.88	.12	.00
Profile 4	.01	.00	.07	.81	.11
Profile 5	.08	.00	.00	.10	.82