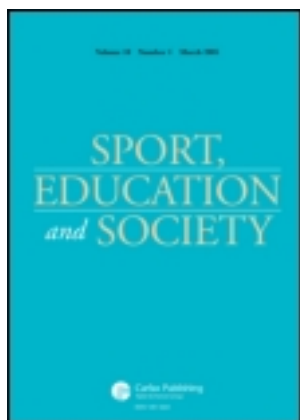




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# Providing students with voice and choice: lessons from intervention research on autonomy-supportive climates in physical education

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This article examines the latest thinking about autonomy-supportive climates within physical education. The basis for the inclusion of these climates are self-determination and achievement goal theories which suggest that a teacher's motivating style towards students can be conceptualised along a continuum that ranges from highly controlling to highly autonomy supportive. In general, autonomy-supportive teachers facilitate, whereas controlling teachers interfere with, the congruence between students' self-determined inner motives and their classroom activity. Drawing upon research involving interventions at pre-school, primary and secondary school levels, the paper examines how 27 studies that demonstrate providing pupils with opportunities to become self-directed leads to higher levels skill attainment, physical activity and perceived competence. Implications for curriculum, pedagogy and assessment are addressed and directions for future research are noted.

**Keywords:** *Physical education; Motivational climates; Autonomy support; Self-direction; Teaching*

## Introduction

The main charge for all teachers, be they specialists in the content areas of mathematics, language arts and sciences, or in the more practical fields of music, art and physical education (PE), is to help students achieve competence in the essential knowledge and skills of that subject. With respect to PE, however, it can be argued that the ultimate goal is for students to value engagement in sport and physical activity to the extent that their participation extends across the life span. This more distal goal requires that PE teachers themselves, together with their pedagogies and curricula, produce learning experiences for young people that lead them to become intrinsically motivated to perform physical activity.

Self-determination theory (SDT) and achievement goal theory (AGT) are two theories that have been utilised as theoretical frameworks to describe and understand

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what motivates individuals to be physically active (Treasure, 1997; Digelidis & Papaioannou, 1999; Ferrer-Caija & Weiss, 2000; Ryan & Deci, 2000; Standage *et al.*, 2003). SDT describes motivation as a multidimensional construct varying in quantity and quality along a continuum characterised by amotivation (i.e. lacking any intention to engage in a behaviour), extrinsic motivation (where the behaviour is engaged in to achieve outcomes that are separable from the behaviour) and intrinsic motivation (i.e. where the behaviour is engaged in for the enjoyment and satisfaction inherent in taking part).

Achievement goal theory aims to understand what motivates individuals by how success is perceived and competence is valued (Nicholls, 1989). According to AGT, behavioural outcomes are related to goal-orientated behaviour described as task (e.g. competence and success are self-referenced) or ego (e.g. competence and success are based on the reference of others). A task-oriented goal perspective has been found to be associated with increased enjoyment and intrinsic motivation in sport and physical activity, regardless of competence level or competitive outcome (Duda & Nicholls, 1992; Fox *et al.*, 1994; Duda & Whitehead, 1998; Liukkonen *et al.*, 1998). Task orientation has also been found to be related to continuing participation in sport (Fox *et al.*, 1994), the intention to be physically active (Biddle & Chatzisarantis, 1999; Sarrazin *et al.*, 2002), self-reported engagement in physical activity (Dempsey *et al.*, 1993; Kimiecik *et al.*, 1996), and objectively assessed physical activity levels (Jaakkola *et al.*, 2008).

Standage and Treasure (2002) suggest that central to both SDT and AGT is the idea that task/mastery involvement facilitates intrinsic motivation. They quote Ryan and Deci (1989, p. 268) who suggest that both theories 'advocate the use of feedback and procedures that minimize ego involvement and facilitate a fuller, more task-involved engagement with academic endeavors' in order to foster intrinsic motivation. Both theories also use the notion of 'climates' to explain how people perceive the environmental structure (Duda 2001; Duda & Hall, 2001; Treasure, 2001) of a particular setting. SDT proposes that climates in which students can exhibit autonomously motivated behaviours will produce more interest and excitement, which will lead to task engagement, enhance performance and persistence (Ryan & Deci, 2000). In contrast, controlling environments which are controlled by rewards and punishments or self-imposed pressures are predicted to last only as long as the contingencies or pressures remain in place. Similarly, AGT postulates that the environments can be structured to emphasise factors that foster either task/mastery or ego/performance orientations. Ego-involving climates stress performance outcomes and social comparisons between students; thereby, increasing external motivation and decreasing enjoyment (Duda & Whitehead, 1998). In contrast, a task-involving or mastery climate relates students' performance to their effort, persistence and personal improvement, thereby increasing intrinsic motivation, enjoyment and task engagement (Ames, 1992).

In linking these two notions of climate, Standage and Treasure (2002) have found that a task or mastery orientation has been found to be positively associated with the more self-determined forms of motivation such as intrinsic motivation and identified

regulation. Likewise, this mastery orientation is also negatively associated with amotivation and external regulation (both factors that represent low levels of self-determination. In an effort to coin a term that best represents the intent of a mastery and non-controlling climate, the term ‘autonomy supportive’ is used throughout this article as it represents the manner in which teachers can foster task orientations in their students.

### *Purpose of this article*

Given that intrinsic motivation is critical for engagement and the fact that autonomy-supportive climates have been shown to promote this outcome, it would be expected that these climates are effective in PE settings. Consequently, the purpose of this article was to examine the research literature pertaining to the effectiveness of interventions that have used autonomy-supportive climates in PE, and to then provide an explanation of how this literature might inform issues of curriculum, pedagogy and assessment in the advancement of PE.

### *Identification and selection of papers*

Three criteria were used to select studies for this article. First, the study had to involve an intervention in which autonomy-supportive climates were put in place. Second, the study had to be an empirically based peer-reviewed paper. Third, the study had to be conducted within PE settings.

With respect to the first criterion, we acknowledge that many studies have indeed examined relationships among many variables that are associated with autonomy-supportive learning environments. These studies have examined how learners *perceived* the educational climate and the patterns of various psychosocial variables linked to achievement motivation theory or SDT (Xiang *et al.*, 2006). Importantly, the findings of these studies have been instrumental in the development of effective interventions. However, these studies did not include specific interventions and most often failed to include detailed accounts of the PE experiences of the young people surveyed.

With respect to the second criterion, papers that focused upon the practical strategies required to implement autonomy-supportive climates within various PE settings were not included. As an example, papers such as those by Ntoumanis (2002) or Digelidis *et al.* (2006) were not included as they were purely descriptive. Finally, studies that examined autonomy-supportive climates in other settings other than PE were not included (e.g. Conroy & Coatsworth, 2007, who examined coaching behaviours in a summer swimming league).

Papers for the review were selected through an initial search of the EBSCO database, which includes journals from North America, the UK, Europe and Australia. The main identifiers used were ‘autonomy-supportive climates in physical education’ and

‘mastery motivational climates in physical education’. Further journal articles were then obtained through the citations and references in the original documents.

### Summary of studies

Table 1 provides an overview of each of the 27 data-based intervention studies that have been conducted over the past 15 years. The table contains seven columns; authorship, focus of the study and the theoretical base, participants and context, details of the intervention, the outcome measured used, results, and the journal that published the paper. The aim of this table is to provide as comprehensive an account of the study as is possible within the constraints of a journal article. Table 1 is organised in two main parts. The first part lists those studies which involved comparison groups in experimental or quasi-experimental designs, while the second part reports studies that investigated autonomy-supportive PE climates, but did not make comparisons to other types of climates. With each of these two categories, papers are listed chronologically.

The following topics were summarised from this review of the research: (1) demographics of participants, (2) length of interventions, (3) study designs and (4) outcome measures.

### *Demographics of participants*

The age range of participants included in the studies investigating autonomy-supportive climates has been quite extensive. Children as young as 2 years of age (Parish *et al.*, 2007), enrolled in daycare physical play programmes, and as old as 35-year-old college students enrolled in PE courses (Murcia *et al.*, 2010) have been investigated. Most of the studies (18) were conducted in K-12 school settings, five were located in preschool settings, and four took place in university courses. Within these, all grade levels (except third grade) were represented. In most cases, multiple studies have been conducted for the range of age groups and grades of children in school. The toddler age group is the only group, among those investigated that has only been included in one study. All 27 studies support the use of autonomy-supportive climates for these age groups in PE settings.

Sex and skill level have also been investigated with respect to autonomy-supportive climates. Studies have found that females and males (Ntoumanis & Biddle, 1999; Parish & Treasure, 2003; Valentini & Rudisill, 2004a; Sage & Kavussanu, 2007; Mandigo *et al.*, 2008), as well as skilled and less-skilled children (Valentini & Rudisill, 2004a), benefit in a number of ways (i.e. developmentally, behaviourally, emotionally and physically) from exposure to autonomy-supportive climates. In addition, autonomy-supportive interventions have been conducted around the world in a variety of different cultures. Within Table 1, the country in which the study was conducted is listed within the ‘participants and context’ column. While most studies have emanated from English-speaking courses (USA 10, UK 7, Australia 1, Canada 1), there have also

Table 1. Overview of data-based studies utilising autonomy-supportive climates

| Authors                              | Focus of the study and associated theoretical base                                                                                                                                                                     | Participants/context                                                                         | Intervention details                     | Outcome measures                                                                                                                                            | Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Journal                                   |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| Theeboom <i>et al.</i> (1995)        | Examined the effectiveness of a performance versus mastery-oriented teaching programme on children's enjoyment, perceived competence, intrinsic motivation and motor skill development (achievement goal theory, AGT)  | 46 females and 73 males<br>8–12 years of age at a summer sports programme (USA)              | 3 weeks<br>(C)                           | Children's enjoyment, perceived competence, intrinsic motivation and motor skill development                                                                | Results revealed that children in the mastery-oriented group reported significantly higher levels of enjoyment and exhibited better motor skills than those in the performance-oriented group. In-depth interviews further indicated that children in the mastery programme were almost unanimous in reporting high levels of perceived competence and intrinsic motivation, while those from the traditional group showed less pronounced effects. These results provide empirical evidence that a mastery motivational climate can result in more positive experiences for young athletes as they learn new skills | <i>Journal of Sport Psychology</i>        |
| Solmon (1996)                        | Investigated differences in students' practice behaviours and perceptions of the motivational climate in physical education (PE) classes manipulated to be task or ego involved (AGT)                                  | 53 females and 56 males<br>Seventh- and eighth-grade students (USA)                          | 2 × 30 min lessons<br>(C)                | Coded student behaviour from videotapes of the classes                                                                                                      | Students perceived the climate conditions differently. Individuals in the task-involved condition completed a greater number of practice trials at a difficult level than those in the ego-involved condition                                                                                                                                                                                                                                                                                                                                                                                                        | <i>Journal of Educational Psychology</i>  |
| Christodoulidis <i>et al.</i> (2001) | Applied a year-long intervention programme, in typical Greek PE school classes, which aimed to change motivational climate, goal orientations, motivation and students' attitudes towards exercise and nutrition (AGT) | 58 females, 47 males (Exp): 340 females, 189 males (Control)<br>10th grade students (Greece) | 25 lessons over a 10-month period<br>(C) | Motivational climate; goal orientations; motivation and students' attitudes towards exercise and nutrition                                                  | Students in the experimental group compared to the control group: (1) had more positive attitudes towards exercise, participation in sports, and eating fruit; (2) perceived the motivational climate of the class as more tasks involving and less ego involving and (3) spent more time exercising per session. The small significant effects that disappeared 10 months after the intervention imply that further theory development and interventions are needed                                                                                                                                                 | <i>European Journal of Sport Science</i>  |
| Morgan and Carpenter (2002)          | Investigated the effects of manipulating motivational climate on pupils' perceptions of the motivational climate, achievement goal orientations and cognitive and affective responses (AGT)                            | 54 females, 99 males<br>13 years old (UK)                                                    | 1 lesson per week for 7 weeks<br>(C)     | Motivational climate; achievement goal orientations, beliefs about the causes of success, task choice, satisfaction, boredom and attitude towards athletics | Pupils' perceptions of a mastery climate and significant increases in their task orientation, preference for challenging tasks, satisfaction and positive attitude as a result of experiencing the mastery programme                                                                                                                                                                                                                                                                                                                                                                                                 | <i>European Physical Education Review</i> |

Table 1 (Continued)

| Authors                          | Focus of the study and associated theoretical base                                                                                                                                                    | Participants/context                                                                                                  | Intervention details                                                                 | Outcome measures                                                                                                                                                           | Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Journal                                          |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| Digelidis <i>et al.</i> (2003)   | Assessed the effects of a year-long intervention in Greek junior high school PE on motivational climate, goal orientations and attitudes towards exercise and healthy diet (AGT)                      | 132 females and 130 males (Exp); 276 females and 245 males (Control)<br>11–14 years old high school students (Greece) | 3 × 45 min lessons per week over one academic year (C)                               | Measures of motivational climate, goal orientations and attitudes<br>Confirmatory factor analyses                                                                          | After adjusting for initial differences on the assessed constructs, students who took part in the intervention, compared with the control group: (1) had more positive attitudes towards exercise and healthy eating, (2) had lower ego and higher task orientation scores and (3) perceived that their teacher gave more emphasis on task involvement and less emphasis on ego involvement                                                                                                                                                             | <i>Psychology of Sport and Exercise</i>          |
| Valentini and Rudisill (2004a,b) | The intent of this study was to examine the fundamental motor skills (FMS) of children with and without disability when exposed to a mastery climate intervention (AGT)                               | 18 females and 34 males (Exp); 18 females and 26 males (Control)<br>6–11 year old elementary school students (Brazil) | 2 × 60 min lessons a week for 12 weeks (C)                                           | FMS—Locomotor and Object control skills (Test of Gross Motor Development [TGMD]) check                                                                                     | Children with and without disabilities who received the intervention demonstrated significant improvement in FMS performance and in the recall of the FMS verbal cues from pre- to post-intervention. The Free Play group did not significantly change over time. These findings support mastery climate motor skill interventions that promote the use of cognitive strategies for all children                                                                                                                                                        | <i>Adapted Physical Activity Quarterly</i>       |
| Valentini and Rudisill (2004a,b) | Two studies were conducted to examine the effects of motivational climate on motor-skill development and perceived physical competence (PPC) in kindergarten children with developmental delays (AGT) | 12/21 females and 7/17 males (Exp); 13/15 females and 7/14 males (Control)<br>5-year-old kindergarten students (USA)  | 2 × 35 min lessons a week for 12 weeks and follow up 6 months after intervention (C) | FMS—locomotor and object control skills (TGMD); PPC (Harter's pictorial perceived competence scale)                                                                        | Results showed that the mastery-climate group demonstrated significantly better locomotor performance and higher PPC post-intervention than did the low-autonomy group, although both groups improved in locomotor and object-control skill performance. The second investigation extended the findings of the first by determining that the intervention effects were present 6 months later. In summary, the mastery-climate group showed positive changes in skill development and PPC, and this positive pattern of change was maintained over time | <i>Journal of Teaching Physical Education</i>    |
| Wallhead and Ntoumanis (2004)    | Investigated the influence of a sport education intervention programme on students' motivational responses in a high school PE setting (AGT)                                                          | 51 males (25 Exp, 26 Control)<br>High school students (UK)                                                            | 8 × 60min lessons (C)                                                                | Pre- and post-intervention measures of student enjoyment, perceived effort, perceived competence, goal orientations, perceived motivational climate and perceived autonomy | Increases in task-involving climate and perceived autonomy explained a significant amount of unique variance in the Sport Education ?students' post-intervention enjoyment, perceived effort, and perceived competence responses. The results suggest that the Sport Education curriculum may increase perceptions of a task-involving climate and perceived autonomy, and in doing so, enhance the motivation of high school students towards PE                                                                                                       | <i>Journal of Teaching in Physical Education</i> |

Table 1 (Continued)

| Authors                        | Focus of the study and associated theoretical base                                                                                                                                                                                                     | Participants/context                                                                | Intervention details              | Outcome measures                                                                                                                                                                                                                                       | Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Journal                                                                            |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Carr (2006)                    | Two studies examined multiple achievement goals in the context of children's PE (AGT)                                                                                                                                                                  | 92 females and 101 males<br>Seventh grade students (UK)                             | October to April (C)              | Slightly adapted form of Middleton and Midgley's (1997) version of the Patterns of Adaptive Learning Survey; Goudas <i>et al.</i> (1994) adaptation of the Perceived Locus of Causality Scale; Perceived Motivational Climate in Sport Questionnaire-2 | Study 1. Children endorsing high mastery/high performance-approach/high performance-avoidance, high mastery/high performance-approach/low performance-avoidance, or high mastery/low performance-approach/low performance-avoidance profiles typically exhibited the most adaptive motivational responses. In contrast, children endorsing a low mastery/high performance-approach/high performance-avoidance profile typically experienced more maladaptive motivational outcomes<br>Study 2. Children exposed to a consistent high mastery/low performance climate experienced decreased performance-avoidance goals and maintained high levels of mastery goals for PE. In contrast, children exposed to a consistent low mastery/high performance climate experienced increased performance-avoidance goals and decreased mastery goals for PE | <i>Journal of Sports Sciences</i>                                                  |
| Sage and Kavussanu (2007)      | Examined the effects of task and ego involvement (and sex differences) on three measures of moral behaviour in a competitive setting (AGT)                                                                                                             | 45 females and 45 males<br>University students (UK)                                 | 1 × 45 min laboratory session (C) | 2, 10-minute games of table soccer; Prosocial choice; goal involvement; goal orientation; and demographics                                                                                                                                             | Players assigned to the task-involving condition were higher in prosocial choice than those in the ego-involving or control conditions. Individuals in the ego-involving condition displayed more antisocial behaviours than those in the task-involving or control conditions. Finally, females displayed more prosocial behaviours than males                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <i>Journal of Sport and Exercise Psychology</i>                                    |
| Barkoukis <i>et al.</i> (2008) | Examined the impact of an intervention programme that manipulated TARGET structures on the cognitive and affective response of students to their PE lesson (AGT)                                                                                       | 180 females, and 174 males<br>Eighth- and ninth-grade high school students (Greece) | 7 months (C)                      | Perceptions of motivational (task- and ego-involving) climate; dispositional achievement goals (task and ego orientation); intrinsic motivation; trait anxiety (cognitive processes, somatic anxiety and worry)                                        | Students in the TARGET intervention group reported higher levels of teachers' emphasis on learning orientation, students' learning orientation, student' task orientation, enjoyment and perceived competence, and lower levels of worry after the intervention                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <i>European Physical Education Review</i>                                          |
| Parish (2008)                  | Investigated the influence of three motivational environments [mastery-oriented climate, performance-oriented climate, and unplanned free play (i.e. high autonomy with limited instruction and equipment)], on the physical activity behaviours (AGT) | 16 females and 11 males<br>3–5-year olds attending a day care (USA)                 | 1 × 30 min lesson for 18 days (C) | Heart rate monitoring; accelerometers and physical activity intensity level was categorised using PAHR > 50                                                                                                                                            | The performance climate (versus mastery and free play) would have allowed the preschoolers less time to engage in physical activity due to the greater amount of time the teachers needed to introduce and manage the behaviour of children during the performance class periods. Therefore, ensuring that children had equal time to engage in physical activity during each class period of the mastery, performance and free play climates, likely impacted the results of the study from a practical perspective                                                                                                                                                                                                                                                                                                                               | <i>Intervention and assessment: Designing studies for children and adolescents</i> |

Table 1 (Continued)

| Authors                       | Focus of the study and associated theoretical base                                                                                                                                  | Participants/context                                                                                                                                         | Intervention details                        | Outcome measures                                                                                                                                   | Results                                                                                                                                                                                                                                                                                                                                                                                                        | Journal                                          |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| Martin <i>et al.</i> (2009)   | Examined the influence of a mastery motivational climate intervention on children's motor skill performance in a naturalistic setting (AGT)                                         | 24 females and 18 males (Exp); 10 females and 12 males (Control)<br>First-grade students in an elementary school (USA)                                       | 5 × 30 min lessons per week for 6 weeks (C) | Motor skill (locomotor and object control skills) TGMD                                                                                             | Results indicated significant group × time interactions for the locomotor and object control subscales. The high autonomy (mastery) group improved significantly from pre- to post-intervention for locomotor and object control skills, while the low autonomy group did not                                                                                                                                  | <i>Physical Education and Sport Pedagogy</i>     |
| Gray <i>et al.</i> (2009)     | Identified the teaching behaviours exhibited when teaching Team Invasion Games using a game-based approach and a skill-focused approach to teach secondary 1 basketball (AGT)       | 24 females and 28 males<br>Secondary school students (UK)                                                                                                    | 1 × 80 min lesson per week for 5 weeks (C)  | Pupils' and teachers' thoughts about their experiences during each basketball lesson                                                               | Change to more mastery behaviours during the game-based lessons and similar percentages of mastery and ego behaviours during the skill-focused lessons. Game-focused teaching strategies promote a mastery-oriented motivational climate and have the potential to increase pupils' motivation in PE and Team Invasion Games.                                                                                  | <i>European Physical Education Review</i>        |
| Robinson and Goodway (2009)   | Examined the effect of two 9-week instructional climates (low autonomy and mastery motivational climate) on object-control skill development in preschoolers (AGT)                  | 16 females and 24 males (Control); 18 females and 20 males (Low autonomy); 20 females and 19 males (Mastery)<br>Preschoolers at a Head Start programme (USA) | 2 × 30 min lessons per week for 9 weeks (C) | Motor skill (locomotor and object control skills) TGMD-2                                                                                           | A significant Treatment × Time interaction was found, supporting the effectiveness of both OC instructional climates in improving OC skills over time, while the comparison group resulted in no changes                                                                                                                                                                                                       | <i>Research Quarterly for Exercise and Sport</i> |
| Robinson <i>et al.</i> (2009) | Examined the effect of two 9-week instructional climates (low-autonomy and mastery motivational climate) on PPC (AGT)                                                               | 16 females and 24 males (Control); 18 females and 20 males (Low autonomy); 20 females and 19 males (Mastery)<br>Preschoolers at a Head Start programme (USA) | 2 × 30 min lessons per week for 9 weeks (C) | Perceived competence (Harter's Pictorial Perceived Physical Competence scale)                                                                      | A significant Treatment × Time interaction was found, supporting that Mastery Motivational Climate participants reported significantly higher perceptions of perceived competence scores over time, while no positive changes were present in low autonomy and comparison participants. The results show that a mastery motivational climate leads to psychological benefits related to achievement motivation | <i>Research Quarterly for Exercise and Sport</i> |
| Spittle and Byrne (2009)      | Investigated the influence of Sport Education model student motivation (intrinsic/extrinsic motivation, goal orientations and perceived motivational climate) in secondary PE (AGT) | 9 females and 32 males (Exp); 9 females and 65 males (Control)<br>eighth-grade high school students (Australia)                                              | 1 × 100 min lesson for 10 weeks (C)         | Intrinsic Motivation Inventory, the Task and Ego Orientation in Sport Questionnaire, and the Perceived Motivational Climate in Sport Questionnaire | There was a significant difference between the conditions on changes in perceived competence, task orientation and mastery climate, with the traditional condition decreasing significantly from pre- to post-test compared with the Sport Education condition. There were no significant differences on interest/enjoyment, effort/importance, pressure/tension, ego orientation, or performance climate      | <i>Physical Education &amp; Sport Pedagogy</i>   |

Table 1 (Continued)

| Authors                    | Focus of the study and associated theoretical base                                                                                                                                                                                                          | Participants/context                                                                        | Intervention details                             | Outcome measures                                                                                                                                                      | Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Journal                                                             |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| Morgan and Kingston (2010) | Aimed to evaluate the effects of an intervention programme to promote a mastery motivational climate on lecturing behaviours and student learning experiences in an undergraduate practical soccer module (AGT)                                             | 6 females and 12 males (Control); 1 female and 15 males (Exp) University students (UK)      | 12 week practical soccer module (C)              | Lecturing behaviours and student learning experiences                                                                                                                 | Lecturer behaviours showed increases in student-set mastery goals, greater differentiation of tasks, increased lecturer feedback on effort and progress to individual students, and more flexible time to learn. Group interviews with students revealed that the mastery programme had a positive impact on their motivation and learning experiences. Results indicated that amotivated students in SE perceived significantly higher levels of enjoyment and satisfaction of the need for relatedness than students taught by the traditional approach. There was no difference in the need for autonomy and competence. Students who perceived their class climate as emphasising mastery were more likely to feel self-determined. Perceived motivational climate was a better predictor of all indices of motivation than goal orientations. Results, discussed according to the achievement goal perspective and the hierarchical model of intrinsic and extrinsic motivation, highlight a possible motivational process explaining how the motivational climate overrides goal orientations. | <i>Journal of Hospitality, Leisure, Sport and Tourism Education</i> |
| Perlman (2010)             | Examined the influence of the Sport Education on amotivated students affect and needs satisfaction (self-determination theory, SDT)                                                                                                                         | 1176 students in 44 classes Ninth grade (USA)                                               | 3 × 50/60 min lessons per week for 4/5 weeks (C) | Abridged self-regulation questionnaire for physical education and the amotivation subscale of the academic motivation scale for PE                                    | Results indicated that amotivated students in SE perceived significantly higher levels of enjoyment and satisfaction of the need for relatedness than students taught by the traditional approach. There was no difference in the need for autonomy and competence. Students who perceived their class climate as emphasising mastery were more likely to feel self-determined. Perceived motivational climate was a better predictor of all indices of motivation than goal orientations. Results, discussed according to the achievement goal perspective and the hierarchical model of intrinsic and extrinsic motivation, highlight a possible motivational process explaining how the motivational climate overrides goal orientations.                                                                                                                                                                                                                                                                                                                                                         | <i>Journal of Teaching in Physical Education</i>                    |
| Brunel (1999)              | Examined the relationship of perceived motivational climate and goal orientation to indices of intrinsic, extrinsic motivation and a motivation, and second their respective role in predicting these indices of motivation (AGT)                           | 160 students enrolled in physical activity classes (badminton) 1st year university (France) | 12 weeks (NC)                                    | Achievement Motivation—Questionnaire des Perceptions de Succes en Sport; intrinsic motivation                                                                         | The mastery climate was linked to enjoyment, perceived ability, and effort in the PE classes, as well as to pre-competition somatic anxiety and post competition vigour. On the other hand, the performance climate was associated with self-confidence, pre-competition vigour, and post-competition stress.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <i>Scandinavian Journal of Medicine &amp; Science in Sports</i>     |
| Cecchini et al. (2001)     | Examined the relationship between the motivational climate created by the PE teacher and the intrinsic motivation of the preparatory sessions together with self confidence and anxiety prior to competition and pre and post competition mood states (AGT) | 115 students sixth grade (Spain)                                                            | 12 lessons followed by a sports competition (NC) | Task and Ego Orientation in Sport Questionnaire; Intrinsic Motivation Inventory; Learning and Performance Orientations in PE Classes Questionnaire; PE trait anxiety  | Gender, perceived ability and perceptions of a mastery climate explain a significant amount of variance in physical activity. These findings suggest that promoting a mastery-oriented motivational climate in PE will foster self-determined situational motivation and physical activity.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <i>European Journal of Sport Science</i>                            |
| Parish and Treasure (2003) | Investigated the influence of perceptions of a motivational climate and perceived ability on situational motivation and the physical activity behaviour (AGT)                                                                                               | 229 females and 213 males Sixth-, seventh, eighth-grade students (USA)                      | 3 × 30 min lessons (NC)                          | Pedometers, perceived motivational climate; perceived ability; situational intrinsic motivation; body mass index                                                      | Reciprocal and guided discovery styles resulted in more mastery and less performance-focused teaching behaviours and more adaptive cognitive and affective responses than the command/practice style.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <i>Research Quarterly for Exercise and Sport</i>                    |
| Morgan et al. (2005)       | Investigated the effects of different teaching styles (teaching styles—command/practice, reciprocal and guided discovery) on the teaching behaviours that influence motivational climate and pupils' cognitive and affective responses in PE (AGT)          | 45 females and 47 males Secondary school students (UK)                                      | 3 × 60 min lessons (NC)                          | Teaching behaviours; computer-coding system devised from Ames's guidelines on how to create a mastery climate; focus groups—pupils' cognitive and affective responses | Reciprocal and guided discovery styles resulted in more mastery and less performance-focused teaching behaviours and more adaptive cognitive and affective responses than the command/practice style.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <i>European Physical Education Review</i>                           |

Table 1 (Continued)

| Authors                      | Focus of the study and associated theoretical base                                                                                                                                                                                                                                        | Participants/context                                                                     | Intervention details                           | Outcome measures                                                                                                                                                                                                                                                                                                                                             | Results                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Journal                                            |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| Parish <i>et al.</i> (2007)  | Determined the effectiveness of a planned mastery motivational physical play session on physical activity as compared to a non-planned free play session (AGT)                                                                                                                            | 10 females, 11 males<br>Toddlers (2.5 yrs)<br>(USA)                                      | 2 × 30 min lessons<br>(NC)                     | Physical activity (heart rate and PAHR > 50)<br>Motivation climate check                                                                                                                                                                                                                                                                                     | Mastery motivational vigorous physical play sessions resulted in higher heart rate and PAHR > 50 for toddlers when compared to free play sessions                                                                                                                                                                                                                                                                                                         | <i>Research Quarterly for Exercise and Sport</i>   |
| Mandigo <i>et al.</i> (2008) | Studied were (1) to examine students' motivational experiences arising from their participation in games lessons based on autonomy-supportive strategies; and (2) to examine the interaction between boys' and girls' motivational experiences across different categories of games (SDT) | 380 females, 379 males from 37 classes<br>Fourth- and seventh-grade students<br>(Canada) | 1 × 30–45 min lesson<br>(NC)                   | Students' motivational experiences                                                                                                                                                                                                                                                                                                                           | Significant between subject differences did emerge for both gender and games category. Girls reported higher levels of optimal challenge, perceived autonomy support, and enjoyment whereas boys reported higher levels of perceived competence. For the games category, participants reported higher levels of self-determined motivation in net/wall games whereas invasion games received the lowest motivational ratings of the four games categories | <i>European Physical Education Review</i>          |
| Murcia <i>et al.</i> (2010)  | Investigated the influence that an autonomous motor task learning programme had on the improvement of perceived competence, intrinsic regulation, incremental belief and motivational orientations. (SDT)                                                                                 | 42 students<br>2 <sup>nd</sup> year university students<br>(Portugal)                    | 1 × 45 min lesson for 12 weeks<br>(NC)         | Incremental factor of the Conceptions of the Nature of Athletic Ability Questionnaire; Goal Orientation in Exercise Scale; Intrinsic regulation factor—Behavioural Regulation in Exercise Questionnaire; Perceived autonomy factor of the autonomy measurement scale; Perceived competence factor of the Motives for Physical Activity Measure Revised Scale | The results showed that the use of an autonomy-based teaching programme increased perceived competence, intrinsic motivation, incremental ability belief and task-involving motivational orientation.                                                                                                                                                                                                                                                     | <i>European Journal of Psychology of Education</i> |
| Tessier <i>et al.</i> (2010) | Tested the effects of a training programme for three PE newly qualified teachers on the aforementioned teachers' overt behaviours and students' psychological needs satisfaction, self-determined motivation and engagement in sport-based PE (SDT)                                       | 102 females and 83 males<br>9th–11th grade students from 3 schools<br>(France)           | 1 × 60 min lesson per week for 6 weeks<br>(NC) | Overt behaviours of newly qualified teachers, students' self-reported need satisfaction, self-determined motivation and engagement in class                                                                                                                                                                                                                  | Results revealed that from pre- to post-intervention: (1) teachers managed to improve their teaching style in terms of all three dimensions, and (2) students were receptive to these changes, as shown by increases in their reported need satisfaction, self-determined motivation and engagement in the class                                                                                                                                          | <i>Contemporary Educational Psychology</i>         |

been contributions from European countries including Greece (3), France (2), Portugal (1) and Spain (1). All have supported the notion that autonomy-supportive climates provide similar learning opportunities for learners.

In a few studies, participants included pre-service (Morgan *et al.*, 2005) and newly qualified (Tessier *et al.*, 2010) teachers who were trained to implement an autonomy-supportive climate, and then evaluated teacher behaviour. These studies showed that teachers can learn how to implement the structures incorporated in an autonomy-supportive learning environment. These studies as well as others have shown that when these structures are in place, students perceive the environment as autonomy supportive and exhibit positive outcomes (e.g. Solmon, 1996; Valentini & Rudisill, 2004a,b; Barkoukis *et al.*, 2008; Gray *et al.*, 2009; Robinson *et al.*, 2009; Robinson & Goodway, 2009; Morgan & Kingston, 2010).

### *Length of interventions*

The length of interventions varies dramatically within the autonomy-supportive literature. Interventions as short as two 30-minute lessons (Solmon, 1996), or as long as a school year (Digelidis *et al.* (2003) have been conducted. The number of sessions per intervention varied from one time per week (Gray *et al.*, 2009; Murcia *et al.*, 2010) to five times per week (Martin *et al.*, 2009). The length of sessions ranged from 30 minutes to one hour. In only three studies, the researchers conducted a retention test to determine if the positive effects of the intervention were sustained over time (Christodoulidis *et al.*, 2001; Valentini & Rudisill, 2004b; Robinson & Goodway, 2009). The results are promising, suggesting that autonomy-supportive climates are sustained up to six months (Valentini & Rudisill, 2004b; Robinson & Goodway, 2009). However, we speculate that for positive outcomes to continue, autonomy-supportive climates should be offered consistently from year to year, rather than randomly introduced at some point in one's educational experience.

There is indeed a need for more investigation involving long-term and continued intervention with autonomy-supportive educational programmes. To date, there are only three studies that have investigated the effects of a long-term autonomy-supportive intervention in PE (Cecchini *et al.*, 2001; Digelidis *et al.*, 2003; Barkoukis *et al.*, 2008). Two of the intervention studies involved a seven-month intervention (Cecchini *et al.*, 2001; Barkoukis *et al.*, 2008), while Digelidis *et al.* (2003) conducted a 10-month (full school year) intervention. Although these studies show promising results with regard to student engagement and learning, no studies have looked at the effects of autonomy-supportive PE programmes over multiple years or longitudinally.

Regardless of the length of the intervention, all studies reported positive findings related to autonomy-supportive PE experiences. None of the studies investigated the length of time needed to reveal positive changes from an autonomy-supportive environment. On the basis of the dependent variables investigated, the length of the intervention may differ. For example, in order to expect changes in motor skill

development as a result of an intervention, a minimum of 8–10 weeks is required (Valentini & Rudisill, 2004a,b; Martin *et al.*, 2009; Robinson & Goodway, 2009). On the other hand, changes in attitudes may occur rapidly within an intervention (Gray *et al.*, 2009; Murcia *et al.*, 2010). The findings from the intervention research suggests that next steps should focus on ways to implement large-scale school-based interventions, where autonomy-supportive PE programmes are implemented and children's behaviours are tracked longitudinally.

### *Study designs*

Of the studies reviewed, 19 adopted designs that compared groups of learners exposed to autonomy-supportive climates with those exposed to climates that could be considered more traditional. Within Table 1, these studies are indicated by '(C)' within the column describing the focus of the study and are arranged chronologically. The typical climate comparisons listed in these studies included 'task-involved or ego-involved', 'mastery-based or performance-based', 'learner-centred or teacher-centred' and 'high-autonomy or low-autonomy'.

Different variables were investigated in these studies to determine the influence of autonomy-supportive climate PE programmes (see 'outcome measures' in Table 1). Within these studies, the researchers used experts or trained teachers to create autonomy-supportive climates and to teach in the PE setting.

The other eight studies listed in Table 1 investigated autonomy-supportive PE climates, but did not make comparisons to other types of climates. In these cases, the code '(NC)' is provided. Teachers were either trained to incorporate autonomy-supportive climates (e.g. Parish *et al.*, 2007; Mandigo *et al.*, 2008; Murcia *et al.*, 2010) or were identified as teachers who were autonomy supportive in their teaching practices (Brunel, 1999; Parish & Treasure, 2003). The primary purpose of these studies was to identify changes in behaviours as a result of the intervention. Such behaviours included motor skill development (Solmon, 1996; Valentini & Rudisill, 2004a,b; Martin *et al.*, 2009; Robinson *et al.*, 2009), physical activity (Parish & Treasure, 2003; Parish, 2008), and body mass index (Parish & Treasure, 2003) as well as a number of psychosocial factors including perceptions of competence (e.g. Barkoukis *et al.*, 2008; Robinson *et al.*, 2009), intrinsic motivation (e.g. Brunel, 1999; Barkoukis *et al.*, 2008), beliefs about the causes of success (Morgan & Carpenter, 2002), task choice (Barkoukis *et al.*, 2008), satisfaction (Morgan & Carpenter, 2002; Tessier *et al.*, 2010), boredom (Morgan & Carpenter, 2002) and cognitive and somatic anxiety (Barkoukis *et al.*, 2008).

Of the 27 intervention studies reviewed, all ensured fidelity of the climate intervention by measuring the learners' perception of the climate, or in the cases where the participants were too young to complete a questionnaire, a climate manipulation check was conducted.

### *Outcome measures*

There are a number of exciting outcomes associated with autonomy-supportive climates in PE. Learners exposed to autonomy-supportive climates in PE reported positive changes in motor performance when compared to less supportive climates (Theeboom *et al.*, 1995; Valentini & Rudisill, 2004a,b; Martin *et al.*, 2009; Robinson & Goodway, 2009; Barkoukis *et al.*, 2008) and physical activity engagement (Christodoulidis *et al.*, 2001; Parish & Treasure, 2003; Parish *et al.*, 2007; Parish, 2008). With respect to changes in psychosocial factors associated with achievement motivation, learners reported positive changes in perceptions of competence compared with learners from less supportive climates, when exposed to autonomy-supportive PE (Valentini & Rudisill, 2004a,b; Barkoukis *et al.*, 2008; Robinson *et al.*, 2009; Murcia *et al.*, 2010). Learners exposed to autonomy-supportive climates also increased intrinsic motivation, incremental ability belief, and task-involving motivational orientation (Murcia *et al.*, 2010); demonstrated adaptive cognitive and affective responses (Morgan *et al.*, 2005), increased task persistence (Solmon, 1996); reduced performance-avoidance goals and maintained high levels of mastery goals in PE (Carr, 2006); increased prosocial choice (Sage & Kavussanu, 2007); and reported more positive attitudes towards exercise, participation in sports and eating fruit (Christodoulidis *et al.*, 2001) when compared to learners exposed to less supportive educational experiences.

From the non-comparison studies, the results show that autonomy-supportive PE results in positive changes in the following: learners reported that the climate had a positive impact on their motivation and learning experiences (Morgan & Kingston, 2010), increased fun, enjoyment, and/or satisfaction (e.g. Cecchini *et al.*, 2001; Morgan & Carpenter, 2002; Tessier *et al.*, 2010), felt self-determined (Brunel, 1999) increased perceptions of ability and effort in PE (Cecchini *et al.*, 2001; Tessier *et al.*, 2010), and sought out challenging tasks to practice and learn (Morgan & Carpenter, 2002). Furthermore, researchers found that children enrolled in mastery climate PE and programmes effectively engaged in the lessons (Barkoukis *et al.*, 2008), and positive attitudes towards physical activity (Digelidis *et al.*, 2003).

### **Implications for curriculum, pedagogy and assessment**

This review has demonstrated that where students experience PE developed on the premise of being autonomy supportive, irrespective of their grade level or gender they can achieve gains in their motor skill performance and their physical activity engagement. Further, students tend to change their motivational profiles in positive ways towards PE, which leads them to be more intrinsically motivated and have higher levels of perceived competence.

### *Curriculum implications*

One of the guiding principles of a mastery climate is that significant student choice of lesson content. While this is not to be confused with the idea of free play, students are

given the freedom to choose from different tasks, and to spend different amounts of time in these tasks. While relatively controlling teachers interfere with students' self-determination because they ask students to adhere to a teacher constructed instructional agenda, there is also the potential for similar outcomes from highly predefined curriculum plans. By consequence, in situations where state mandated curricula are very restrictive, many teachers might struggle to accommodate student choice as much as is intended from autonomy-supportive climates. However, curriculum planners should be reminded that research on learning motor skills suggests that children from autonomy-supportive programmes do indeed develop their skills (see Valentini & Rudisill, 2004a,b; Robinson *et al.*, 2009), and in some cases, do this to a greater extent than a more traditional, teacher-directed approach (see Martin *et al.*, 2009). What becomes potentially problematic for curriculum planners is the issue of time, that is, in efforts to cover a multi-activity curriculum where activities are presented in short units, the outcome is more often little vertical progression in skill development (see Kirk, 2010).

### *Pedagogical implications*

With respect to instruction and pedagogy, it must first be clear that any teaching is indeed, autonomy supportive. Similar to the concept of 'benchmarks' (see Metzler, 2011) that represent the essential components of any instructional model, there are immutable aspects of teaching that cannot be compromised if one is to call the climate as autonomy supportive. These include (1) providing choices, (2) encouraging students' experimentation and self-initiation, (3) fostering students' willingness to take on challenges, explore new ideas and persist at difficult activities, (4) offering optimal challenges (neither too easy, nor too difficult), (5) providing feedback that is not evaluative of the person, (6) and giving a meaningful rationale for requested behaviour (see Reeve, 2006).

It is important to note that in many cases, these concepts may be foreign to many teachers' motivational strategies, with them preferring controlling strategies such as rewards and other extrinsic incentives (see Reeve *et al.*, 2004). Further, when teachers *do* implement less controlling pedagogies, these are often with the caveat that students are old enough and have sufficient ability to handle autonomy (see Flowerday & Schraw, 2000; and Shapiro & Cole, 1994 for research on classroom teachers, and Xiang *et al.*, 2011; and Xiang *et al.*, 2003 within PE). However, the results of this review would suggest that these perceptions may not be well founded. For example, a number of studies have demonstrated that children in pre-school settings are able to: (1) respond positively to a variety of tasks and equipment that accommodate a wide range of skill levels, (2) manage their own instructional time, and also manage themselves during that instructional time, (3) respond well to receiving incentives, private recognition and praise based on personal accomplishments and (4) self-evaluate. Likewise, not only the most skilful students need be afforded opportunities for voice and choice within lessons. This review has identified

that less skilful boys and girls are able to demonstrate desired learning outcomes equivalent to their more skilled peers (Valentini & Rudisill, 2004a).

With respect to choice, Stefanou *et al.* (2004) have proposed that instructional choices can be provided at three levels. The first is cognitive (such as allowing students to ask questions), the second is organisational (which included letting students chose who they work with), while the third is procedural (such as allowing students to choose from a number of tasks or a level of challenge within a task). Those authors have argued that of these, cognitive choices may play a more important role in fostering motivation and engagement. This may perhaps be due to their studies being conducted in classroom settings. However, as with previous restrictive thinking on the potential of autonomy-supportive climates, the findings within this review show that students can derive benefits within lessons where they are provided with choice on all three levels, that is, allowing students to select from a variety of tasks and the time they allocate to practicing those tasks is a strong motivator for engagement.

### *Assessment implications*

With respect to assessment, two key points are noteworthy. This first relates to the change in the role of the teacher. Being more ‘off centre-stage’, and taking a reduced role in directing student activity and decision making, the teacher is afforded the opportunity to spend more time in individual assessment. However, it should be noted that to be consistent with the intent of autonomy-supportive climates, this feedback should focus on encouraging effort and persistence, as well as praising signs of improvement and mastery (see Reeve, 2006). With respect to the measurement of performance outcomes, teachers will still have a set of standards against which they will evaluate a student’s achievement. However, in reporting final performance scores to students, there still should be acknowledgement of an individual’s improvement over time.

In addition, and consistent with the intent of autonomy-supportive climates, the teacher is also given increased opportunities to help students learn to self-assess. It should be noted, however, that we do not have empirical data to support anecdotal accounts that children can indeed make appropriate self-evaluations and use these evaluations to promote further learning.

### **Final words**

From an examination of the methodologies used in this review, it is evident that many of the dependent measures used teacher and/or students’ perceptions of motivation, enjoyment, ability and effort. Others that used more behavioural methods focused on discreet motor skill acquisition or measures of class involvement through the use of pedometers. What is missing, however, are sophisticated measures of actual lesson *engagement*.

Engagement refers to the 'behavioural intensity and emotional quality of a person's active involvement during a task' (see Reeve *et al.*, 2004, p. 147). It is a wide-ranging concept that reflects a person's enthusiastic participation in a task and includes many interrelated expressions of motivation, such as intrinsically motivated behaviour, self-determined extrinsic motivation, work orientation and mastery motivation (see Reeve *et al.*, 2002). Of particular utility and importance, engagement is considered to represent the behavioural pathway by which students' motivational processes contribute to their subsequent learning and development. Consequently, it not only predicts important outcomes but also reveals underlying motivation (Reeve *et al.*, 2004).

Future research in PE might begin to use measures of student engagement as a legitimate dependent variable. While such methodologies are labour intensive (given they require measures of attention, effort, verbal participation, persistence and positive emotion), they should, however, provide a more descriptive and rich account of how students respond to autonomy-supportive climates and also serve as quality discriminators in intervention studies.

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