

The trans-contextual model: Perceived learning and performance motivational climates as analogues of perceived autonomy support

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Running head: TRANS-CONTEXTUAL MODEL

The Trans-Contextual Model: Perceived Learning and Performance Motivational Climates as
Analogues of Perceived Autonomy Support

Abstract

1
2 The trans-contextual model of motivation (TCM) proposes that perceived autonomy support in
3 physical education (PE) predicts autonomous motivation within this context, which, in turn, is related
4 to autonomous motivation and physical activity in leisure-time. According to achievement goal theory
5 perceptions of learning and performance motivational climate in PE can also affect autonomous
6 motivation in PE. The purpose of the present study was to examine the influence of an integrated
7 approach of perceptions of motivational climate in PE by incorporating aspects of perceptions of
8 motivational climate from achievement goal frameworks on autonomous motivation in PE within the
9 TCM. High school students (N=274) completed self-report measures of perceived autonomy support,
10 perceived learning and performance motivational climate and autonomous motivation in PE. Follow-up
11 measures of autonomous motivation in a leisure-time context were taken along with measures of
12 attitudes, subjective norms, perceived behavioural control, and intentions from the theory of planned
13 behaviour one week later. Self-reported physical activity behaviour was measured five weeks later. The
14 results of the path analyses indicated that perceived learning climate was the strongest predictor of
15 autonomous motivation in PE and leisure-time contexts and mediated the effect of perceived autonomy
16 support on autonomous motivation in PE. Perceived performance climate showed no significant effect
17 on autonomous motivation in PE and leisure-time. Results also confirmed the premises of TCM
18 regarding the effect of autonomous motivation in leisure-time on leisure-time physical activity and the
19 mediating role of the planned behaviour theory variables.

The Trans-Contextual Model: Perceived Learning and Performance Motivational Climates as Analogues of Perceived Autonomy Support

The trans-contextual model (TCM; Hagger, Chatzisarantis, Culverhouse & Biddle, 2003a) is an integrated theoretical model of motivation that integrates components of self-determination theory (SDT; Deci & Ryan, 1985, 2002), the hierarchical model of intrinsic and extrinsic motivation (Vallerand, 2007), and the theory of planned behaviour (TPB; Ajzen, 1985). Based on the premises of theoretical integration (Hagger, 2009; Orbell, Hagger, Brown, & Tidy, 2006), the aim of the model is to identify whether motivation in one educational context, such as physical education (PE), can lead to motivation in another, related, context, such as physical activity in leisure time. This is important, as support for the trans-contextual component of the model will provide evidence that fostering motivation in education may give rise to motivation in other contexts and promote greater behavioural engagement outside of the educational context. This may lead to long term adaptive outcomes such as increased participation in physical activity. The present study aims to test and extend the trans-contextual model by incorporating components from achievement goal theory and examine how these are related to the factors proposed to influence within- and trans-contextual motivation in the TCM. The model will be tested in a PE and leisure-time physical context among adolescents in high schools. First, it is important to outline the theoretical premises of the TCM, and this will be addressed in the next section.

The Trans-Contextual Model: Theoretical Bases

Central to self-determination theory is the distinction between *autonomous* and *controlled* forms of motivation (Deci & Ryan, 1985). The experience of autonomous motivation is characterized by enjoyment, satisfaction, interest, and a sense of choice. Participation in an activity is spontaneous and free from any external reinforcement. On the other hand, controlling motivation denotes the engagement in an activity through reinforcement such as gaining contingent outcomes, or the avoidance of negative reinforcements such as punishment. Autonomous motivation has been associated

1 with adaptive responses in terms of activity involvement and persistence, whereas controlling
2 motivation is accompanied by lower-levels of satisfaction and enjoyment, and persistence with the
3 activity is maintained only as long as the reinforcing contingencies are present (Deci & Ryan, 2008).
4 According to the theory, an autonomy-supportive environment will result in an increase in autonomous
5 motivation and, subsequently, an adaptive pattern of responses (Reeve, 2002). An autonomy-supportive
6 environment is characterized by style or approach offered by social agents to target individuals “by
7 taking their perspective, encouraging initiation, supporting a sense of choice, and being responsive to
8 their thoughts, questions, and initiatives” (Deci & Ryan, 2008, p. 18).

9 Introducing the hierarchical model of intrinsic and extrinsic motivation, Vallerand (2007)
10 suggested that the autonomous-controlled motivation distinction in self-determination theory exists at
11 three levels of generality: the global, contextual, and situational levels. An important prediction of the
12 model is that motivation in one context can affect motivation in another (Vallerand, 2007). For
13 instance, intrinsic motives in an academic context (e.g., motivation in PE) could be transferred to
14 intrinsic motives in a social or sport context (e.g., leisure-time motivation). According to Vallerand’s
15 (2007) model, the transfer of motivation is possible at the contextual level from one context to the next.
16 Specifically, individuals store motivational experiences in different life contexts, such as education and
17 leisure, as motivational schemas. These schemas provide individual with top-down information about
18 the type of motivation he/she can expect to feel if he or she was to engage in a similar, related context.
19 When the individual encounters similar and related contexts, these schemas can serve to promote or
20 inhibit motivation towards acting in this context. For instance, Sénécal, Vallerand and Guay (2001)
21 reported a conflict between work and family motivational orientations, whereas Hagger et al. (2003)
22 indicated that self-determined motivation in physical education facilitated self-determined motivation
23 towards leisure-time physical activity. In addition, consistent with self-determination theory, motives
24 at one level of generality are affected by the social environment at the same level. For instance,
25 motivation in PE is influenced by learning environment initiated by the PE teacher which should

1 support autonomy. Autonomy-supportive environments are therefore thought to increase autonomous
2 motivation in the same context (Vallerand, 2007).

3 The theory of planned behaviour is an important social-cognitive theory that aims to explain the
4 volitional antecedents of intentional behaviour (Ajzen, 1985). The theory is a rational decision-making
5 approach to understanding intentional behaviour. As such, behaviour intention is considered key
6 variable of the theory and is viewed as the immediate antecedent of behaviour, and reflect the person's
7 commitment and determination to enact this behaviour (Armitage & Conner, 2001). This is in contrast
8 to self-determination theory, which is an organismic approach to motivation based on psychological
9 needs rather than beliefs, social cognitive information, and decision making. Intentions are shaped by
10 one's attitudes, subjective norms, and perceived behavioural control (PBC). Attitudes represent the
11 combination of outcome expectancies (i.e., a behaviour will lead to specific, desired outcomes), and the
12 valences attached to these outcomes. Subjective norms reflect perceived social pressures to perform the
13 behaviour. PBC denotes one's perceived ability to perform the target behaviour, and may predict
14 behaviour either directly, or indirectly, via the intentions path (Ajzen, 1985).

15 The TCM aims to describe and explain the psychological mechanisms by which motivational
16 climate can affect out-of-school leisure-time physical activity. More specifically, the TCM has been
17 used to examine whether perceptions of the social environment that support autonomous forms of
18 motivation in school physical education (PE) can affect students' participation in leisure-time physical
19 activity (Hagger, et al., 2003). The TCM proposes that autonomy support in an educational context
20 fosters autonomous motivation within this context, which, in turn, is translated into autonomous
21 motivation in another context. These perceptions of autonomous motivation affect behaviour in the
22 same context through the influence of the constructs from the TPB. The process behind the proposed
23 link between motivational orientations from SDT and the expectancy/future –oriented, behaviour-
24 specific social cognitive constructs from the TPB lies in prompting and recall. When individuals are
25 prompted to recall their perceived motives toward a particular behaviour (e.g., physical activity) by

1 measures of motivation (e.g., SDT questionnaires), they will only be compelled to initiate that
2 behaviour if asked or prompted to make a decision about future activity (e.g., attitudes, intentions).
3 This distinction between ‘recollection’ and ‘prediction’ is analogous to the distinction between
4 ‘remembered utility’ and ‘expected utility’ (Kahneman & Tversky, 1979)¹.

5 So far there is increasing research evidence in support of the TCM premises as well as the
6 integration of self-determination theory and the TPB (for a review see Hagger & Chatzisarantis, 2009).
7 Across the literature, autonomy support in PE has been identified as a significant predictor of
8 autonomous motivation in PE which, in turn, has a significant effect on autonomous motivation in
9 leisure-time physical activity. The latter had a significant effect on behavioural intention and physical
10 activity behaviour through the variables of the TPB (Hagger & Chatzisarantis, 2007, 2009, in press;
11 Hagger et al., 2003).

12 **Achievement Goal Theory (AGT)**

13 AGT is another theoretical approach that has been adopted to study the effect of social
14 environment on individuals’ motivation and behaviour in educational contexts. A central element of
15 this approach is that individuals participate in an activity to demonstrate competence (Nicholls, 1989).
16 According to the theory there are two different ways to define competence, labeled *learning* and
17 *performance* orientations². A learning orientation reflects an undifferentiated conception of competence
18 and effort (i.e., competence and effort jointly lead to achievement) while ego orientation a
19 differentiated one (i.e., high competence is evident when achieving with low effort). Learning-oriented
20 individuals define success based on self-referenced criteria, such as personal improvement and mastery
21 of tasks. Such individuals view effort as a means to achieve at a task or behaviour which is likely to
22 lead to high perceived competence (Nicholls, 1989). On the other hand, performance-oriented
23 individuals define success using normative criteria or through comparison with others. As the basic
24 goal of involvement is the demonstration of superior ability, performance oriented individuals feel
25 successful and experience high competence when they outperform others or their performance is higher

1 than normative standards. On the contrary, they feel unsuccessful and their perceptions of competence
2 are low when their performance is below normative standards or cannot outperform others (Nicholls,
3 1989).

4 These perceptions of competence and success have also been used to describe perceived
5 motivational climate, a situational construct that reflects people's perception of the environment and
6 influences action in achievement situations (Ames, 1992). Perceptions of motivational climate have
7 been viewed as either *learning-oriented* or *performance-oriented* depending on how people perceive
8 the structure of the achievement environment. In a learning-oriented climate, emphasis is put on
9 personal development and mastery of skills, whereas in a performance-oriented climate emphasis is
10 placed on social comparison and performance outcomes (Ames 1992). Research evidence on
11 perceptions of motivational climate in educational settings has indicated that perceived learning climate
12 is associated with more adaptive responses to involvement in educational settings such as higher
13 intrinsic motivation, satisfaction, persistence, effort, interest, participation in lessons, and lowered
14 tension while these constructs were found to be unaffected or negatively influenced by a perceived
15 performance climate (Ntoumanis & Biddle, 1999). Further, research evidence has demonstrated that a
16 performance-oriented perceived motivational climate is associated with increased extrinsic motivation,
17 tension, anxiety, pressure, lowered effort, and lower enjoyment (Ntoumanis & Biddle, 1999).

18 **Perceptions of Motivational Climate: An Integrated Approach**

19 According to both AGT and the TCM, perceptions of the social environment are linked to
20 autonomous motivation in educational contexts and lead to more adaptive responses from involvement
21 (Ames, 1992). Yet, these theoretical approaches propose that perceptions of motivational climate arise
22 from different antecedents. The TCM hypothesizes that perceived motivational climate is influenced by
23 perceptions of the autonomy support provided by PE teachers. Research using this approach has
24 suggested that an environment perceived to be autonomy-supportive leads to increased academic
25 achievement (Deci, Vallerand, Pelletier, & Ryan, 1991), a better understanding of educational concepts

1 (Black & Deci, 2000), higher non-contingent self-esteem (Hagger, Biddle, Chow, Stambulova, &
2 Kavussanu, 2003b; Hagger, Hein & Chatzisarantis, 2011), and greater persistence on educational tasks
3 among school students (Reeve, 2002) and intrinsic motivation at the contextual level (Vallerand, 2007).
4 From an AGT perspective, perceptions of motivational climate promote engagement through the
5 emphasis provided by PE teachers on the development of competence. Research using this approach
6 has indicated that when the emphasis of PE students was put on self-referenced criteria, autonomous
7 motivation was increased and an adaptive pattern of responses emerged. In contrast, an emphasis on
8 social comparison criteria was associated with extrinsic forms of motivation and maladaptive responses
9 (Barkoukis, Tsorbatzoudis & Grouios, 2008).

10 Recent research in PE has suggested that the integration of these approaches in the investigation
11 of perceptions of motivational climate would provide a more thorough understanding on the role of
12 social environment. For instance, Ntoumanis (2001) examined different facets of perceptions of
13 motivational climate based on achievement goal and self-determination theories and suggested that
14 they affect different psychological needs (i.e., self-improvement predicted competence, cooperative
15 learning predicted relatedness, and task choice predicted autonomy). These findings provide evidence
16 that dimensions of motivational climate have differential effects on students' perceptions. Similarly,
17 Ommundsen and Kvalø (2007) indicated that positive perceptions of a mastery climate (a dimension
18 derived from AGT), and teacher support for autonomy (dimension used in the TCM), were both
19 associated with high levels of autonomous motivation toward PE. These findings imply that an
20 integrated approach incorporating aspects from both AGT and TCM may provide a more
21 comprehensive understanding of the effect social factors (perceptions of teacher's behaviour) have on
22 the formation of students' motivation and subsequent outcomes from participation in PE classes. Based
23 on the previous research, Liukkonen, Barkoukis, Watt, and Jaakkola (2010) found that different
24 perceptions of motivational climate dimensions, all characterized by high self-determination (i.e.,
25 learning, autonomy supportive, and relatedness dimensions), showed a similar pattern of responses

1 with respect to adaptive outcomes like enjoyment and effort and maladaptive outcomes like state
2 anxiety in PE classes. More specifically, self-determined dimensions of motivational climate positively
3 affected enjoyment and effort and negatively predicted state anxiety. On the other hand, performance
4 climate was a positive predictor of state anxiety and a negative predictor of enjoyment and effort.

5 **The Present Study and Hypotheses**

6 The purpose of the present study was to examine a modified version of the TCM integrating
7 perceptions of motivational climate in PE as predictors of autonomous motivation in PE within the
8 TCM. The study seeks to advance knowledge by incorporating aspects of motivational climate from
9 AGT and establishing how these perceptions affect autonomous motivation and subsequent behaviour
10 within the TCM. Based on previous research (Liukkonen et al., 2010), learning climate showed a
11 similar pattern of influence to autonomy-supportive climate on important adaptive outcomes in PE. For
12 example, learning climate was significantly and positively related to children's cognitive and affective
13 responses in PE lessons. In contrast, performance climate was negatively related to these outcomes.
14 Yet, there is no evidence for (a) the effect of these motivational climate dimensions on the formation of
15 motivational regulations from SDT in PE contexts and (b) in the effect of these climate dimensions on
16 motivation and intentions to engage in out-of-school, leisure-time physical activity and actual physical
17 activity behaviour. Furthermore, the research will establish whether learning climate acts as an
18 analogue for autonomy-supportive climate or adds further to the explanation of variance in the forms of
19 motivational regulation in PE and leisure-time from SDT within the context of the TCM. In the latter
20 case, this would be important information as it would suggest that autonomy-supportive climate is an
21 aspect of learning climate, as Ames (1992) argued. In this case, would the other aspects of a learning
22 climate such as development of competence and positive reinforcement, further facilitate the formation
23 of autonomous motivation in PE and leisure-time? In addition, important questions arise with respect to
24 the role of performance climate in the model. PE usually involves a lot of competitive tasks and
25 winning might be an important goal that could lead to high motivation. So, would fostering a

1 performance climate increase the competitiveness of students leading to higher motivation for
2 participation in out-of-school physical activities and actual participation in physical activity? Would
3 performance climate mediate the effect of autonomy support on autonomous motivation in PE and
4 leisure-time reported in previous studies (Hagger et al., 2003)? In contrast, autonomy support has been
5 strongly associated with learning motivational climate, but as performance-oriented climate has been
6 linked with perceived controlling behaviours displayed by the teacher, we expected no relationship
7 between controlled support and autonomy support. These questions will be addressed in the present
8 study. Therefore, the primary aim of the present study is to examine the effects of perceptions of
9 learning and performance motivational climate in conjunction with perceptions of autonomy support on
10 autonomous motivation in PE. A secondary aim is to replicate the TCM as tested in previous studies
11 (Hagger & Chatzisarantis, 2007, 2009).

12 We hypothesize that perceptions of learning motivational climate from AGT will be significantly
13 related to autonomous motivation in PE (Hypothesis 1a). In accordance with previous theory and
14 research (Butler, 1987; Ryan & Deci, 1989), perceptions of a learning-oriented motivational climate are
15 likely to impel students to derive competence through the accomplishment of personally-referenced
16 goals and the development of self-referenced criteria for success. Satisfaction of the need for
17 competence has been frequently shown to promote autonomous forms of motivation (Deci & Ryan,
18 2000). Hence, as learning oriented motivational climate is hypothesized to increase perceptions of
19 competence, it is expected that it will be associated with autonomous motivation in PE. In contrast, as
20 perceptions of performance motivational climate reflects an environment putting emphasis on gaining
21 competence through attaining other-referenced criteria for success, it is not expected to be related to
22 autonomous motivation (Hypothesis 1b; Please see Figure 1 for an illustration of the hypothesized
23 relationships).

24 In addition, it is expected that perceived teachers' autonomy support will have a significant
25 effect on autonomous motivation in PE, as proposed by the TCM (Hagger & Chatzisarantis, 2007) and

1 self-determination theory (Deci & Ryan, 1985), and supported by numerous empirical studies (Wilson
2 & Rodgers, 2004). However, as Ames (1992) contented that support of autonomy leads to increased
3 perceptions of learning-oriented motivational climate, we hypothesized that children who rated teachers
4 as being autonomy supportive are also likely to report a learning-oriented motivational style. Recent
5 research evidence in physical education settings has indicated that a learning oriented motivational
6 climate influences autonomous motivation both directly and indirectly through the satisfaction of basic
7 psychological needs (Cox & Williams, 2008). According to SDT, satisfaction of needs for autonomy,
8 competence and relatedness is vital for the development of autonomous motivation (Deci & Ryan,
9 2000). Support of autonomy targets only the need for autonomy, whereas a learning oriented
10 environment can influence all three basic psychological needs (see Ames, 1992; Quedsted & Duda,
11 2009; Reinboth & Duda, 2006). In addition, autonomy support is only one facet of a learning oriented
12 environment which also involves the development of competence through the tasks taught, peer
13 grouping and cooperation, evaluation approaches and organization of the teaching process (Ames,
14 1992; Barkoukis et al., 2008). We therefore hypothesized that perceived learning climate would
15 mediate the effect of perceived autonomy support on autonomous motivation (Hypothesis 1c).
16 However, as we did not expect perceptions of a performance motivational climate to predict
17 autonomous motivation, we did not expect the inclusion of perceived autonomy support to affect this
18 relationship. Performance perceived climates foster competence through normative or other-referenced
19 outcomes and success is perceived to be derived from events external to the individual. In this sense, a
20 performance motivational climate is inconsistent with a sense of personal ownership or agency over
21 behaviour and, therefore, likely to be poorly associated with autonomous motivation and perceived
22 autonomy support.

23 We also propose that the trans-contextual transfer of autonomous motivation will occur between
24 PE and leisure-time physical activity contexts. Therefore, autonomous motivation in PE is expected to
25 predict autonomous motivation in leisure-time, in accordance with the TCM (Hypothesis 2). In

1 addition, it is expected that there will be no direct effects of perceived autonomy support and
2 perceptions of learning and performance motivational climate on autonomous motivation in leisure-
3 time. Instead, autonomous motivation in PE is hypothesized (Hypothesis 3) to mediate the effects of
4 perceived autonomy support and perceptions of learning and performance motivational climate in PE
5 on autonomous motivation in leisure-time. We also hypothesize (Hypothesis 4) that autonomous
6 motivation in leisure-time will predict the proximal determinants of actual physical activity behaviour
7 in leisure-time that have been shown in previous research to be related to SDT variables, namely,
8 attitudes, subjective norms and PBC.

9 It is also hypothesized (Hypothesis 5) that attitudes, subjective norms, and PBC will predict
10 intentions as stipulated in the TPB (Ajzen, 1985) and numerous meta-analyses (e.g., Armitage &
11 Conner, 2001; Hagger, Chatzisarantis, & Biddle, 2002). It is hypothesized (Hypothesis 6) that the
12 effects of autonomous motivation in leisure-time on intentions to engage in leisure-time physical
13 activity will be mediated by attitudes and PBC, but not subjective norms. Intentions to participate in
14 leisure-time physical activity are hypothesized (Hypothesis 7) to be the sole, direct predictor of leisure-
15 time physical activity behaviour at time point 3. It is also expected that PBC will have no significant
16 direct effect on behaviour, an alternative hypothesis to the mediational model stipulated by Ajzen
17 (1985) to account for occasions when PBC serves as a proxy for actual control over behaviour. Finally,
18 the effects in the model are proposed to be independent of the effects of past leisure-time physical
19 activity behaviour and therefore direct paths from past behaviour to all of the theory constructs will be
20 included as free parameters in the model. It is hypothesized (Hypothesis 8) that the proposed
21 relationships in the model will remain unchanged with the inclusion of past behaviour.

22 Method

23 Participants

24 Participants (N = 274; males = 132, females = 137, unreported = 5; Mean age 16.89, SD = .65)
25 were recruited from three co-educational high schools in Greece. Attrition across the three waves of

1 data collection resulted in a final sample of 170 (males = 84, females = 86; Mean age 16.91, SD = .63,
2 attrition rate = 37.96%). Chi-square analysis revealed no variation in the proportion of males and
3 females among those who dropped out of the study relative to those who remained in the study. An
4 independent samples *t*-test and chi-square analysis revealed no significant difference in age or gender
5 distribution, respectively, among those who dropped out of the study and participants remaining in the
6 study. These findings suggest there was no response bias in terms of demographics between recruited
7 participants who dropped out of the study and those that were included in the final analysis.

8 **Measures**

9 **Perceived autonomy support.** The 12-item Perceived Autonomy Support Scale for Exercise
10 Settings was administered to measure participants' perceived autonomy support provided by their PE
11 teachers. This measure has shown construct, discriminant, predictive, and nomological validity with
12 other like constructs (Hagger et al., 2007). An example item from the scale is: "I feel that my PE
13 teacher provides me with choices, options, and opportunities to do active sports and/or vigorous
14 exercise". Responses were recorded on seven-point scales ranging from 1 ("*strongly disagree*") to 7
15 ("*strongly agree*"). The internal reliability for the perceived autonomy support scale was satisfactory
16 ($\alpha = .90$).

17 **Perceptions of learning and performance motivational climate.** A short version of the
18 Learning and Performance Orientations in Physical Education Classes Questionnaire (13 items;
19 Digelidis, Papaioannou, Laparidis, & Christodoulidis, 2003) was used to assess students' perceptions of
20 learning and performance motivational climates created by their PE teachers. Perceptions of learning
21 climate were measured with 7 items (e.g., "the PE teacher is completely satisfied when every student's
22 skills are improving"), while perceptions of performance climate with 6 items (e.g., "the PE teacher
23 regards as competent students only those with the best sport record"). Responses were recorded on

1 five-point scales ranging from 1 (“*strongly disagree*”) to 5 (“*strongly agree*”). The internal reliability
 2 statistics for the learning ($\alpha = .80$) and performance ($\alpha = .77$) scales were satisfactory.

3 **Autonomous motivation in PE**³. A modified version of Ryan and Connell’s (1989) Perceived
 4 Locus of Causality Scale was used to measure autonomous motivation in PE. The scale was modified
 5 to refer to the PE context rather than a general education context. The scale measures four types of
 6 motivation: *intrinsic motivation* (e.g., “I participate in PE because it is fun”); *identified regulation* (e.g.,
 7 “I participate in PE because I value PE”), *introjected regulation* (e.g., “because I will feel ashamed if I
 8 do not do PE”), and *external regulation* (e.g., “I participate in PE because important others want me to
 9 do PE”). As in the original scale, two items tapped each motivation type and responses were made on
 10 four-point scales ranging from 1 (“*not true at all*”) to 4 (“*very true*”). Reliabilities were satisfactory for
 11 the intrinsic motivation scale ($\alpha = .73$), but below the desirable level of acceptability for identified
 12 regulation ($\alpha = .53$), introjected regulation ($\alpha = .55$), and external regulation ($\alpha = .44$)⁴.

13 **Autonomous motivation in leisure-time**. Mullen, Markland, and Ingledew’s (1997)
 14 Behavioural Regulations in Exercise Questionnaire was used to measure autonomous motivation in a
 15 leisure-time context. Participants were asked “Why do you participate in active sports and/or vigorous
 16 physical activities in your spare time?” followed by four reasons from each motivational regulation.
 17 Items measuring intrinsic motivation (e.g., “I exercise because it is fun”), identified regulation (e.g., “I
 18 exercise because it is important to make the effort”), introjected regulation (e.g., “I exercise because I
 19 will feel guilty if I do not”), and external regulation (e.g., “I exercise because others say I should”)
 20 were assessed on seven-point scales ranging from 1 (“*not true at all*”) and 7 (“*very true*”). Reliabilities
 21 were satisfactory for intrinsic motivation ($\alpha = .75$), identified regulation ($\alpha = .71$), introjected
 22 regulation ($\alpha = .71$), and external regulation ($\alpha = .70$).

23 **Theory of Planned Behaviour variables**. Measures of the TPB variables were constructed
 24 based on the recommendations of Ajzen (2002) and previous research (e.g., Chatzisarantis, Hagger,

1 Smith, & Phoenix, 2004). The measure of intentions comprised three items (e.g., “I intend to do active
2 sports and/or vigorous physical activities during my leisure-time in the next 5 weeks...”) rated on
3 seven-point scales anchored by 1 (“*strongly disagree*”) to 7 (“*strongly agree*”). Internal consistency for
4 this scale was satisfactory ($\alpha = .75$). Attitudes were measured using five seven-point semantic
5 differential scales with the bipolar adjectives: *bad-good*, *harmful-beneficial*, *not enjoyable-enjoyable*,
6 *useful-useless*, and *boring-interesting* in response to the common stem: “Participating in active sports
7 and/or vigorous physical activities during my leisure-time in the next five weeks is...” These items
8 achieved satisfactory internal consistency ($\alpha = .89$). Subjective norms were measured by two items
9 (e.g., “People important to me think that I should do active sports and/or vigorous physical activities
10 during my leisure-time in the next 5 weeks”) on seven-point scales with 1 (“*strongly disagree*”) to 7
11 (“*strongly agree*”) endpoints. The internal consistency of this scale was low ($\alpha = .43$)⁵. The PBC
12 measure comprised three items (e.g., “I feel in complete control over whether I do active sports and/or
13 vigorous physical activities in my leisure-time in the next 5 weeks”) measured on seven-point scales
14 ranging from 1 (“*no control*”) to 7 (“*complete control*”). The internal consistency of this scale was
15 adequate for this scale across the samples ($\alpha = .78$).

16 **Physical activity behaviour.** Self-reported leisure-time physical activity behaviour was
17 measured using an adapted version of Godin and Shepherd’s (1985) Leisure-Time Exercise
18 Questionnaire. Participants rated their five-week behavioural frequency during their leisure-time on
19 two items (e.g., “In the course of the past five weeks, how often have you participated in vigorous
20 physical activities for 20 minutes at a time?”) using six-point Likert scales with scale endpoints *never*
21 (1) and *everyday* (6). A definition of vigorous physical activity was given: “Vigorous physical
22 activities are activities which make your heart beat faster, breathe faster, and hot and sweaty”. The
23 inter-item correlation for this measure was .60.

1 **Past behaviour.** Past physical activity behaviour was assessed using a single-item: “In the
2 course of the past six months, how often, on average, have you participated in vigorous physical
3 activities for 20 minutes at a time?” Responses were made on six-point Likert scales with scale
4 endpoints *not at all* (1) and *most days per week* (6). This measure has been used in many previous
5 studies to estimate past behavioural frequency (Chatzisarantis, et al., 2004; Hagger et al., 2003a).

6 **Research Design**

7 The study adopted a three-wave prospective design. In the first wave (time 1), participants
8 completed self-report measures of perceived autonomy support from PE teachers, autonomous
9 motivation in a PE context, and perceptions of learning and performance motivational climate in PE. A
10 second questionnaire containing measures of the components of the TPB, autonomous motivation in a
11 leisure-time physical activity context, and past behaviour was administered in the second wave, one
12 week later (time 2). The one week interval was used to minimise the amount of error variance
13 introduced into the data that could be attributed to the use of similar measures of autonomous
14 motivation in PE and leisure-time contexts, as in previous research (Hagger & Chatzisarantis, 2007).
15 Five weeks later, self-reported physical activity behaviour was measured in the third wave (time 3).

16 Permission from school principals and parental consent was obtained prior to data collection.
17 Pupils were told that they were participating in a survey on young people and would be asked to
18 complete a battery of questionnaires over a series of weeks. Data were collected in quiet classroom
19 conditions and pupils were isolated so that they could not discuss responses. Questionnaires were
20 completed anonymously to preserve confidentiality and were matched using birth date and gender.

21 **Data Analysis**

22 Data were analysed by path analysis using a simultaneous process and with averaged
23 composites of the study variables. Data were analysed using the EQS program (Bentler, 2004) with a
24 robust maximum likelihood estimation method. Goodness-of-fit of the proposed model with the data

1 was evaluated using multiple recommended indexes of good-fit: the Sattora-Bentler scaled goodness-
2 of-fit chi-square ($S-B\chi^2$), the Comparative Fit Index (CFI), the Non-Normed Fit Index (NNFI), and the
3 Root Mean Squared Error of Approximation (RMSEA). Values approaching .95 for the CFI and NNFI
4 were indicative of an acceptable model. Values of .05 or less for the RMSEA was deemed satisfactory
5 for well-fitting models (Hu & Bentler, 1999). The Lagrange Multiplier (LM) test was used to identify
6 paths in the model that would make a significant change in the goodness-of-fit chi-square value if
7 freed.

8 **Results**

9 *Path Analyses*

10 Descriptive statistics and zero-order correlations among the composite variables used in the
11 analysis are given in Table 1. We tested two path models of relationships among the TCM constructs.
12 In the first path model (Figure 2, Model 1), we tested the TCM relationships, but specified that the
13 perceived learning and performance motivational climate would have independent effects on
14 autonomous motivation in PE alongside perceived autonomy support. The first hypothesized model
15 exhibited acceptable fit with the data ($S-B\chi^2 = 33.26$, $df = 24$, $p = .10$; CFI = .98; NNFI = .96; RMSEA
16 = .05). In the second path model (Figure 2, Model 2)⁶, we tested an alternative model in which the
17 effect of perceived autonomy support on autonomous motivation was mediated by learning and
18 perceived performance motivational climate. This model tested the premise that participants' reporting
19 high levels of perceived support were likely to do so because of the also reported high levels of
20 perceived learning motivational climate. Other than the mediation effect of perceived autonomy
21 support by the perceptions of learning and performance motivational climate, there were no other
22 differences in the hypothesized pattern of effects across the two models. This also produced a model
23 with acceptable fit ($S-B\chi^2 = 33.67$, $df = 25$, $p = .11$; CFI = .98; NNFI = .96; RMSEA = .05).

24 **Relationships in the Model**

1 **Overview of analysis.** Standardized path coefficients (β) for the free parameters in the path
2 analysis are given in Figure 1. The model accounted for 57.9% of the variance in leisure-time physical
3 activity intentions and 12.9% of the variance in physical activity behaviour.

4 **Hypothesis 1.** In Model 1, perceived learning motivational climate had a significant, direct
5 effect on autonomous motivation in PE ($\beta = .37, p < .01$), supporting Hypothesis 1a. There was also no
6 significant effect of perceived performance motivational climate on autonomous motivation, as
7 expected (Hypothesis 1b). There was no significant direct effect of perceived autonomy support from
8 PE teachers on autonomous motivation. There was, however, a large and significant zero-order
9 correlation between perceptions of learning motivational climate and autonomous motivation in PE ($r =$
10 $.76, p < .01$). This suggested that there was a significant amount of shared variance between the
11 perceived learning climate and perceived autonomy support constructs. There was also a significant
12 effect of perceived autonomy support on autonomous motivation in PE ($\beta = .39, p < .01$). The
13 significant relations among these constructs satisfied criteria for mediation (Baron & Kenny, 1986). We
14 therefore tested the hypothesis that perceived learning climate mediated the effect of perceived
15 autonomy support on autonomous motivation (Hypothesis 1c). This was done by specifying Model 2.

16 In Model 2, perceived autonomy support had a significant, direct effect on perceptions of
17 learning climate ($\beta = .76, p < .01$). There was also a significant direct effect of perceived learning
18 climate on autonomous motivation in PE ($\beta = .37, p < .01$) but not for perceived performance climate,
19 as found in Model 1. Importantly, there was no significant direct effect of perceived autonomy support
20 on autonomous motivation in PE, but there was a significant indirect effect mediated by perceived
21 learning motivational climate (indirect effect, $\beta = .29, p < .01$). The latter effect is equivalent to a Sobel
22 (1982) test and the mediated effect satisfied all criteria for mediation stipulated by Baron and Kenny
23 (1986). These results therefore support Hypothesis 1c and complete mediation.

1 **Hypothesis 2.** In accordance with the hypothesis, there was a significant direct effect of
2 autonomous motivation in PE on autonomous motivation in a leisure-time context ($\beta = .28, p < .01$).

3 **Hypothesis 3.** It was expected that autonomous motivation in PE would mediate the effects of
4 perceived autonomy support and perceptions of learning and performance motivational climate on
5 autonomous motivation in leisure-time. There were significant indirect effects of perceived autonomy
6 support ($\beta = .30, p < .01$) and perceived learning climate ($\beta = .10, p < .01$) in PE on autonomous
7 motivation in leisure-time mediated by autonomous motivation in PE. We also included direct effects
8 of perceived autonomy support and perceptions of learning and performance motivational climate on
9 autonomous motivation in leisure-time. Only perceived learning climate had a significant direct effect
10 ($\beta = .22, p < .01$) on autonomous motivation in leisure-time. Therefore, this hypothesis was partially
11 supported as autonomous motivation in PE did not completely mediate the effect of perceived learning
12 climate on autonomous motivation in leisure-time. Importantly, as Model 2 included direct effects of
13 perceived autonomy support on perceived learning motivational climate, there was also a significant
14 indirect effect of perceived autonomy support on autonomous motivation in leisure-time mediated by
15 perceived learning climate by virtue of the direct effect of perceived learning climate on autonomous
16 motivation in leisure-time. Therefore, perceived autonomy support had two indirect effects on
17 autonomous motivation in leisure-time, one was mediated by perceived learning climate and
18 autonomous motivation in PE (partial indirect effect of perceived autonomy support→perceived
19 learning climate→autonomous motivation in PE→autonomous motivation in leisure-time: $\beta = .08, p <$
20 $.01$) and the other by perceived learning climate only (partial indirect effect of perceived autonomy
21 support→perceived learning climate→autonomous motivation in leisure-time: $\beta = .17, p < .01$).

22 **Hypothesis 4.** Autonomous motivation in leisure-time had significant direct effects on attitudes
23 ($\beta = .38, p < .01$) and PBC ($\beta = .42, p < .01$) from the TPB.

1 climate. It was proposed that perceived learning climate would serve to mediate the effects of perceived
2 autonomy support on autonomous motivation. Path analyses supported hypotheses from the TCM and
3 indicated that the addition of perceived motivational climate assisted in furthering understanding of the
4 processes leading to motivation in PE and leisure-time physical activity.

5 A unique aspect of the present study was the inclusion of teacher-initiated motivational climate.
6 Results indicated that perceived learning motivational climate makes a unique contribution to the
7 model as it was a strong and significant predictor of autonomous motivation in PE, as expected. Most
8 important, the model also helped explain the process by which perceived learning motivational climate
9 influences autonomous motivation in PE by mediating the effect of perceived autonomy support on
10 autonomous motivation in PE as hypothesized (hypotheses 1a and 1c respectively). These findings
11 imply that a perceived learning climate incorporates aspects of autonomy support. Indeed, Ames'
12 (1992) development of an intervention (TARGET) to foster learning climate included a dimension
13 devoted to the promotion of autonomy support (Authority). Ames (1992) suggested that the provision
14 of meaningful choices to students and opportunities to participate in the decision-making process will
15 increase perceptions of autonomy and lead to perceptions of a learning-oriented motivational climate.
16 These findings imply that fostering such a climate would result in the formation of autonomous
17 motives in PE. Hence, a student-centered climate, focusing on self-improvement, providing students
18 opportunities for decision-making, fostering teamwork in heterogeneous teams, employment of lessons
19 and practices with various levels of difficulty, encouraging goal setting and self-evaluation, and
20 allowing students to work at their own level (see TARGET for a more thorough coverage of the
21 strategies to develop a learning motivational climate; Ames 1992), will increase the intrinsic appeal of
22 physical activities performed in PE lessons and enhance autonomous motivation in PE. Importantly for
23 the extended TCM, it seems that the origins of a perceived learning climate may stem from pupils'
24 perceptions that their teachers adopt autonomy-supportive teaching behaviours. The mediational
25 analysis in the present study indicates that pupils who perceived their PE teachers as supporting their

1 autonomy were more likely to view the motivational climate operating in that context as learning in
2 orientation. As cited earlier, such perceptions are related to the adoption of autonomous motivation in
3 the PE context.

4 Consistent with the tenets of the TCM (hypothesis 2) autonomous motivation in PE predicted
5 autonomous motivation in leisure-time. This finding supports our hypothesis and is line with
6 Vallerand's (1997) contention that motivational schemas exist in each context and that these schemas
7 provide top-down information and serve as a 'template' for motivation in other contexts. The finding is
8 also consistent with previous research suggesting that motivational schemas in school physical
9 education are positively associated with the motivational schemas in leisure-time physical activity
10 (Hagger et al., 2003). In addition, consistent with our hypothesis (hypothesis 3), autonomous
11 motivation in leisure-time was directly predicted by perceived learning climate and, indirectly, by
12 perceived autonomy support. Autonomous motivation in PE partially mediated the effect of perceived
13 learning climate on autonomous motivation in leisure-time. These findings imply that teacher-initiated
14 motivational climate in PE can influence motivation in another context related to physical activity,
15 namely, leisure-time physical activity outside of school. Further, our analyses provide evidence to
16 support the important role that social agents, such as physical educators, can play in determining
17 pupils' motivation. Perceived learning climate was found to be the stronger predictor of autonomous
18 motivation in leisure-time as it also mediated the effect of perceived autonomy support. Hence, it
19 seems that fostering such a climate can also result in the formation of autonomous motives in PE. From
20 a practical perspective, the present results imply that the application of interventions, such as
21 TARGET, may be efficacious in fostering adaptive motivational responses regarding participation in
22 physical activities both within school (PE) and out of school (leisure-time).

23 Contrary to the effects found for perceptions of learning motivational climate, performance
24 climate was found to have no significant effect on autonomous motivation in PE. These findings
25 support our hypothesis (hypothesis 1b) and are consistent with AGT (Ames, 1992). A performance-

1 oriented climate emphasizes social comparison and the demonstration of competence relative to others
2 and, thus, the focus of involvement is the attainment of rewards for superior competence. Inherently,
3 this contradicts autonomous forms of motivation, which refers to involvement due to internal reasons,
4 such as interest for the activity and the pleasure derived from participation in the activity (Deci &
5 Ryan, 1985). Hence, fostering a performance climate is not expected to be related to autonomous forms
6 of motivation and may therefore not be effective in promoting long term behavioural engagement in
7 PE.

8 In addition, perceived performance climate had no significant effect on autonomous motivation
9 in leisure-time. There are numerous studies that have found perceptions of performance climate to be
10 associated with maladaptive responses in terms of physical activity involvement (Ntoumanis & Biddle,
11 1999). Interestingly, fostering a learning motivational climate does not necessarily reduce perceptions
12 of performance climate (Barkoukis et al., 2008). This is consistent with recent theoretical developments
13 on AGT suggesting the adoption of multiple goals (Pintrich, 2000; Thomas & Barron, 2006). Education
14 practitioners are therefore advised a) to emphasize learning-oriented outcomes such as focusing on
15 personal goals and competence with the tasks and practices during lessons and b) play down the
16 adoption of performance-related reasons for participation by removing emphasis on peer comparison
17 and removing tangible rewards for performance achievements.

18 Present findings also confirm the hypotheses of Hagger and Chatzisarantis (2007, 2009) and
19 Wilson and Rodgers (2004) that autonomous motives affect intentions through the effect of the TPB
20 variables. Consistent with the theory, present findings suggest that autonomous motives can affect the
21 decision-making process involved in planning and engaging in physical activity behaviour. More
22 specifically, they influence the perceived likelihood of attaining desirable outcomes (behavioural
23 beliefs) associated with the behavior, the normative value of the outcomes (subjective norms), and
24 beliefs related to control over performing the behavior in future. The positive association between
25 autonomous motives and the belief-based decision-making constructs from the TPB means that

1 increases in autonomous motivation likely lead to positive outcome beliefs, subjective norms and
2 control beliefs, which, in turn, will lead to a positive decision (i.e., intention) toward performing the
3 behavior. Furthermore, they also support Vallerand's (2007) contentions that the effects of distal,
4 context-level motivational constructs (i.e., autonomous motives in a leisure-time context) affect
5 proximal, situational-level constructs (i.e., intentions to engage in physical activity) in a top-down
6 fashion. This is also important for the TCM as it provides support for the complimentary nature of
7 these theories in the theoretical integration proposed elsewhere (see Hagger, 2009; Hagger &
8 Chatzisarantis, 2007).

9 In addition, the hypothesized relations among the TPB variables and their effect on leisure-time
10 physical activity supported the theoretical assumptions (Ajzen, 1985) and results from previous studies
11 (Armitage & Conner, 2001). As proposed by the theory, intention is the most proximal predictor of
12 leisure-time physical activity and serves to mediate the effects of attitudes, subjective norms, and PBC
13 on physical activity. Within the context of the TCM these findings are pertinent as they confirm the
14 hypothesized relations of the component models and lend support to the theoretical integration. In
15 addition, they provide further impetus into the importance of motivation and intentions to engage in
16 behaviours that are challenging and difficult from a self-regulation perspective and indicate that
17 interventions targeting these self-regulatory beliefs are likely to assist people overcoming difficulties in
18 self-regulation failure (Chatzisarantis & Hagger, 2007; Hagger, Wood, Stiff, & Chatzisarantis, 2009,
19 2010; Hoffman, Friese, & Wiers, 2008).

20 **Limitations and Conclusions**

21 There are of course limitations of these data and the findings that can be inferred from the
22 reported effects. The first limitation of the study is the correlational nature of the data. Although a
23 prospective design was employed suggesting a temporal ordering of the purported relationships, the
24 results cannot infer causality insofar as one variable affects a change in another. Thus, we adhere to

1 recommendations that any inferences of causality are made on the basis of theoretical speculation
2 rather than the data (Hagger & Chatzisarantis, 2007).

3 Our measure of leisure-time physical activity should also be acknowledged as a limitation.
4 Although we used a measure that had strong validity and reliability statistics alongside methods viewed
5 as ‘objective’ (Godin & Shephard, 1985), there still remains the potential for increased method
6 variance. Future studies should provide tests of the TCM with more objective measures of behaviour.
7 An example of a study that has adopted the TCM and using such measures is reported by Wallhead,
8 Hagger, and Smith (2010). These researchers have found identical patterns of results using
9 accelerometers as measures of physical activity participation. This provides some confirmatory data to
10 support the pattern of results shown in the present study.

11 To conclude, the present results support the original integrated approach of the TCM and
12 extended it by including achievement goal-based perceptions of motivational climate. The inclusion of
13 these perceptions make a unique contribution to the literature in terms of explaining variance in the key
14 outcome variables of the TCM, namely, autonomous motivation in PE and leisure-time contexts and
15 the proximal antecedents of intentions, namely, attitudes, subjective norms, and PBC. In addition, the
16 inclusion of these constructs demonstrated unique mechanisms in the model, especially the mediation
17 of the effect of perceived autonomy support on autonomous motivation in PE by perceived learning
18 climate. This is an important process in the model that has not been previously identified or tested.

19

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- 21

Footnotes

¹We thank an anonymous review for this suggestion.

²Nicholls (1989) labelled the two goal orientations task and ego orientation. Yet we adopted the learning and performance orientations terms to be consistent with the terminology used to describe motivational climate dimensions, which were the variables of interest in this study.

³We produced a single measure of autonomous motivation in PE, a relative autonomy index (RAI) in order to reduce the number of constructs in subsequent analyses testing study hypotheses. The RAI was calculated from the perceived locus of causality constructs using the procedures outlined by Vallerand (2007). Weights were assigned to each intrinsic motivation (+2), identified regulation (+1), introjected regulation (-1), and extrinsic regulation (-2) items from the perceived locus of causality measures for PE and leisure-time. Each weighted item was then aggregated to form four indicators of two latent relative autonomy index constructs, one in each context. The RAI was used in all subsequent analyses.

⁴The questionnaire measuring motivational regulations exhibited relatively low reliabilities for three of the scales, a finding noted in the original measure used in the TCM and reflects general problems with internal consistency with scales with very few items but also that such a few items cannot adequately capture the essence of the construct (Hagger et al., 2003).

⁵The low inter-item correlation for this scale probably reflected relatively disparate aspects of social influence which were not conceptually similar. This is a known problem associated with the subjective norm construct noted in previous studies examining the psychometric properties of scale (Hagger & Chatzisarantis, 2005; Hagger, Chatzisarantis, & Biddle 2001, 2002). These studies have also demonstrated that the contribution of the subjective norm construct to intentions is modest at best, which was the case in the present study. The relatively poor internal consistency of the scale may contribute to the poor predictive utility and cannot be discounted as a potential limitation of the present analysis.

1 ⁶Model 2 is identical to Model 1 with the inclusion of the mediated paths from perceived
2 autonomy support to PE autonomous motivation via performance and learning climate.

3

Table 1

Descriptive Statistics and Intercorrelations among the Extended Trans-Contextual Model Components

Factor	M	SD	1	2	3	4	5	6	7	8	9	10
1. Past PA	3.51	1.63	–									
2. PA	4.49	1.32	.30	–								
3. Intention	4.32	1.42	.33	.28	–							
4. Attitude	5.64	1.49	.31	.16	.64	–						
5. Subjective Norm	4.21	1.56	.08	.07	.34	.24	–					
6. PBC	4.88	1.49	.31	.20	.70	.64	.30	–				
7. Autonomous Motivation (LT)	5.11	5.23	.08	.02	.26	.40	-.14	.44	–			
8. Autonomous Motivation (PE)	1.54	3.35	.08	.20	.16	.21	-.02	.20	.36	–		
9. PAS (PE)	4.34	1.27	.14	.09	.16	.11	.02	.28	.20	.39	–	
10. Learning orientation	3.46	0.83	.03	.16	.18	.19	-.03	.28	.29	.45	.76	–
11. Performance orientation	2.81	0.89	.10	.15	.09	-.03	-.04	-.09	-.17	-.13	-.14	-.14

Note. PA = Physical activity behaviour; Past PA = Past physical activity behaviour; PBC = Perceived behavioural control; LT =

Leisure-Time context; PE = Physical Education context; PAS = Perceived autonomy support. Correlations > .15 significant at $p < .05$

and correlations > .20 significant at $p < .01$.

Figure captions

Figure 1. The hypotheses of the extended trans-contextual model.

Note. Numbers indicate the respective hypotheses.

Figure 2. The extended trans-contextual model.

Note. The model depicted is Model 2, which was identical to Model 1 with the exception of the paths from perceived autonomy support→learning orientation and perceived autonomy support→performance orientation paths and the inclusion of error covariances among the constructs. The values for these error covariances were: perceived autonomy support↔learning orientation ($\phi = .76, p < .01$), perceived autonomy support↔performance orientation ($\phi = -.16, p < .05$), and performance orientation↔learning orientation ($\phi = -.15, p = .06$). For clarity, the following parameters have been omitted from the diagram: (1) direct paths from past behaviour on all study variables, (2) error variances (errors in prediction) for all endogenous (predicted) constructs, and (3) error covariances among the attitude, subjective norm, and perceived behavioural control variables.



