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Motivation in physical education across the primary–secondary school transition

● **Victoria Warburton and Christopher Spray** Loughborough University, UK

Abstract

The purpose of this study was to examine the temporal patterns of approach-avoidance achievement goals, implicit theories of ability and perceived competence in physical education across the transition from primary to secondary school. We also evaluated the predictive utility of implicit theories and perceived competence with regard to achievement goal adoption, and determined the moderating influence of gender on temporal patterns and antecedent–goal relationships. One hundred and forty pupils (mean age at start of study = 11.37 years, SD = .28) completed measures of entity and incremental beliefs, perceived competence and goals on four occasions during a 12-month period. Mastery-approach, performance-approach and performance-avoidance goals, as well as entity and incremental beliefs, exhibited a linear decline over time. Mastery-avoidance goals showed no significant change. Girls exhibited a linear decline in perceived competence, whereas for boys the trajectory was curvilinear. Competence perceptions predicted initial scores, but not rate of change, on mastery-approach and both types of performance goals. Incremental beliefs predicted rate of change in mastery-approach goal adoption, whereas entity beliefs were associated with changes in performance-avoidance goals and initial scores on performance-approach goals. Limited differences between boys and girls in these antecedent–goal relationships were observed.

Key-words: approach-avoidance achievement goals • implicit theories of ability • perceived competence • physical education • primary–secondary school transition

The motivation of young people in school physical education (PE) has been a popular topic of research in recent years. Much of this interest has been fuelled by a concern that pupils' experiences of PE may not be positive, an awareness of increasing sedentary behaviours among youth coupled with rising juvenile obesity and a recognition of the importance of the PE context in reaching all young children and adolescents in laying a foundation for active, healthy lifestyles beyond school (Biddle et al., 1998). Researchers have utilized a wide array of theoretical perspectives to further understanding of motivation. One of the most frequently employed frameworks has been achievement goal theory (Elliot, 1999, 2005; Nicholls, 1989). The present study

adopted Elliot's contemporary hierarchical model of approach-avoidance achievement motivation in identifying predictors of change in pupils' PE-based goals as they progressed from primary to secondary schooling.

Achievement goals, implicit beliefs, and perceived competence

The work by Elliot and associates (see Elliot, 1999, 2005; Elliot and McGregor, 2001) in the educational domain has sought to provide a comprehensive model of achievement motivation through consideration of both approach and avoidance forms of motivation, i.e. the need to achieve competence and the need to avoid incompetence. Elliot's model amalgamates the approach and avoidance components of need achievement theory with the mastery and performance goals of dichotomous goal perspectives theory (see Nicholls, 1989) to propose a 2×2 achievement goal framework. The four achievement goals proposed in this framework reflect different representations of the definition and valence of competence. Specifically mastery-approach goals focus on developing task- or self-referent competence, whereas mastery-avoidance goals focus on avoiding developing task- or self-referent incompetence. Thus, pupils may strive to do their best in a class activity in the PE lesson, or alternatively their striving may stem from a concern that they are unable to do the activity as well as they feel they can. Performance-approach goals focus on demonstrating normative competence and performance-avoidance goals focus on avoiding demonstrating normative incompetence. Thus, pupils aim to show they are one of the best in the class at an activity, or alternatively, they are more concerned with being worse at the activity than their classmates. In his theorizing, Elliot identifies a number of potential antecedents which are thought to represent the reasons for individuals adopting these different goals in an achievement situation. These include, for example, implicit theories of ability, competence expectancies, need for achievement, fear of rejection, perception of the motivational climate, fear of failure and gender (see Elliot, 1999). In PE, the temporal relations between implicit theories of ability and perceptions of competence with the four goals of the approach-avoidance framework have received limited empirical attention. In the present study, therefore, we focused attention on the predictive utility of these antecedents while controlling for possible gender effects.

Implicit theories of ability refer to the stability or malleability of human attributes and behaviours. Initially, research extensively examined implicit theories in the educational domain with regard to the effect of children's views about the stability or malleability of their intelligence on educational achievement (see Dweck, 1999). This research has supported the existence of two implicit theories of ability, termed incremental and entity theories. The endorsement of incremental beliefs leads individuals to view personal attributes and behaviours as being malleable, controllable qualities that can be increased through learning. On the other hand, the endorsement of entity beliefs leads individuals to view personal attributes and behaviours as

a fixed, stable capacity (quantity) that cannot be improved. As such, individuals are described as incremental theorists or entity theorists depending on which view of human attributes and behaviours they endorse.

Research in the educational and physical domains has shown that entity and incremental beliefs are associated with different achievement goals. Holding incremental beliefs leads to the adoption of mastery goals, whereas the endorsement of entity beliefs leads to the adoption of performance goals (Biddle et al., 1999, 2003; Cury et al., 2002; Dweck and Bempechat, 1983; Dweck and Leggett, 1988; Lintunen et al., 1999; Ommundsen, 2001; Sarrazin et al., 1996). Particularly in the PE and sport contexts, however, previous research has adopted mainly cross-sectional designs that limit the strength of conclusions regarding causality and direction of influence.

Elliot's model (Elliot, 1999) also suggests that perceptions of competence antecede achievement goal adoption. High perceptions of competence are expected to be associated with approach goals (both mastery and performance), while low perceptions of competence are expected to be associated with both types of avoidance goals. Research in education and PE domains has found support for these links between perceptions of competence and approach-avoidance achievement goals (e.g. Cury et al., 2002; Elliot and Church, 1997). However, there is a dearth of longitudinal research that speaks to the patterns of change in competence perceptions and approach-avoidance achievement goal adoption over time. Studies of dichotomous achievement goals and perceptions of competence in PE utilizing cross-sectional age comparisons have suggested, however, that older pupils report lower task (mastery) orientation and perceived competence than younger pupils (Digelidis and Papaioannou, 1999).

Primary-secondary school transition

One of the key periods in a child's school career that is likely to impact on their experiences, motivation and achievement in all school subjects, including PE, is the transition from primary to secondary school. This transition occurs during a key developmental period for pupils and can be a difficult time, both academically and socially (Zeedyk et al., 2003). In the educational domain, the Observational Research and Classroom Learning Evaluation (ORACLE) project assessed pupils' enjoyment, motivation and achievement across the transfer from primary to secondary school in the UK (see Delamont and Galton, 1986; Galton and Willcocks, 1983). This research found that as much as 40 percent of pupils failed to make the expected progress in the year immediately after transfer in mathematics, reading and language skills. In addition, while pupils' motivation and enjoyment increased in the first term after transfer, they had declined by the end of the school year to levels below those observed in primary school prior to transfer. A recent replication of the ORACLE project found a similar pattern of results (Hargreaves and Galton, 2002).

Research by Eccles and colleagues in the US (Eccles and Harold, 1991; Eccles et al., 1989, 1993a, 1993b; Jacobs et al., 2002; Wigfield et al., 1991) has utilized the expectancy-value theory of achievement motivation (Eccles et al., 1983; Wigfield

and Eccles, 1992) to examine the influence of the transition from primary school to secondary school on achievement motivation.¹ Of particular interest are the findings on sport competency beliefs. While there appeared to be a general downward trajectory in sport competency beliefs over a child's school career, this decline accelerated following the transition to secondary school (Jacobs et al., 2002). The greatest declines in sport competency beliefs were observed immediately after the transition (Eccles et al., 1989; Marsh, 1989; Wigfield et al., 1991).

Several studies have utilized the dichotomous achievement goal perspective (Dweck, 1986, 1990; Nicholls, 1989) to examine pupils' achievement motivation in mathematics and English across the primary to secondary school transition (e.g. Anderman and Anderman, 1999; Anderman and Midgley, 1997). Pupils reported lower endorsement of mastery goals, greater adoption of performance goals and a decline in perceived academic competence in both subjects after the transfer.

The present study

To our knowledge, there has been no published research that has examined pupil's implicit theories of ability, perceived competence and approach-avoidance goals across the transition from primary to secondary school in the PE context. The aim of the present research was to examine temporal patterns among key achievement motivation variables and to examine the predictive utility of implicit theories of ability and perceived competence to approach-avoidance achievement goal adoption as pupils progressed from Year 6 in primary school to Year 7 in secondary school. Moreover, the effects of gender on goals, goal antecedents and antecedent-goal relationships were examined.

Previous research has revealed no consistent pattern of gender differences in the endorsement of incremental and entity theories of ability and approach-avoidance goal adoption. Limited evidence suggests that academically able girls are more likely than able boys to endorse an entity theory of ability (Leggett, 1985). However, other evidence suggests there are no gender differences in the endorsement of incremental and entity beliefs (Freedman-Doan et al., 2000). In education, Anderman and colleagues (Anderman and Anderman, 1999; Anderman and Midgley, 1997) have shown that boys are more likely to endorse performance goals than girls. This finding complemented other studies which identified gender differences to exist in the endorsement of achievement goals (Roeser et al., 1996; Ryan et al., 1997). However, a review of research on gender and motivation in the educational domain concluded that there was 'no clear pattern of gender differences in students' achievement goal orientations' (Meece et al., 2006: 360).

Gender differences in competency beliefs, which emerge early in a child's school career, have been shown to remain across the transition to secondary school and through late adolescence (Eccles and Harold, 1991; Eccles et al., 1993b; Jacobs et al., 2002; Wigfield et al., 1991). Boys report higher sport competency beliefs than girls. In PE-based studies in the UK, girls have been found to be over-represented in clusters that

can be described as 'poorly motivated', i.e. characterized by weak goal orientations, incremental beliefs and perceived competence, or 'amotivated', i.e. characterized by low mastery orientation, incremental beliefs, perceived competence and high entity beliefs. On the other hand, boys tend to be over-represented in 'highly motivated' groups, i.e. characterized by strong goal orientations, incremental and entity beliefs, and perceived competence (see e.g. Wang and Biddle, 2001).

Based on previous research, we anticipated that pupils would, on average, decline in their perceptions of competence in PE across the transition to secondary school (Jacobs et al., 2002). Perceptions of competence were predicted to be higher for boys than girls at all assessment points (Jacobs et al., 2002; Wang and Biddle, 2001). Further, we hypothesized that higher perceptions of competence would predict initial status (when pupils were in Year 6) and rate of change (throughout Year 7) in mastery-approach and performance-approach goals. On the other hand, lower competence perceptions would be associated with initial status and rate of change in mastery-avoidance and performance-avoidance goals. Moreover, we expected incremental beliefs to predict initial status and rate of change in mastery-approach and mastery-avoidance goals, whereas entity beliefs were hypothesized to predict initial status and rate of change in both types of performance goals (Cury et al., 2002; Elliot, 1999, 2005). Finally, due to the present research being the first, to our knowledge, to assess implicit theories of ability and approach-avoidance achievement goals in PE across the transfer to secondary school, we decided not to propose specific a priori hypotheses for the temporal patterns. Similarly, given that previous research has not revealed consistent differences between boys and girls in the adoption of implicit theories and achievement goals, we chose not to posit hypotheses for this aspect of the study.

Method

Participants

Male ($n = 68$) and female ($n = 72$) participants from Year 6 of three primary schools in eastern England, participated in the research. These schools were selected on the basis that they were feeder schools to a specific secondary school where arrangements for post-transfer data collection had already been agreed. At the start of the research (wave 1), participants were aged 10 or 11 years ($M = 11.37$, $SD = 0.28$ years).

Procedures

Ethical approval for the research procedures was obtained from the relevant institutional body. These procedures complied with the guidelines of the British Psychological Society. Permission for conducting the research was sought from the head teacher at each of the primary schools and the secondary school to which participants

were transferring at the end of the school year. Parental consent was obtained through distribution of letters prior to data collection. Following an introduction to the purpose of the research, informed assent was given from all participants through the completion of a 'willingness to participate' form. Any child who did not have parental consent or give their informed assent for participation in the research was withdrawn from all data collection procedures. All procedures took place in a normal curriculum lesson. Participants were assured that all information collected would be anonymous and would remain confidential. They were provided with the opportunity to ask any questions before the questionnaire was administered. An explanation of how to complete each section of the questionnaire was given. Each participant responded to an anonymous multi-section questionnaire which took approximately 20 minutes to complete. These procedures were repeated at 3, 6 and 12 months following wave 1. At wave 1, the participants were nearing the end of Year 6 of primary school, and at waves 2–4, participants had transferred into Year 7 of secondary school.

Measures

Each participant completed a multi-section questionnaire that collected the following information.

Personal details

This section of the questionnaire contained items relating to form group, date of birth, gender, age and primary school. Because the questionnaires were anonymous and repeated measurements were to be taken, this information allowed participants to be identified at subsequent data points.

Goal adoption

Goal adoption was assessed using the Achievement Goals Questionnaire for Sport (Conroy et al., 2003). Students responded to 12 items on a seven-point Likert scale that ranged from not at all true of me (1) to very much like me (7). Three items assessed each type of goal. Sample items included, 'It is important for me to perform as well as I possibly can' (mastery-approach), 'I am often concerned that I may not perform as well as I can perform' (mastery-avoidance), 'It is important to me to do well compared to others' (performance-approach) and 'I just want to avoid performing worse than others' (performance-avoidance).

Implicit theories of ability

Participants' conceptions of the nature of ability in sport and PE were assessed using the 'Conceptions of the Nature of Athletic Ability Questionnaire version 2' (CNAAQ-2, Biddle et al., 2003). Twelve items, assessing four subscales which reflect different representations of the nature of ability, were answered on a five-point Likert scale that ranged from strongly disagree (1) to strongly agree (5). Sample items include 'It is difficult to change how good you are at sport/PE' (stable), 'To be good

at sport/PE you need to be naturally gifted' (gift), 'You need to learn and to work hard to be good at sport/PE' (learning) and 'If you put enough effort into it, you will always get better at sport/PE' (improvement). The CNAAQ-2 posits a hierarchical factor structure, with stable and gift subscales underpinning a higher order entity belief, and learning and improvement subscales underpinning a higher order incremental belief. In the present study, we were interested only in the two higher-order dimensions of implicit beliefs.

Perceived competence

Pupils' sense of competence in PE was assessed using six items answered on a five-point Likert scale that ranged from strongly disagree (1) to strongly agree (5). Example items included 'I am often able to successfully complete the activities I am set in PE', 'I can perform tasks and skills in PE better than I used to' and 'I am better at PE than others in my class'.

Data analysis

First, we examined the extent and pattern of missing data across the four intervals, and determined whether associations were evident between missing data and the substantive variables under investigation. Data were missing as a consequence of normal absences on the days of questionnaire administration. There were no significant associations between number of missed measurement occasions and initial scores on implicit beliefs, perceived competence or goals. Because the amount of missing data was small, we chose not to replace missing scores.

All main analyses were carried out using MLwiN (version 2.0, Rasbash et al., 2005).² MLwiN is specifically designed to analyse multilevel data (see Singer and Willett, 2003). In the present study, repeated measurement occasions were nested within individuals. Moreover, implicit beliefs and perceptions of competence served as time-varying predictors of achievement goal adoption (to explain within- and between-person variability), whereas gender acted as a time-invariant predictor (to explain between-person variance only). A series of models was examined to address the current research questions. In these models, time was centred at wave 1 and the time-varying predictors were grand-mean centred (Singer and Willett, 2003). Model A represented an unconditional means model which was used to assess the amount of between-person and within-person variance in the variables under investigation. The variance estimates produced from this model allow the intra-class correlation coefficient to be calculated. The intra-class correlation coefficient indicates how much of the total variation in the dependent variable is attributable to differences between individuals and provides the justification for using multilevel methods of data analysis. In the present research, the intraclass correlation coefficients were as follows: perceived competence (0.61), incremental beliefs (0.42), entity beliefs (0.36), mastery-approach (0.57), mastery-avoidance (0.28), performance-approach (0.52) and performance-avoidance goals (0.47). These coefficients suggested that significant

amounts of variance remained that could potentially be explained by within- and between-person predictors.

Model Bi represented an unconditional growth model which examined the initial status and linear rate of change for each of the variables under investigation. Model Bii represented a nonlinear growth model which examined whether there were quadratic changes over time in the variables under investigation. Both linear and quadratic representations of time were included in this model.³

Model C represented an uncontrolled effects model. These models separately examined whether gender, incremental beliefs, entity beliefs or perceived competence predicted either initial status or rate of change in students' approach-avoidance achievement goal adoption. In line with theoretical propositions, perceived competence and incremental beliefs were entered as predictors of initial status and rate of change in mastery-approach and avoidance goals. Similarly, perceived competence and entity beliefs were entered as predictors of initial status and rate of change in performance-approach and avoidance goals (Dweck, 1986, 1999; Elliot, 1999). In addition, an uncontrolled effects model examined the effect of gender on the initial status and rate of change in incremental and entity beliefs and perceptions of competence.

The final model (Model D) represented a controlled effects model. These models examined the effects of implicit theories of ability or perceived competence on pupil's initial status and rates of change in approach-avoidance achievement goal adoption while controlling for the effects of pupils' gender.

Model fit was assessed through examination of the deviance statistic of the model ($-2 \log L$) and established whether adding predictors of initial status and the rate of change significantly improved model fit.⁴ In order to present the most parsimonious models, only those main effects and interaction effects for models in which a significant improvement in model fit was observed are reported (Cohen et al., 2003).

Results

Preliminary analysis

Descriptive statistics and internal consistency estimates were computed for each subscale at each wave of measurement and are presented in Table 1 along with the average internal consistency estimates across time. Mean scores for all subscales except for mastery-avoidance and perceived competence showed a decline over the course of the investigation. At wave 1, the observed alpha values for three subscales (mastery-approach, performance-avoidance and incremental beliefs) were below 0.70. At wave 2, only the mastery-approach scale failed to exhibit acceptable levels of internal consistency, whereas all subscales showed acceptable reliability at waves 3 and 4. The average alpha values for each subscale across waves of measurement exceeded 0.70.

Table 1 Descriptive statistics and internal consistency estimates at each wave of measurement

	Range	Wave 1			Wave 2			Wave 3			Wave 4			Average α Waves 1-4
		M	SD	α	M	SD	α	M	SD	α	M	SD	α	
Mastery-approach	1-7	5.51	1.25	.67	5.46	1.20	.63	5.33	1.29	.75	5.31	1.34	.74	.70
Mastery-avoidance	1-7	4.34	1.71	.78	4.34	1.63	.78	4.29	1.53	.75	4.39	1.48	.80	.78
Performance-approach	1-7	4.59	1.71	.83	4.27	1.73	.88	4.06	1.63	.89	3.98	1.69	.88	.87
Performance-avoidance	1-7	5.06	1.53	.62	4.72	1.62	.80	4.57	1.55	.77	4.35	1.71	.83	.76
Perceived competence	1-5	4.01	0.74	.81	3.68	0.85	.85	3.78	0.83	.85	3.64	0.90	.89	.85
Incremental beliefs	1-5	4.18	0.65	.68	4.05	0.71	.72	4.03	0.71	.76	4.03	0.71	.78	.74
Entity beliefs	1-5	2.61	0.85	.71	2.57	0.89	.75	2.49	0.86	.77	2.40	0.75	.71	.74

Main analysis

Temporal patterns

Results from the unconditional growth model (Model Bi) showed that the mean level (intercept) of each variable under investigation was significantly different from zero at the first wave of measurement. Of the four achievement goals, mastery-approach goals (5.50) had the highest intercept and mastery-avoidance goals (4.33) the lowest intercept at wave 1. Incremental beliefs (4.15) were more highly endorsed than entity beliefs (2.62). Examination of the rate of change (slope) of all variables revealed that mastery-approach ($\beta = -0.08, p < .001$), performance-approach ($\beta = -0.21, p < .001$) and performance-avoidance goals ($\beta = -0.24, p < .001$), incremental beliefs ($\beta = -0.05, p < .05$) and entity beliefs ($\beta = -0.07, p < .01$) evidenced significant change over time. Specifically, these variables showed a linear decline in scores across waves 1 to 4. Perceived competence exhibited a nonlinear rate of change over time, which was indicated by a significant improvement in model fit when a quadratic term was added to the model ($\Delta\chi^2(4) = 13.23, p < .05$) (Model Bii). A small decline in perceived competence was observed immediately after transfer to secondary school, followed by a plateau during the remainder of Year 7. Finally, mastery-avoidance goals showed no significant change over time ($\beta = 0.01, p > .05$).

Gender differences in goals, perceptions of competence and ability beliefs

At wave 1, gender (coded 0 = female, 1 = male) was a positive predictor of mastery-approach ($\beta = 0.85, p < .001$), performance-approach ($\beta = 0.94, p < .001$) and performance-avoidance goals ($\beta = 0.46, p < .05$) and perceived competence ($\beta = 0.67, p < .001$). Boys reported higher scores on these variables than girls at wave 1 and at all subsequent measurement occasions. The interaction between gender and quadratic time ($\beta = 0.09, p < .05$) was a significant predictor of perceived competence. As illustrated in Figure 1, perceived competence was predicted to show a linear decline over time for girls, while for boys the trajectory revealed a small decrease on transfer to secondary school with a slower decline during Year 7 and a small increase at the end of the school year. No other main effects, nor interaction effects between gender and time, were observed ($p > .05$).

Predicting change in mastery-approach goal adoption

In Model C, perceptions of competence ($\beta = 0.87, p < .001$) were found to positively predict mastery-approach goal adoption at the start of the research, but had no effect on the rate of change over time ($p > .05$). In contrast, incremental beliefs had no effect on the adoption of mastery-approach goals in Year 6 ($p > .05$), but positively predicted the rate of change in mastery-approach goal adoption across Year 7 ($\beta = 0.20, p < .001$).

We then repeated the analyses but controlling for pupils' gender (Model D). Results are presented in Table 2. For a one-point difference in perceived competence, average initial mastery-approach goal adoption was 0.89 higher; for a one-point difference in incremental beliefs, average rate of change in mastery-approach goal adoption during Year 7 was 0.20 higher.

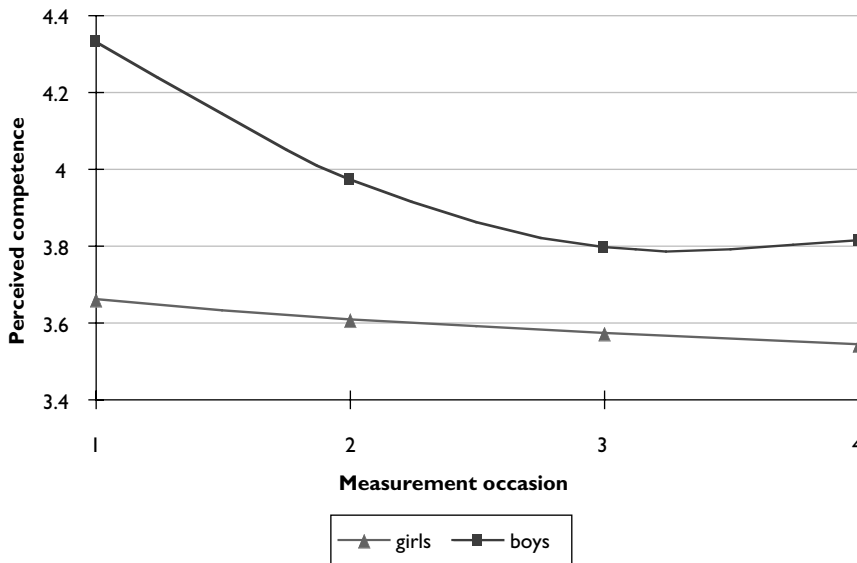


Figure 1 Temporal pattern of perceived competence in PE among boys and girls across the primary–secondary school transition

Table 2 Controlled effects models predicting mastery-approach goal adoption

Fixed effects	Perceived competence		Incremental beliefs			
	Estimate	SE	Estimate	SE		
Initial status	Intercept	5.240	0.076***	Intercept	5.076	0.124***
	PC	0.892	0.061***	Incremental ^a	0.169	0.102
	Gender	0.351	0.106**	Gender	0.807	0.177***
Rate of change				Intercept	0.002	0.043
				Incremental	0.198	0.062***
				Gender	-0.147	0.047**

Note: *Intercept* describes the coefficient for initial status and rate of change in MAp goals for a girl of average perceived competence/incremental beliefs. *PC/Incremental* describes the coefficient for the differential in initial status or rate of change for a one-unit difference in perceived competence/incremental beliefs controlling for the effect of gender. *Gender* describes the coefficient for the differential in initial status and rate of change between girls and boys controlling for the effect of perceived competence/incremental beliefs.

^a In this model, the main effect of incremental beliefs was retained even though it was non-significant because when it was removed there was a significant decline in model fit.

** $p < 0.01$; *** $p < 0.001$.

Predicting mastery-avoidance goal adoption in Year 6

In Model C, perceptions of competence and incremental beliefs had no significant effect on mastery-avoidance goal adoption at the end of Year 6 ($p > .05$). However, as shown in Table 3, when controlling for gender (Model D), perceptions of competence

Table 3 Controlled effects models predicting mastery-avoidance goal adoption

Fixed effects		Perceived competence	
		Estimate	SE
Initial status	Intercept	4.542	0.116***
	PC	0.355	0.093***
	Gender	-0.349	0.167*

Note: *Intercept* describes the coefficient for initial status in MAV goals for a girl of average perceived competence. *PC* describes the coefficient for the differential in initial status for a one-unit difference in perceived competence controlling for the effect of gender. *Gender* describes the coefficient for the differential in initial status between girls and boys controlling for the effect of perceived competence.

* $p < 0.05$; *** $p < 0.001$.

positively predicted mastery-avoidance goal adoption. For a one-point difference in perceived competence, average initial mastery-avoidance goal adoption was 0.36 higher. Controlling for perceived competence, boys reported lower scores on mastery-avoidance goals than girls when at primary school.

Predicting change in performance-approach goal adoption

The addition of either perceptions of competence or entity beliefs to the model predicting performance-approach goals (Model C) revealed that both perceived competence ($\beta = 0.80$, $p < .001$) and entity beliefs ($\beta = 0.24$, $p < .05$) predicted performance-approach goal adoption in Year 6. However, they had no effect on the rate of change across Year 7 ($p > .05$). When controlling for gender (Model D), for a one-point difference in perceived competence, average initial performance-approach goal adoption was 0.77 higher; for a one-point difference in entity beliefs, average rate of change in performance-approach goal adoption during Year 7 was 0.33 higher (see Table 4).

Table 4 Controlled effects models predicting performance-approach goal adoption

Fixed effects		Perceived competence		Entity beliefs		
		Estimate	SE	Estimate	SE	
Initial status	Intercept	4.110	0.149***	Intercept	4.047	0.164***
	PC	0.767	0.091***	Entity	0.331	0.087***
	Gender	0.595	0.195**	Gender	0.951	0.211***
Rate of change	Intercept	-0.131	0.047**	Intercept	-0.192	0.049***

Note: *Intercept* describes the coefficient for initial status and rate of change in PAp goals for a girl of average perceived competence/entity beliefs. *PC/Entity* describes the coefficient for the differential in initial status for a one-unit difference in perceived competence/entity beliefs controlling for the effect of gender. *Gender* describes the coefficient for the differential in initial status between girls and boys controlling for the effect of perceived competence/entity beliefs.

** $p < 0.01$; *** $p < 0.001$.

Predicting change in performance-avoidance goal adoption

In Model C, perceptions of competence ($\beta = 0.51, p < .001$) were found to predict performance-avoidance goal adoption at the start of the research, but had no effect on the rate of change ($p > .05$). In contrast, entity beliefs had no significant effect on the adoption of performance-avoidance goals in Year 6 ($p > .05$), but positively predicted the rate of change in performance-avoidance goal adoption across Year 7 ($\beta = 0.13, p < .05$). When controlling for gender (Model D), for a one-point difference in perceived competence, average initial performance-avoidance goal adoption was 0.61 higher; for a one-point difference in entity beliefs, average rate of change in performance-avoidance goal adoption during Year 7 was 0.13 higher (see Table 5).

Discussion

Physical education provides a unique setting in the school curriculum for examining achievement motivation. The focus on physical competence as well as cognitive competence sets it apart from many other subjects in the school curriculum. The striving for competence or striving to avoid incompetence is pertinent in PE as the abilities of pupils are unambiguous, constantly on public display and can be easily and regularly evaluated by the self and others. The present research sought to identify temporal patterns among key achievement motivation variables in PE across the transfer from primary to secondary school. The predictive utility of implicit theories of ability and perceived competence in explaining approach-avoidance achievement goal adoption over this transitional education period were examined. Finally, we sought to determine the influence of gender on these motivational processes.

Table 5 Controlled effects models predicting performance-avoidance goal adoption

Fixed effects		Perceived competence		Entity beliefs		
		Estimate	SE	Estimate	SE	
Initial status	Intercept	4.913	0.115***	Intercept	4.698	0.149***
	PC	0.614	0.087***	Entity ^a	0.121	0.115
					Gender	0.626
Rate of change	Intercept	-0.270	0.056***	Intercept	-0.216	0.046***
	Gender	0.208	0.073**	Entity	0.129	0.059*

Note: *Intercept* describes the coefficient for initial status and rate of change in PAV goals for a girl of average perceived competence/entity beliefs. *PC/Entity* describes the coefficient for the differential in initial status and rate of change for a one-unit difference in perceived competence/entity beliefs controlling for the effect of gender. *Gender* describes the coefficient for the differential in initial status and rate of change between girls and boys controlling for the effect of perceived competence/entity beliefs.

^a In this model the main effect of entity beliefs was retained even though it was non-significant because when it was removed there was a significant decline in model fit.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Temporal patterns of achievement goals, beliefs and perceived competence

All achievement goals as conceptualized by the 2×2 framework (Elliot, 1999, 2005; Elliot and McGregor, 2001) were endorsed in the present sample as mean scores at each measurement occasion were above the scale mid-point. However, consistent with previous research in the physical domain, mastery-approach goals were the most strongly endorsed on all four occasions (Conroy and Elliot, 2004; Conroy et al., 2003; Wang et al., 2007).

The present research provides the first insight into the temporal patterning of approach-avoidance achievement goal adoption in the PE context from primary to secondary school. Following the transfer to secondary school, there was a linear decline in the adoption of mastery-approach, performance-approach and performance-avoidance goals during Year 7. The analysis also revealed that the adoption of mastery-avoidance goals was stable over the study period. In PE, young children's concern with, and their striving to avoid, self- and task-referenced failure appears to be persistent, at least during the period studied in the current investigation. This may be of concern to teachers of PE as it shows a focus of their students on incompetence and failure. The salience of mastery-avoidance goals in PE across the primary-secondary transition supports previous cross-sectional research on adolescents in the physical domain (Conroy et al., 2003; Wang et al., 2007). Initial studies suggest that young people may experience motivational difficulties as a result of pursuing mastery-avoidance goals (e.g. Conroy et al., 2006).

In the present study, a decline in both types of performance goals was observed over the transition from primary to secondary school. This contrasts with evidence in the educational domain which examined dichotomous achievement goals over a transition (Anderman and Anderman, 1999; Anderman and Midgley, 1997). Further research which examines pupils' motivation in Year 8 of secondary school and beyond is needed to establish whether this decline is temporary. Moreover, this research should identify the situational predictors of pupils' approach-avoidance performance goal adoption, which were unexplored in the present study.

At all four measurement occasions, individuals in the current sample held the view that sport ability can be improved and developed through learning more strongly than the view that sport ability is a fixed, stable quantity. This finding is consistent with previous research in the physical domain (Biddle et al., 2003; Cury et al., 2002). The temporal analysis of implicit theories of ability revealed a linear decline in the endorsement of incremental and entity beliefs across the primary-secondary transition. Future work needs to identify not only the causal predictors of such changes, but also their motivational ramifications for young people in PE.

Mean scores for perceptions of competence in the present sample were above the scale mid-point at all four measurement occasions, although highest when pupils were at primary school. A nonlinear trajectory emerged for perceptions of competence across the primary-secondary school transition for the total sample. Perceptions of

competence showed a decline when transferring to secondary school, and continued to decline at a slower rate in the early part of Year 7 before reaching a plateau at the end of the year. When pupils transfer to secondary school, they become members of a new and larger reference group, in which they make judgements about their ability relative to others. The addition of new members to this reference group alters the standard for being one of the best at PE, which may make pupils feel less able than when based in primary school classes. The transfer to secondary school also results in the pupils being taught by specialist PE teachers, rather than generalist primary teachers. The PE teachers may promote new criteria or standards by which individuals judge their competence. Pupils may feel less able to meet the new standards immediately after transfer and so feel less competent than when participating in PE at primary school. Pupils may also be introduced to a variety of new activities which they are less confident of mastering. These situational characteristics may serve to reduce perceptions of competence at the start of secondary school.

However, as pupils progress through Year 7, they complete additional units of work which build on the tasks and skills learnt at the beginning of the year, and so may feel more able to meet the demands of PE. Pupils have also established themselves within their new, larger reference groups and adjusted to the standards of competence promoted by PE teachers. These aspects may halt the decline in perceptions of competence throughout Year 7.

Predicting approach-avoidance achievement goals

Consistent with theoretical predictions, individuals who endorsed the view that ability in PE is a fixed, stable quantity were more likely, initially, to adopt goals focused on normative competence (Dweck, 1986, 1999). In addition, over time, higher entity beliefs were positively associated with performance-avoidance goal adoption. Interventions that serve to minimize the development of entity beliefs among pupils in PE may counteract potential concern with demonstrating normative incompetence during Year 7. Consequently, pupils will be less likely to experience the negative outcomes linked with this form of achievement striving, i.e. low levels of performance and intrinsic motivation, high levels of anxiety and worry (Elliot and Church, 1997; Elliot and Conroy, 2005; Elliot and McGregor, 2001).

Incremental beliefs were shown to predict increases in mastery-approach goals over the course of the study. In other words, endorsing the view that ability can be improved and developed through learning led to an increased adoption, over time, of goals which focused on developing task- and/or self-referenced competence. In accordance with previous research in which mastery-approach goals were associated with the most positive outcomes in achievement situations (e.g. persistence, effort, intrinsic motivation, self-regulated learning; Elliot and Church, 1997; Elliot and McGregor, 2001; Middleton and Midgley, 1997), the present work adds further support to the importance of developing and sustaining in pupils a belief that physical skills can be acquired and improved through learning and practice.

In line with theoretical propositions and previous research in the physical domain, perceptions of competence were positively associated with both types of approach goals (Cury et al., 2002; Wang et al., 2007). However, counter to theoretical propositions (Elliot, 1999, 2005), performance-avoidance goals were positively related with perceptions of competence. Previous research in the PE context has also found this relationship to be positive (Wang et al., 2007). The ability of young children to discern between the subtleties of performance-approach and performance-avoidance achievement striving may account for this finding (see Urdan and Mestas, 2006). Further research, adopting both quantitative and qualitative approaches, is needed to ascertain children's and adolescents' comprehension of these constructs in PE.

Although perceived competence was positively linked with mastery-approach, performance-approach and performance-avoidance goals on all measurement occasions, there was no effect on changes in goal adoption. It would appear that changes in perceived competence have little impact on the dynamics of achievement goal striving among pupils starting secondary school. Based on present results, interventions in the physical domain that wish to increase pupils' adoption of mastery-approach goals may be more effective if they target other antecedents, e.g. incremental ability beliefs.

The influence of gender

In the present study, uncontrolled effects models revealed that gender was not associated with variability in incremental and entity beliefs about ability, either in primary school, or during the first year of secondary school. However, gender differences in perceived competence, along with mastery-approach, performance-approach and performance-avoidance goal adoption, appeared to be established by the time pupils left primary school, and these differences remained during Year 7. This suggests that future research designed to capture changes in children's sense of competence and goal adoption in PE (and associated predictors) should be conducted during the primary school years. We need to ascertain the individual and environmental characteristics that lead boys to feel more competent in primary school PE class and report greater striving to demonstrate self- and normatively referenced competence (and avoid normatively referenced incompetence).

In line with previous literature in the physical domain, boys reported higher perceptions of competence than girls at all measurement occasions (Eccles et al., 1993b; Marsh, 1998). The trajectory for boys evidenced a small decline over the transfer to secondary school, a slower decline in the early part of Year 7 and a small increase at the end of Year 7. This is encouraging as boys' perceptions of competence appeared to recover over the course of Year 7 from the decline observed immediately after transfer to secondary school. For girls, it would seem that perceptions of competence exhibit a linear decline. Further work is necessary to determine if the decline in girls' perceived competence continues through Year 8.

The significant findings relating antecedents to goals in uncontrolled effects models remained when controlling for gender, e.g. the effects of perceived

competence on adoption of both types of approach goals in Year 6 and the effects of entity beliefs on the rate of change over time in performance-avoidance goals. However, some interesting insights emerged. For example, when controlling for perceived competence, gender appeared to be associated with mastery-avoidance goals (in favour of girls). Controlling for gender, perceived competence positively predicted initial mastery-avoidance goal adoption. Moreover, although initial performance-avoidance goal adoption was predicted by perceived competence, change in performance-avoidance goal scores over the course of the study was explained by gender. Controlling for perceived competence, boys were estimated to report greater performance-avoidance goal adoption over time than girls.

In conclusion, the present research highlights some important changes in motivation in PE classes as children make the transition from primary to secondary school. These changes appear, on the whole, to be suggestive of less adaptive motivation profiles, e.g. reduced competence perceptions, lowered incremental views about ability and lowered mastery-approach goal adoption. However, we also found a reduction in performance-avoidance goal striving over time, which could arguably be interpreted as adaptive. Longer term longitudinal research, involving multiple primary and secondary schools, is required to enhance the generalizability of results, and in particular, to investigate important environmental predictors of achievement motivation at the teacher, class and school levels. The focus of the current study was restricted to the influence of personal antecedents impacting on goal pursuit. Future studies should determine the combined influence of implicit ability beliefs and competence perceptions. Work is also needed to identify the cognitive, affective and behavioural outcomes linked to changing motivational processes. We would especially recommend that research efforts are pursued to delineate the temporal patterning of pupils' motivational perceptions and outcomes in PE over their entire school careers. Present findings suggest, for example, that the effects of perceived competence on goal pursuit may occur earlier in pupils' schooling than the effects of implicit ability beliefs. Unlike perceived competence, the influence of incremental views of ability on mastery-approach goals, and entity views on performance-avoidance goals, appeared to emerge during the first year of secondary school rather than during primary school. These empirical findings require verification in larger samples, but ultimately may inform the timing of targeted interventions. Such endeavours will collectively assist primary teachers and specialist physical educators to optimize motivation in PE across the transition from primary to secondary school.

Notes

- 1 In the present paper, the phrase 'primary to secondary school' will be used throughout, even when referring to research based in the United States on the transfer from elementary to junior high school.
- 2 Confirmatory factor analyses were also conducted at each time point on the scales measuring achievement goals, beliefs and perceived competence but results are not reported here. The findings supported previous research in the physical domain which

- has found the AGQ-S and CNAAQ-2 to be valid and reliable measures of approach-avoidance achievement goals and implicit theories of ability respectively (Biddle et al., 2003; Conroy et al., 2003). Given that we specifically designed perceived competence items for the present study, we conducted CFA to establish reliability and factorial validity of the perceived competence scale. Results supported a one factor model (e.g. Time 1: $\chi^2 = 1.97$ (6df), NNFI = 1.073, CFI = 1.000, SRMR = .017, RMSEA = .000, CI = .000–.037). Factor loadings across all time points ranged from .514–.847. Further details can be obtained from the first author.
- 3 Only perceived competence exhibited nonlinear change over time. Model C for perceived competence therefore developed from the unconditional nonlinear growth model. Model C for all other variables developed from the unconditional linear growth model.
 - 4 Details of the deviancy statistics pertaining to model modifications can be obtained from the first author.

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Résumé

La motivation en Education Physique à travers la transition premier-second degré

Le but de cette étude était d'analyser les modèles cognitifs des buts d'accomplissement et d'évitement, des théories implicites des habiletés et du sentiment de compétence en éducation physique à travers la transition premier-second degré. Nous avons également

évalué la pertinence des prédictions à partir des théories implicites et de la compétence perçue au regard de l'adoption de buts d'accomplissement. Nous avons enfin déterminé l'influence relative du genre sur les modèles cognitifs et les relations avec les buts précédents. Les croyances initiales et leur évolution, la compétence perçue et les buts ont été mesurés auprès de cent quarante élèves (âge moyen au début d'étude = 11.37 ans, SD = .28) lors de quatre tests au cours d'une période de 12 mois. Les buts de maîtrise, de performance et d'évitement de la performance, ainsi que les croyances initiales et leur évolution, ont connu un déclin continu tout au long de l'étude. L'étude des buts d'évitement de la maîtrise n'a pas révélé de changement significatif. Alors que la compétence perçue chez les filles est caractérisée par une diminution linéaire, elle évolue selon une trajectoire curviligne chez les garçons. La compétence perçue a été identifiée comme un indicateur de prédiction des niveaux initiaux des buts de maîtrise, de performance et d'évitement de la performance, sans pour autant permettre d'anticiper leur évolution. L'évolution des croyances a été identifiée comme un indicateur de l'évolution dans l'adoption de buts de maîtrise, alors que les croyances globales ont été associées à l'évolution des buts d'évitement de la performance et aux mesures initiales des buts de performance. Peu de différences entre les filles et les garçons ont été observées dans les relations entre ces buts.

Resumem

La motivación en la educación física durante la transición de la escuela primaria a la secundaria.

La finalidad de este estudio ha sido analizar los modelos o patrones temporales de acercamiento o evitación en el logro de metas, las teorías de capacidad y percepción de la competencia que están implícitas en la Educación Física a lo largo de la transición desde la escuela primaria a la secundaria. Hemos evaluado también el valor predictivo de las teorías implícitas y de la competencia percibida en relación con la adopción del objetivo de éxito, y determinado la influencia moderadora del género sobre los patrones temporales y las relaciones con los objetivos precedentes. Ciento cuarenta alumnos (edad media al comienzo del estudio 11.37 años, desv. .28) completaron las medidas de entidad y creencias incrementales, competencia percibida y objetivos alcanzados, en cuatro ocasiones, durante un período de 12 meses. Las metas de aproximación al dominio, aproximación al rendimiento y evitación del rendimiento, así como la entidad y las creencias incrementales, experimentaron un descenso lineal a lo largo del tiempo. Los objetivos de evitación del dominio no mostraron cambios significativos. Las chicas mostraron un descenso lineal en la competencia percibida, mientras que en los chicos la trayectoria fue curvilínea. Las percepciones de competencia predijeron las marcas iniciales, pero no la tasa de cambio, en las metas de aproximación al dominio y en ambos tipos de metas de rendimiento. Las creencias incrementales predijeron tasas de cambio en la adopción de metas de aproximación al dominio, mientras que las creencias de entidad se asociaron con cambios en las metas de evitación del rendimiento y en las marcas iniciales de las metas aproximación al rendimiento. Se observaron pequeñas diferencias entre chicas y chicos en estas relaciones antecedente-meta.

Zusammenfassung

Motivation im Sportunterricht in Grund- und Mittelschule

Ziel dieser Studie war es, zeitliche Muster der Annäherung-Vermeidung von Leistungszielen, implizite Theorien von Fähigkeiten und wahrgenommener Kompetenz im Sportunterricht während des Übergangs von der Grundschule zur Mittelschule zu untersuchen. Außerdem haben wir den Vorhersagenutzen der impliziten Theorien hinsichtlich der Fähigkeiten und wahrgenommenen Kompetenzen in Bezug auf die Annahme eines Leistungsziels bewertet und bestimmten den mäßigenden Einfluss des Geschlechts auf zeitliche Muster und die vorangegangenen Zielbeziehungen. Einhundertvierzig Schüler (Durchschnittsalter zu Beginn der Studie = 11,37 Jahre, $SD=0,28$) haben bei vier Gelegenheiten innerhalb eines zwölfmonatigen Zeitrahmens die Erfassung der feststehenden und schrittweise sich verbessernden Überzeugung, der wahrgenommenen Kompetenzen und Ziele vervollständigt. Die Bewältigungsmotivation, die Leistungsmotivation und der Leistungs-Vermeidungskonflikt, wie auch der Datensatz und der zunehmende Glauben zeigten einen klaren Abfall über die Zeit. Die Bewältigungs-Vermeidungsziele zeigten keine signifikante Veränderung. Mädchen zeigten eine lineare Verringerung in ihrer selbst wahrgenommenen Kompetenz. Im Gegensatz zu den Jungen – hier war die Kurve gekrümmt. Die wahrgenommenen eigenen Kompetenzen konnten zwar die Eingangswerte, jedoch nicht den Grad der Veränderung des Bewältigungsansatzes und beider Typen der Leistungszielsetzungen vorhersagen. Die vorhergesagte Veränderungsrate bei den Bewältigungsmotivationszielen bestätigte sich, während das eigene Zutrauen ('entity beliefs') in einem Zusammenhang mit Veränderungen beim Annäherungs-Vermeidungskonflikt und der anfängliche Spielstand mit dem Leistungsprinzip standen. Es wurden begrenzt Unterschiede zwischen Jungen und Mädchen bei den vorangegangenen Zielbeziehungen beobachtet.

Victoria Warburton is with the School of Sport and Exercise Sciences at Loughborough University, UK. [email: V.E.Warburton@lboro.ac.uk]

Dr Christopher Spray is Senior Lecturer in the School of Sport and Exercise Sciences at Loughborough University, UK.

Address for correspondence: Christopher M. Spray, School of Sport and Exercise Sciences, Loughborough, Loughborough University, Leicestershire. LE11 3TU, UK. [email: C.M.Spray@lboro.ac.uk]
