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# Antecedents of approach-avoidance achievement goal adoption: An analysis of two physical education activities

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## Abstract

The purpose of this study was to determine the relationship between implicit theories of ability and competence perceptions to changes in approach-avoidance goal adoption in two specific activities in the curriculum. Four hundred and thirty pupils, aged 11–15 years, completed measures of approach-avoidance goals, perceived competence and implicit theories of ability at the start and end of a tennis or cricket unit of work in physical education (PE). In both tennis and cricket, most of the variance in the variables under investigation was due to differences between pupils and not to differences between classes. Controlling for prior approach-avoidance goal adoption, incremental beliefs predicted change in mastery-approach goal adoption and perceptions of competence predicted change in performance-approach goal adoption over the unit of work in both tennis and cricket. Differences in the predictive pattern of antecedents to changes in goal adoption emerged between activities.

## Keywords

Approach-avoidance goals, physical education, prospective study

The continued concern over declining physical activity levels and increased prevalence of adolescent obesity highlights the importance of understanding the motivational processes that direct young people's physical activity behaviour, particularly during the adolescent years (Chief Medical Officers of England, Scotland, Wales, and Northern Ireland, 2011; Department of Health, 2004). Consequently, the significance of PE as a physical activity context is underscored through

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its unique position to gain access to all young people regardless of their physical ability. Furthermore, research has shown PE to play a role in influencing young people's attitudes towards physical activity and their participation beyond school (Biddle, 2001; Hagger et al., 2003).

Over the years, PE has been a key context for motivation research which has drawn upon influential theoretical perspectives such as the achievement goal approach to help understand and explain young people's physical activity behaviour and experiences (see Ames, 1984; Dweck and Elliott, 1983; Elliot, 1999, 2005; Nicholls, 1989). The recent theorising in this approach places competence, both its definition and valence, as the conceptual centrepiece of motivation (see Elliot, 1999, 2005 for reviews). The theoretical propositions of Elliot (Elliot, 1999, 2005) allow for a more refined conceptualisation of achievement goals than that afforded in previous achievement goal approaches (Dweck, 1986, 1990; Nicholls, 1984, 1989).

In his writing, Elliot conceptualises achievement goals as representing purely the aim of achievement behaviour, i.e. to demonstrate/develop competence or to avoid demonstrating/developing incompetence. Elliot (1999, 2005) proposes that the specific aims of achievement behaviour, as reflected in an individual's achievement goal adoption, can be underpinned by a host of reasons/antecedents which, when combined with the achievement goal, form a 'goal complex' (see Elliot and Thrash, 2001). It is this goal complex that provides the greatest understanding of an individual's motivational regulation by precisely accounting for both the energisation and direction of achievement behaviour. Elliot and colleagues have identified four achievement goals in the 2×2 achievement goal framework which each reflect a different definition and valence of competence (Elliot and McGregor, 2001). Pupils in PE may therefore strive to do their best on an activity in the PE lesson and try to develop their skills from the last time (mastery-approach; MAP goal). They may strive to avoid being unable to do the activity as well as they feel they can or could do before (mastery-avoidance; MAV goal). They may aim to show they are one of the best in the class at an activity (performance-approach; PAp goal) or aim to avoid being worse at the activity than their classmates (performance-avoidance; PAV goal). The role of these four achievement goals in regulating behaviour in achievement situations is outlined in the hierarchical model of approach and avoidance achievement motivation (Elliot, 1999; Elliot and Church, 1997).

In this model, approach-avoidance achievement goals are proposed to mediate the effect of antecedents on achievement-relevant processes and outcomes. In his theorising, Elliot (1999) identifies a range of variables which are thought to differentially predict approach-avoidance achievement goal adoption. Several of these antecedents have strong roots in the extant achievement motivation literature: for example, the motive dispositions of need for achievement and fear of failure, implicit theories of ability, competence perceptions and perceptions of the motivational climate. In the present research, we were concerned with two of the antecedents, namely, perceived competence and implicit theories of ability.

Elliot (1999, 2005) proposes that an entity theory of ability (in which ability is viewed as a fixed immutable quality) will be associated with the adoption of both PAp and PAV goals, while an incremental theory of ability (in which ability is viewed as malleable and improvable) will be associated with the adoption of both MAP and MAV goals. Furthermore, high perceptions of competence are proposed to be associated with the adoption of MAP and PAp goals, and low perceptions of competence with the adoption of MAV and PAV goals. Although these propositions have been largely supported across achievement domains (e.g. Cury et al., 2002; Elliot and Church, 1997; Ommundsen, 2006), an emerging research finding in the PE context is that perceptions of competence have demonstrated positive relations with all four goals (Wang et al., 2007; Warburton and Spray, 2008).

### *The physical education curriculum and motivation*

Much of the research conducted in PE has focused on motivation at the contextual level and identified predictors and correlates of achievement goal strivings relating to the PE setting in general (e.g. Ommundsen, 2001a, 2001b, 2004; Spray and Warburton, 2011; Warburton and Spray, 2008, 2009). However, PE programmes incorporate a wide variety of activities which place different demands on pupils. Examining motivation at the contextual level may mask differences in the motivational profile of specific activities which, in turn, may have implications for the way that those activities are taught. A notable exception to this trend, however, is the research by Goudas and colleagues (Goudas et al., 1994) which examined pupils' motivation in two activities, i.e. football/netball and gymnastics, within a school PE programme. Each activity had a different motivational profile which suggested that a general conceptualisation of motivation in PE may be inappropriate. In addition, although individuals are thought to hold different implicit theories in different domains (Dweck, 1999), research in the physical domain has found that pupils differentially endorsed implicit theories of ability across activities within PE (Spray and Warburton, 2003). Specifically, in gymnastic activities pupils were more likely to endorse entity beliefs whereas when participating in games activities, i.e. football or netball, the same pupils were more likely to endorse incremental beliefs. Differential beliefs may require teachers to employ activity specific teaching strategies to ensure that pupils have a positive motivational experience in each activity.

In England, the key stage 3 National Curriculum for PE (NCPE: Qualification and Curriculum Authority (QCA), 2007) identifies the PE programme of study for pupils aged 11–14 years. This programme of study sets out specific guidelines regarding the content to be taught with pupils' learning incorporating a range of different activities, such as games, dance, gymnastic, athletics, fitness and health, swimming and outdoor and adventurous activities. The variety of activities that comprise a pupil's PE programme during this key stage places different demands on their cognitive and motor skills. Some activities rely more on technical and co-ordination skills, i.e. football, netball, tennis, cricket, while other activities, such as athletics and gymnastics, rely more on physical skills such as strength, speed and flexibility. Even within activities, particularly games activities, the different positions in the team, such as goalkeeper, defender, attacker, may require different cognitive and motor skill proficiencies.

Furthermore, the different requirements of the activities within a PE programme may elicit different motivational profiles within the same pupil. For example, a pupil who excels (high PC) at games activities may believe that they can work at and improve (incremental belief) their games ability and as a result strive to master the skills and tasks they are set (MAP goal). However, that same pupil may not be so good (low PC) at gymnastics and may believe that to succeed in gymnastics requires an innate natural ability (entity belief). Therefore, in gymnastics lessons the pupil may strive not to be one of the worst in the class (PAV goal). As such, pupils, when asked about their PE-level achievement goals, beliefs and competence perceptions may think about the activity they enjoy and excel in, and report goals, beliefs and competency perceptions which are influenced unduly by such activities. Consequently, examining specific activities will provide an additional test of the theoretical propositions underlying pupil's approach-avoidance achievement motivation and enhance our understanding of the motivational processes operating in the PE setting.

## *The present study*

The study sought to provide a test of the theoretical propositions outlined in the hierarchical model of approach and avoidance achievement motivation. The purpose of this study was to examine the predictive utility of implicit theories of ability and perceptions of competence to pupils' approach-avoidance achievement goal adoption in two activities taught within the key stage 3 NCPE. Specifically, these relationships were examined over the course of a cricket and a tennis unit of work, while controlling for pupils' prior approach-avoidance achievement goal adoption. The focus on change in achievement goal adoption provided a more rigorous examination of the theoretical propositions than that afforded by cross-sectional research which is typical of the achievement goal literature (Biddle et al., 2003b; Harwood et al., 2008).

In line with theoretical propositions and previous research (Cury et al., 2002, 2006; Dweck, 1999; Elliot, 1999), it was expected that higher perceptions of competence at the start of the unit of work (Time 1) would predict MAP and PAp goals at the end of the unit of work (Time 2). Low perceptions of competence at the start of the unit of work were anticipated to predict MAV and PAV goals at the end of the unit. Furthermore, it was expected that Time 1 incremental beliefs would predict MAP and MAV achievement goals at the end of the unit of work, whereas endorsing entity beliefs at the start of the unit of work would predict Time 2 PAp and PAV goals. Finally, the multilevel structure of the data allowed the examination of variance components associated with pupil and class effects on the variables under investigation. Specifically, we examined how much of the variance in Time 1 and Time 2 scores on the variables under investigation, and the change in these scores over the course of the unit of work in tennis or cricket, was attributable to class effects.

## **Method**

### *Participants and procedures*

Male ( $n=227$ ) and female ( $n=203$ ) participants from 14 physical education classes in Years 7, 8 and 9 at a state comprehensive high school in East England, UK participated in the research. Participants were aged between 11–15 years (mean age ( $M$ )=13.16, standard deviation ( $SD$ )=0.86 years). Although ethnicity data were not formally recorded, the vast majority of pupils were white. Pupils were taught in single-sex ability-streamed classes for the activities. During the weeks in which data were collected, pupils were participating in one lesson per week of either tennis (females) or cricket (males) and one lesson of athletics. Of the 14 PE groups, six were participating in cricket and eight in tennis, with a total of four teachers teaching all 14 groups. Two male teachers taught all of the cricket groups, with one teacher teaching four of the groups studied. Two female teachers taught all eight tennis groups with one teacher teaching six of the tennis groups studied. Procedures followed the ethical guidelines of the British Psychological Society and were approved by the ethical advisory committee at the authors' institution. Administration of questionnaires took place prior to a normal curriculum PE lesson and participants had completed two lessons of their unit of work in the activity prior to the first data collection (Time 1). Participants were given an explanation of how to complete each section of the questionnaire and were provided with the opportunity to ask questions. They were instructed to think about the specific activity they were participating in during their PE lesson at the time of questionnaire administration and not the PE context 'in general'. All participants were assured that the information collected would remain confidential. The questionnaire took approximately 15 minutes to complete. These procedures were repeated during the last lesson of the unit of work in each activity (Time 2).

## Measures

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

*Personal details.* Three items relating to PE class, date of birth and gender comprised this section of the questionnaire. This information allowed participants to be matched at the second measurement occasion.

*Goal adoption.* Goal adoption was assessed using the Achievement Goals Questionnaire for Sport (AGQ-S; Conroy et al., 2003). Pupils responded to 12 items on a seven-point Likert scale that ranged from 'not at all like me' (1) to 'very much like me' (7). Three items assessed each type of goal. The individual item stem of 'In this (tennis) (cricket) unit of work what are your main concerns' preceded the items. Sample items included: 'It is important for me to perform as well as I possibly can' (MAp); 'I am often concerned that I may not perform as well as I can perform' (MAv); 'It is important to me to do well compared to others' (PAp); 'I just want to avoid performing worse than others' (PAv).

*Implicit theories of ability.* Pupils' conceptions of the nature of ability in sport and PE were assessed using an adapted version of the Conceptions of the Nature of Athletic Ability Questionnaire version 2 (CNAAQ-2; Biddle et al., 2003a). 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 included: 'It is difficult to change how good you are at tennis/cricket' (Stable); 'To be good at tennis/cricket you need to be naturally gifted' (Gift); 'You need to learn and to work hard to be good at tennis/cricket' (Learning); 'If you put enough effort into it, you will always get better at tennis/cricket' (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 tennis/cricket'; 'I can perform tasks and skills in tennis/cricket better than I used to'; and 'I am better at tennis/cricket than others in my class'.

## Data analysis

The extent and pattern of missing data were examined to see if any associations were evident with the substantive variables under investigation. Data were missing as a consequence of normal absences on the days of questionnaire administration. Logistic regression analyses revealed no significant associations between missing data and scores on implicit beliefs, perceived competence or goals. The final sample was comprised of 301 students (154 males,  $M=13.26$ ,  $SD=0.86$  years; 147 females,  $M=13.00$ ,  $SD=0.85$  years), for whom data were collected and matched at both measurement occasions.

Much of the research in this area has, to date, utilised statistical methods of analysis and research designs that fail to take into account the nested structure of the data. Pupils within the same PE class may be more similar to each other than to pupils from a different class (Marsh et al.,

2006). The nested structure therefore violates the assumption of independence needed for the statistical analyses that have typically been used in previous research, such as structural equation modelling and multiple regression. In order to account for the nested structure of data within the PE setting and to avoid the likelihood of a Type I error (Marsh et al., 2006), all analyses in the present study were carried out using MLwiN (version 2.0, Rasbash et al., 2005) which is specifically designed to analyse multilevel data and can account for missing data, unstructured data sets, and does not require the assumption of sphericity in the data. In the present study, individuals were nested in PE classes, therefore two levels were identified; pupil (level 1) and PE class (level 2). This allowed variance at both the individual and class level to be examined.

For each activity, two models were examined to address the current research questions. Model A represented an unconditional means model which was used to assess the amount of variance in the dependent variables under investigation which can be independently attributed to individual or class effects. The variance estimates produced from this model allowed the intra-class correlation coefficient to be calculated. The intra-class correlation coefficient indicated how much of the total variation in the dependent variable was attributable to differences between PE classes.

The second model (Model B) represented a conditional model which separately examined the predictive utility of T1 implicit theories of ability or perceived competence to pupils' T2 approach-avoidance achievement goal adoption when controlling for T1 approach-avoidance achievement goal scores. In line with theoretical propositions, perceived competence and incremental beliefs were entered as predictors of MAP and MAV goals. Similarly, perceived competence and entity beliefs were entered as predictors of PAP and PAV goals (Dweck, 1999; Elliot, 1999).

## Results

### *Descriptive statistics*

Descriptive statistics were computed for each subscale at T1 and T2 for each activity and are presented in Table 1. With the exception of entity beliefs in tennis, all mean scores were above the scale mid-point at both time points. For both tennis and cricket, mean scores were lower at T2 than at T1 for incremental beliefs, MAP and both PAP and PAV goals. MAP goals were the most strongly endorsed in both activities, while MAV goals were the least endorsed in cricket and PAP goals the least endorsed in tennis.

### *Class and individual effects: Variance component analysis*

For each of the variables under investigation the variance components and intra-class correlations from Model A were examined and are reported in Table 2 (cricket) and Table 3 (tennis). In both activities, at T1 and T2, the variance components for pupil effects were significant and larger than those for class effects which were non-significant. At both time points, the intra-class correlation coefficients for all variables in each activity were very low (Hox, 2002). Most of the variance in the variables under investigation was due to differences between pupils and not to differences between classes. This suggests that pupils in the present study within the same PE class were not more similar to each other than to pupils from a different class.

**Table 1.** Means and standard deviations for time 1 and time 2 for each activity.

	Range	Cricket (n=154)				Tennis (n=147)			
		Time 1		Time 2		Time 1		Time 2	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
MAp goals	1–7	5.32	1.17	5.05	1.31	5.12	1.13	4.73	1.30
MAv goals	1–7	4.29	1.46	4.27	1.48	4.59	1.41	4.42	1.42
PAP goals	1–7	4.61	1.46	4.50	1.51	4.15	1.47	3.87	1.38
PAv goals	1–7	4.82	1.36	4.50	1.52	4.56	1.41	4.21	1.43
Incremental beliefs	1–5	3.84	0.75	3.60	0.75	3.96	0.73	3.88	0.74
Entity beliefs	1–5	2.66	0.81	2.85	0.89	2.47	0.75	2.46	0.83
Perceived competence	1–5	3.32	0.96	3.33	0.86	3.11	0.77	3.25	0.70

MAp: mastery-approach; MAv: mastery-avoidance; PAP: performance-approach; PAv: performance-avoidance; SD: standard deviation.

### *The effect of ability beliefs and perceived competence on achievement goal adoption*

Tables 4 and 5 present the results of Model B for both tennis and cricket. The models separately examined the predictive utility of T1 implicit theories of ability or T1 perceived competence to T2 approach-avoidance achievement goal adoption when controlling for goal adoption at T1.

### *Predicting change in MAp goal adoption*

In cricket, when controlling for T1 MAp goal adoption, for every point change in T1 incremental beliefs or T1 perceived competence, the score for T2 MAp goals is predicted to increase by 0.421 and 0.481 points, respectively. In tennis, when controlling for T1 MAp goal adoption, for every point change in T1 incremental beliefs, the score for T2 MAp goals is predicted to increase by 0.375 points. However, for every point change in T1 perceived competence, there was no significant change in T2 MAp scores. In both activities, pupils who endorsed the view that ability can be improved and developed through learning at the start of the unit of work were more likely to report adopting the adaptive achievement striving of focusing on self-referenced competence and mastery of tasks (i.e. MAp goals) at the end of the unit of work. It was only in cricket, however, that pupils with higher levels of perceived competence at the start of the unit of work reported greater adoption of self-referenced achievement goals at the end of the unit of work.

### *Predicting change in MAv goal adoption*

In cricket, when controlling for T1 MAv goal adoption, for every point change in T1 perceived competence, the score for T2 MAv goals is predicted to increase by 0.233 points. However, for every point change in T1 incremental beliefs, there was no significant change in T2 MAv scores. In tennis, when controlling for T1 MAv goal adoption, for every point change in T1 incremental beliefs, the score for T2 MAv goals is predicted to increase by 0.485 points. However, for every point change in T1 perceived competence, there was no significant change in T2 MAv scores. Therefore, pupils in tennis who endorsed the view that ability can be improved and developed through learning at the start of the unit of work were more likely to report adopting achievement



**Table 2.** Variance components attributable to different classes and individual pupils on all variables – cricket.

Outcome variable	T1		T2	
	Variance	SE	Variance	SE
MAp goals				
Pupil	1.366 <sup>a</sup>	0.156	1.656 <sup>a</sup>	0.196
Class	0.000	0.000	0.045	0.072
ICC	0.00		0.03	
MAv goals				
Pupil	1.955 <sup>a</sup>	0.233	2.030 <sup>a</sup>	0.241
Class	0.175	0.175	0.134	0.128
ICC	0.08		0.06	
PAp goals				
Pupil	2.119 <sup>a</sup>	0.241	2.098 <sup>a</sup>	0.249
Class	0.000	0.000	0.148	0.249
ICC	0.00		0.07	
PAv goals				
Pupil	1.784 <sup>a</sup>	0.211	2.103 <sup>a</sup>	0.251
Class	0.050	0.078	0.185	0.154
ICC	0.03		0.08	
Incremental beliefs				
Pupil	0.560 <sup>a</sup>	0.064	0.546 <sup>a</sup>	0.065
Class	0.000	0.000	0.017	0.065
ICC	0.00		0.03	
Entity beliefs				
Pupil	0.574 <sup>a</sup>	0.069	0.708 <sup>a</sup>	0.084
Class	0.104	0.065	0.066	0.054
ICC	0.15		0.09	
Perceived competence				
Pupil	0.902 <sup>a</sup>	0.103	0.728 <sup>a</sup>	0.083
Class	0.000	0.000	0.000	0.000
ICC	0.00		0.00	

ICC: intra-class correlation coefficient; MAp: mastery-approach; MAv: mastery-avoidance; PAp: performance-approach; PAv: performance-avoidance; SE: standard error.

<sup>a</sup> $p < 0.001$ .

strivings focusing on self- and task-referenced incompetence (i.e. MAv goals) at the end of the unit of work. On the other hand, pupils who reported higher levels of perceived competence in cricket at the start of the unit of work reported greater adoption of achievement goals focusing on self- and task-referenced incompetence at the end of the unit of work.

### Predicting change in PAp goal adoption

In both activities, when controlling for T1 PAp goal adoption, for every point change in T1 entity beliefs, there was no significant change in the score for T2 PAp goals. However, when controlling for T1 PAp goal adoption, for every point change in T1 perceived competence, the score for T2 PAp goals is predicted to increase by 0.447 points in cricket and 0.547 points in tennis. In both activities, pupils with higher levels of perceived competence at the start of the unit of work

**Table 3.** Variance components attributable to different classes and individual pupils on all variables: tennis.

Outcome variable	T1		T2	
	Variance	SE	Variance	SE
<b>MAp goals</b>				
Pupil	1.217 <sup>a</sup>	0.148	1.642 <sup>a</sup>	0.199
Class	0.056	0.064	0.045	0.073
ICC	0.04		0.03	
<b>MAv goals</b>				
Pupil	1.833 <sup>a</sup>	0.223	1.818 <sup>a</sup>	0.221
Class	0.134	0.119	0.182	0.140
ICC	0.07		0.09	
<b>PAP goals</b>				
Pupil	2.138 <sup>a</sup>	0.249	1.826 <sup>a</sup>	0.221
Class	0.000	0.000	0.058	0.085
ICC	0.00		0.03	
<b>PAv goals</b>				
Pupil	1.941 <sup>a</sup>	0.235	2.027 <sup>a</sup>	0.245
Class	0.038	0.079	0.010	0.070
ICC	0.19		0.01	
<b>Incremental beliefs</b>				
Pupil	0.499 <sup>a</sup>	0.061	0.527 <sup>a</sup>	0.064
Class	0.034	0.031	0.010	0.021
ICC	0.06		0.02	
<b>Entity beliefs</b>				
Pupil	0.556 <sup>a</sup>	0.065	0.679 <sup>a</sup>	0.082
Class	0.000	0.000	0.013	0.028
ICC	0.00		0.02	
<b>Perceived competence</b>				
Pupil	0.557 <sup>a</sup>	0.068	0.458 <sup>a</sup>	0.056
Class	0.029	0.031	0.027	0.027
ICC	0.05		0.06	

ICC: intra-class correlation coefficient; MAp: mastery-approach; MAv: mastery-avoidance; PAP: performance-approach; PAv: performance-avoidance; SE: standard error.

<sup>a</sup> $p < 0.001$ .

reported greater adoption of achievement goals focusing on demonstrating norm-referenced competence at the end of the unit of work.

### *Predicting change in PAv goal adoption*

In cricket, when controlling for T1 PAv goal adoption, for every point change in T1 perceived competence, the score for T2 PAv goals is predicted to increase by 0.228 points. For every point change in T1 entity beliefs, there was no significant change in T2 PAv scores. Pupils with higher levels of perceived competence at the start of the unit of work reported greater adoption of achievement goals focusing on avoiding norm-referenced competence at the end of the unit of work. However, in tennis, when controlling for T1 PAv goal adoption, for every point change

**Table 4.** Effects of time 1 implicit theories of ability on time 2 goals controlling for the effects of time 1 goals.

Predictor (Time 1) Variable	Time 2 goals											
	MAp			MAv			PAp			PAv		
	Tennis	Cricket	B (SE)	Tennis	Cricket	B (SE)	Tennis	Cricket	B (SE)	Tennis	Cricket	B (SE)
Fixed effects												
Constant	4.719 <sup>a</sup> (0.085)	5.004 <sup>a</sup> (0.105)	4.426 <sup>a</sup> (0.117)	4.247 <sup>a</sup> (0.153)	3.866 <sup>a</sup> (0.116)	4.413 <sup>a</sup> (0.153)	4.191 <sup>a</sup> (0.125)	4.747 <sup>a</sup> (0.115)				
MAp goals	0.574 <sup>a</sup> (0.081)	0.414 <sup>a</sup> (0.066)										
MAv goals			0.407 <sup>a</sup> (0.078)	0.391 <sup>a</sup> (0.085)								
PAp goals					0.540 <sup>a</sup> (0.064)	0.482 <sup>a</sup> (0.075)						
PAv goals							0.606 <sup>a</sup> (0.067)	0.596 <sup>a</sup> (0.074)				
Incremental beliefs	0.375 <sup>b</sup> (0.136)	0.421 <sup>a</sup> (0.140)	0.485 <sup>a</sup> (0.136)	0.224 (0.146)								
Entity beliefs					-0.012 (0.123)	0.052 (0.133)	-0.287 <sup>b</sup> (0.127)	-0.055 (0.129)				
Residual variance												
Pupil	0.900 <sup>a</sup> (0.180)	1.203 <sup>a</sup> (0.200)	1.105 <sup>a</sup> (0.183)	1.384 <sup>a</sup> (0.227)	1.163 <sup>a</sup> (0.189)	1.478 <sup>a</sup> (0.236)	1.285 <sup>a</sup> (0.208)	1.676 <sup>a</sup> (0.254)				
Class	0.000 (0.000)	0.029 (0.050)	0.053 (0.065)	0.074 (0.086)	0.055 (0.064)	0.148 (0.120)	0.076 (0.075)	0.026 (0.061)				

MAp: mastery-avoidance; MAv: mastery-approach; PAp: performance-avoidance; PAv: performance-approach; SE: standard error; B: Beta.  
<sup>a</sup> $p < 0.001$ , <sup>b</sup> $p < 0.05$ .

**Table 5.** Effects of time 1 perceived competence on time 2 goals controlling for the effects of time 1 goals.

Predictor (Time 1) Variable	Time 2 goals												
	MAp			MAv			PAp			PAv			
	Tennis	Cricket		Tennis	Cricket		Tennis	Cricket		Tennis	Cricket		
B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	
Fixed effects													
Constant	4.710 <sup>a</sup> (0.086)	5.002 <sup>a</sup> (0.106)	4.142 <sup>a</sup> (0.120)	4.242 <sup>a</sup> (0.133)	3.866 <sup>a</sup> (0.100)	4.379 <sup>a</sup> (0.156)	4.192 <sup>a</sup> (0.129)	4.458 <sup>a</sup> (0.120)					
MAp goals	0.605 <sup>a</sup> (0.091)	0.352 <sup>a</sup> (0.085)											
MAv goals			0.434 <sup>a</sup> (0.082)	0.400 <sup>a</sup> (0.079)									
PAp goals					0.479 <sup>a</sup> (0.058)	0.342 <sup>a</sup> (0.075)							
PAv goals							0.568 <sup>a</sup> (0.070)	0.535 <sup>a</sup> (0.077)					
Perceived Competence	0.237 (0.132)	0.481 <sup>a</sup> (0.106)	0.194 (0.139)	0.233 <sup>b</sup> (0.110)	0.547 <sup>a</sup> (0.118)	0.447 <sup>a</sup> (0.080)	0.200 (0.127)	0.228 <sup>b</sup> (0.112)					
Residual variance													
Pupil	0.943 <sup>a</sup> (0.185)	0.965 <sup>a</sup> (0.201)	1.212 <sup>a</sup> (0.198)	1.441 <sup>a</sup> (0.230)	1.018 <sup>a</sup> (0.188)	1.200 <sup>a</sup> (0.216)	1.239 <sup>a</sup> (0.205)	1.664 <sup>a</sup> (0.255)					
Class	0.000 (0.000)	0.034 (0.052)	0.053 (0.069)	0.074 (0.085)	0.043 (0.053)	0.187 (0.120)	0.084 (0.079)	0.045 (0.069)					

MAp: mastery-avoidance; MAv: mastery-approach; PAp: performance-avoidance; PAv: performance-approach; SE: standard error; B: Beta. <sup>a</sup>p<0.001, <sup>b</sup>p<0.05.

in T1 entity beliefs, the score for T2 PAV goals is predicted to decrease by  $-0.287$  points. For every point change in T1 perceived competence, there was no significant change in T2 PAV scores. Pupils who believed ability to be a fixed, stable quantity at the start of the unit of work reported being less likely to adopt achievement strivings which focused on avoiding normative incompetence at the end of the unit of work.

## Discussion

During the key stage 3 NCPE, pupils participate in a range of different activities which place different demands on the cognitive and motor skills of pupils and it is unlikely that pupils will excel in all activities. Consequently, when asking pupils about their motivation for PE, the achievement goals, beliefs and perceptions of competence they report may be biased by specific activities. The main purpose of this study was to provide a test of the theoretical propositions of the hierarchical model of approach and avoidance achievement motivation within two activities in the key stage 3 NCPE. The predictive utility of implicit theories of ability and perceptions of competence to changes in approach-avoidance achievement goal adoption was examined while controlling for the effect of prior achievement goal adoption. This provided a more rigorous examination of the theoretical propositions than that afforded by cross-sectional research which is typical of the achievement goal literature (Biddle et al., 2003b).

The multilevel structure of the data with regard to the grouping of pupils in specific PE classes was intact. However, the class level variance components failed to reach significance, which maybe a consequence of the number of intact classes the current investigation had in each activity. Across the three year groups, only seven classes for each activity were examined which may not have been sufficient to provide an adequate examination of class effects on motivational variables in PE. Future research using larger samples will afford a more rigorous test of the multilevel structure and tease out class and teacher influences on key motivational variables in specific activities.

### *Perceptions of competence and approach-avoidance achievement goals*

In cricket, perceptions of competence were associated with all types of achievement striving. Pupils with higher levels of perceived competence at the start of the unit of work reported greater adoption of all achievement goals at the end of the unit of work. However, in tennis, perceptions of competence at the start of the unit of work were associated only with the achievement striving that focused on demonstrating normative competence (i.e. PAp goals) at the end of the unit of work. Across the two activities there was partial support for the theoretical propositions of Elliot (1997, 1999, 2005). High perceptions of competence predicted MAp (cricket only) and PAp goals (cricket and tennis), however, low perceptions of competence were not found to predict avoidance goals in either cricket or tennis. The positive relationship between perceptions of competence and both types of avoidance goals appears to be an emerging finding in research in the PE context (Spray and Warburton, 2011; Wang et al., 2007; Warburton and Spray, 2008). Although, the direction of the relationship between perceptions of competence and avoidance goals was not as expected, the magnitude of the coefficients was smaller for the avoidance goals than for approach goals. This provides partial support for Elliot's theorising. The effect of perceived competence on the dynamics of achievement goal adoption appears to be more influential when examining these variables at the activity specific level rather than the contextual level. Previous research at

the contextual level found perceptions of competence to have little effect on the temporal patterns of achievement goal adoption (Warburton and Spray, 2008, 2009).

### *Ability beliefs and approach-avoidance achievement goals*

Mixed support was found for the theoretical propositions regarding implicit theories of ability and approach-avoidance achievement goal adoption. In both tennis and cricket, when prior achievement goal adoption was controlled, pupils who endorsed the view that ability can be improved and developed through learning at the start of the unit of work were more likely to report adopting the adaptive achievement striving of focusing on self-referenced competence and mastery of tasks (i.e. MAP goals) at the end of the unit of work. This is encouraging given the substantial literature which associates incremental beliefs and MAP goal adoption with adaptive outcomes, such as intrinsic motivation, persistence, adaptive attributions, effort, task choice, self-regulation and adaptive help-seeking (Elliot and Church, 1997; Elliot and McGregor, 2001; Middleton and Midgley, 1997). In addition, controlling for prior MAV goal adoption, pupils in tennis who highly endorsed incremental beliefs were also more likely to report striving to avoid self- and task-referenced incompetence. This may be worrisome for PE teachers when considering that pupils who adopt this form of achievement striving may experience motivational difficulties (Conroy et al., 2006). Incremental beliefs are congruent with the values of the educational system and are promoted throughout the curriculum; teachers may therefore inadvertently influence some pupils to adopt avoidance achievement strivings. The relationship between incremental beliefs and mastery achievement strivings in the PE context is complex. If teachers wish to encourage adaptive self- and task-referenced achievement strivings in their pupils, the setting of differentiated tasks during lessons will increase the likelihood that all pupils experience improvement and focus on competence rather than incompetence.

The findings with respect to entity beliefs and performance goals were more equivocal. Current results, which are based on a rigorous test of theoretical propositions, did not find support for the relationship between entity beliefs and both types of performance goals in either activity. The relationship between entity beliefs and PAp and PAV goals has been consistently found in research in both the educational and physical domains (Cury et al., 2006; Elliot and McGregor, 2001; Warburton and Spray, 2008, 2009). However, it does not appear to be evident when examining specific activities in the PE curriculum. In the present study, an entity theory of ability did not predict change in PAp or PAV goal adoption in cricket or PAp goal adoption in tennis. This finding requires further examination, particularly among activities that may be more conducive to the endorsement of entity beliefs. Previous research in the PE context has shown that pupils are more likely to endorse entity beliefs when participating in gymnastic activities and incremental beliefs when participating in games activities (Spray and Warburton, 2003). Both activities in the current investigation were classified under the 'games' area of the National Curriculum. The mean scores for both activities were higher for incremental than entity beliefs suggesting that the skills and abilities, i.e. co-ordination, striking, used in games activities may be more conducive to being viewed from an incremental perspective. This may account for the equivocal findings regarding the theoretical propositions for entity beliefs and PAp and PAV goals.

Furthermore the negative relationship observed between entity beliefs and PAV goals in tennis is contrary to theoretical propositions (Dweck, 1999; Elliot, 1999). Pupils who believed their tennis ability to be a fixed, stable quantity at the start of the unit of work reported being less likely to adopt PAV goals at the end of the unit of work. Looking at the pattern of mean scores for entity

beliefs and PAV goals, as well as considering the fundamental skills necessary to participate in tennis, may account for this finding. Pupils' level of endorsement of entity beliefs did not change over the unit of work, with mean scores similar at T1 and T2, but the mean scores for PAV goals were lower at the end of the unit of work. Tennis is also a particularly difficult activity for pupils to master; it requires hand-eye co-ordination, quick reactions, wrist strength and judgement/spatial awareness skills. At the start of the unit of work, pupils may have been aware that they found tennis a difficult activity but were not aware of the standard of others in the class. Initially, these pupils may have been concerned about being incompetent in relation to others but as the unit of work progressed they realised that others in the class also struggled with the tasks and skills. The level of differentiation in competence may not have been as great as they expected and so, over the course of the unit of work, they became less concerned with avoiding demonstrating normative incompetence. The predictive pattern expected between entity beliefs and PAV goals was therefore not observed. Given the unique relations being observed in each activity, further research is needed to explore the predictors of achievement strivings across the activities of the PE curriculum. Teachers will be able to draw on this information to inform their teaching strategies for each activity, to ensure a positive motivational experience for pupils across the activities in the curriculum.

## **Conclusion, implications and future research**

Overall, the present study provided an insight into the antecedent→goal relationships within two activities taught within the key stage 3 National Curriculum, thereby further testing the nomological network of antecedents and approach-avoidance achievement goals proposed in the theorising of Elliot (1999, 2005). There was some support for the hypothesised relationships in both activities. For cricket, relationships between perceptions of competence and both avoidance goals were consistent with previous research in the PE context (Spray and Warburton, 2011; Wang et al., 2007; Warburton and Spray, 2008). The relationships between PAp goals and perceptions of competence, and between incremental beliefs and MAp goals, were consistent across both activities. This latter finding adds further support to the importance of encouraging pupils in PE activities to believe in hard work, effort and the malleability of ability. The equivocal results obtained for the predictive utility of entity beliefs to both types of performance goals requires further investigation at the activity specific level. Activities in which ability is more likely to be viewed from an entity perspective such as gymnastics (Spray and Warburton, 2003) should be examined in relation to these theoretical propositions.

The present study provided an insight into the motivational profiles of different activities within the physical education curriculum. The differences found suggest that it is important for teachers to consider the nature of activities when motivating pupils in the PE setting. Differences in the nature, novelty and frequency of activities in the school curriculum each year can influence young people's motivational processes during a unit of work. In activities such as tennis, the importance for teachers of emphasising the belief that ability can be improved and developed while minimising the belief that ability in tennis is a fixed stable quantity is shown in the present study. Teachers' interactions and communications with students about their ability and developing their ability are therefore especially important in this activity. Furthermore, in trying to help foster adaptive motivational strivings in young people in tennis activities, teachers need to ensure that differentiated tasks are used during lessons so that pupils can experience feelings of success and increase the likelihood that pupils will focus on competence rather than incompetence. Finally, the results suggest that in cricket, teachers need to develop high perceptions of competence through

differentiated tasks and minimise aspects of social comparison and competition to ensure that adaptive motivational strivings are developed in their pupils. Ensuring the emphasis is on development and learning within lessons through the use of personal diaries and goal-setting strategies should help to focus pupils on self- and task-referenced competence as well as provide opportunities for their perceptions of competence to improve.

Future research should also seek to address the limitations of the present work. Research in PE on pupils' physical self-concept and exercise behaviour established that some of the variance could be explained by age and gender (Marsh et al., 2006). Due to the design of the present study, it was not possible to isolate gender and age effects, resulting in the possibility that some of the unexplained variance could be attributed to these demographic variables. A larger project which includes sufficient numbers of schools, teachers and classes, and in which pupils of both genders are taught the same activity, will help to address this issue. Moreover, it will enable the effects of schools, teachers and classes on pupils' motivation to be disentangled and provide a more rigorous examination of these effects than afforded here. Finally, the present research examined individual difference variables over of a unit of work in an activity which lasted for six weeks. The stability of these variables over this relatively short period, as shown in the mean scores for some of the variables, may have attenuated their predictive utility. Assessing these variables over units of work which last for a greater length of time may provide a stronger test of the theoretical propositions. In conclusion, the current findings provide partial support for Elliot's theoretical propositions but outline some variations in the motivational processes underpinning the different activities. However, further research is required across a variety of activities to fully evaluate these propositions. An understanding of the motivational processes underpinning participation in each activity of the curriculum will ensure that teachers are better placed to influence the motivation of pupils across the PE curriculum.

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