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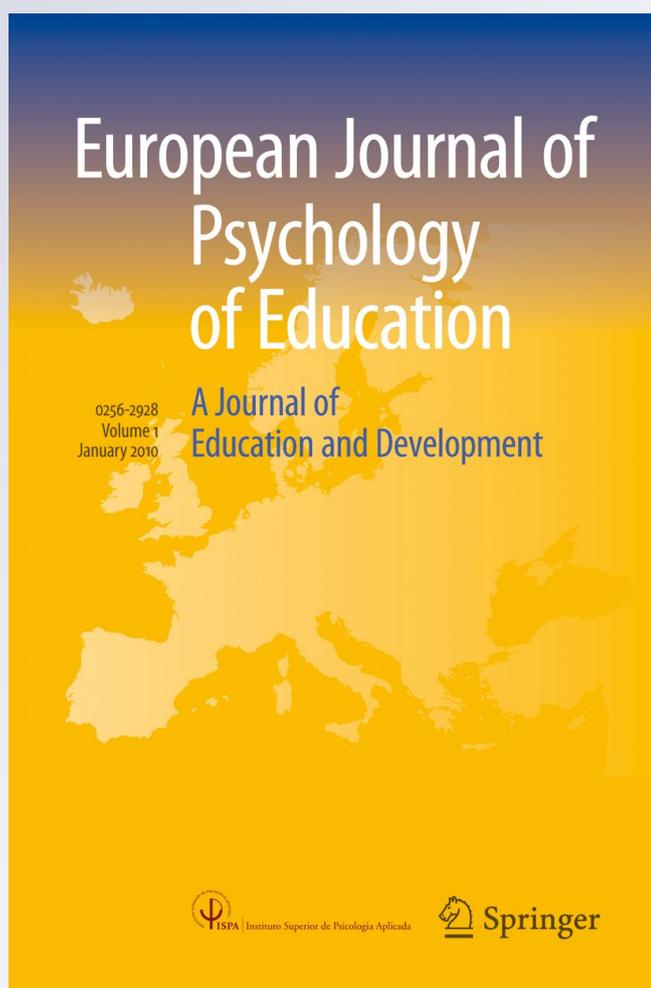
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Transferring motivation from educational to extramural contexts: a review of the trans-contextual model

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Abstract Students' self-determined or autonomous motivation in educational contexts is associated with adaptive educational and behavioural outcomes including persistence on educational tasks and academic performance. A key question for educators is whether promoting autonomous motivation toward activities in an educational context leads to increased autonomous motivation toward related activities in extramural contexts. In this article, we present a trans-contextual model that demonstrates the processes by which autonomous motivation is transferred from educational to extramural contexts. Using an integrated, multi-theory approach including self-determination and planned behaviour theories, we propose a motivational sequence in which perceived support for autonomous motivation for a given activity leads to autonomous motivation in educational contexts but also to autonomous motivation toward activities in extramural contexts. Autonomous motivation toward the activity in extramural contexts is proposed to be associated with attitudes, perceived control, and intentions to perform the activity in future and actual behaviour. We review recent prospective and intervention research that has applied the model to explain the transfer of autonomous motivation toward physical activity from a physical education context to a leisure time context. We also outline how the model can be applied in other educational contexts such as the transfer of motivation for science and language activities in educational contexts to motivation toward assignments in these subjects in extramural contexts. The applicability of the model as a basis for educational interventions to promote motivational transfer across contexts is discussed.

Keywords Motivational transfer · Self-determination theory · Intrinsic motivation · Theoretical integration · Theory of planned behaviour · Hierarchical model

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Introduction

A key question for educators is whether teaching styles, methods, and practices not only foster motivation toward, and persistence with, learning activities in the classroom but also in contexts outside of school (Ciani et al. 2010). There is a wealth of evidence in the social psychological literature applied to educational contexts that has indicated that teaching styles and other motivational strategies adopted by social agents like teachers and educators lead to adaptive outcomes within the school context. For example, adopting democratic teaching styles (Tomasetto 2004), fostering mastery oriented motivational climates (Barkoukis et al. 2008), and providing autonomy support (Reeve 2002) are strategies that have been utilised by social agents in educational contexts to promote increased motivation among pupils and students. Overall, the support offered by teachers in the classroom has been shown to have direct effects on pupils' emotional and motivational responses (e.g. Covington and Dray 2002). Furthermore, the adoption of autonomy-supportive strategies has been associated with numerous adaptive outcomes such as academic achievement (Deci et al. 1991), perceived competence (Harter 1985), deep learning of concepts (Lau et al. 2008), and selection of tasks of optimal challenge (Murphy and Thomas 2008).

There is also some evidence that such strategies also foster desirable outcomes beyond the classroom, such as engagement in extra-curricular activities (Tomasetto 2004) and studying behaviour (Kolic-Vehovec et al. 2008). This indicates that social agents' behaviours in educational settings may motivate students to engage in behaviours and activities outside of school that are adaptive in terms of learning and skill development. Such influences likely fulfil a key goal of education to influence educational activities beyond the classroom. In addition, motivating students outside of the classroom will meet educational aims to promote increased transformative experiences (Pugh et al. 2010) and inquisitive behaviours (Yoon 2009) among pupils that assist in the development of flexible, critical, and analytic thinking skills that are generalizable and transferable. It must, however, be stressed that little is known of the processes by which teacher behaviours in educational contexts impact on students motivation and behaviour within the school and, most importantly, outside school.

The aim of the present review is to provide an overview of a recently developed motivational model that outlines the processes by which perceptions of social agents' behaviours that support motivation and learning affect motivation to engage in educational activities in both the classroom and extramural contexts. The model is based on the integration of leading social psychological and motivational theories and not only identifies the important factors and processes involved in trans-contextual motivation, but also provides an impetus for the development of interventions to promote motivation for learning activities in both educational and extramural contexts. After outlining the conceptual and theoretical bases of the model, we review a series of prospective and intervention studies from our laboratory that provides evidence to support its core trans-contextual premises. We also outline how the model serves as a novel basis for educational interventions to enhance motivation among pupils in educational and extramural contexts and the potential of the model to be applied to interventions in diverse educational contexts to promote general educational aims of fostering adaptive outcomes in students outside the classroom.

Background

Our approach to understanding the transfer of motivation for educational activities across contexts draws from multiple theoretical paradigms that provide complementary explan-

ations for the proposed trans-contextual effects. We therefore propose a *trans-contextual model* (TCM) of motivation, a multi-theory integrated model that specifies the processes by which motivation for education activities (e.g. school work, contributions in class, cooperative work) in an educational context is transferred into motivation toward related activities (e.g. home work, additional reading, studying for exams) in an extracurricular or leisure time context (Hagger and Chatzisarantis 2007; Hagger et al. 2003, 2005). The model draws from three prominent social psychological theories of motivation: self-determination theory (Deci and Ryan 1985), the theory of planned behaviour (Ajzen 1991), and the hierarchical model of motivation (Vallerand 2007). Central to the model is the hypothesis that support provided social agents (e.g. teachers, educators) for students' autonomy will promote students' perceived autonomy support and self-determined or *autonomous* motivation toward educational activities in educational contexts, but will also lead to increased autonomous motivation in extramural contexts. It is further proposed that autonomous motivation compels individuals to form intentions to participate in target education-related activities in the extramural contexts in the future. The hypothesis that motivation is transferred across contexts is important as it indicates that autonomous motivation toward educational activities in different contexts is linked to future intentional behaviour toward such activities. Such evidence is useful for intervention design as it provides a rationale for promoting autonomous motivation in a context where a 'captive audience' exists (e.g. the classroom) that will have an influence on motivation in extramural contexts where access is more limited.

Importantly, the model is proposed to be generalisable and universal, such that the trans-contextual motivational effects will be applicable to different educational contexts and associated extra-curricular education-related activities. For example, support for motivation for mathematics or language activities by teachers in the classroom would be transferable to related extramural educational activities like practicing multiplicative tables and solving mathematics problems or reading, respectively. Finally, it is important to note that the source of the motivation in the educational context stems from the presentation style and behaviours performed by the teacher. Therefore, it is the students' perceptions of the extent to which the teacher provides support for autonomous motivation that is expected to engender autonomous motivation in the classroom and extramural contexts. We next introduce the individual component theories that inform the development of the TCM and then provide a detailed conceptual basis for their integration and how they provide a basis for the model hypotheses.

Component theories

Self-determination theory

Self-determination theory (SDT; Deci and Ryan 1985, 2000) is a prominent theory of human motivation and specifies the environmental and interpersonal factors that affect motivated behaviour. Central to SDT is the distinction between self-determined or *autonomous* motivation relative to non-self-determined or *controlling* motivation. Autonomous reasons or motives reflect engagement in behaviours due to an inherent interest in the behaviour itself, or for the attainment of personally endorsed and highly valued outcomes that results from engaging in the behaviour, and an absence of pressuring external contingency. Controlled reasons or motives, on the other hand, reflect engaging in behaviour due to perceived or actual external contingencies (e.g. deadlines, rewards). From

an SDT perspective, autonomous motivation is more likely to lead to behavioural persistence because motivation emanates from the individual and not external sources while controlled motivation is likely to lead to behavioural persistence only as long as the external contingencies are present. Research has shown that the extent to which people experience motivation to engage in activities and behaviours as autonomous will determine their persistence with behaviour in the future and whether they gain certain adaptive outcomes such as satisfaction, enjoyment, and psychological well-being (Chatzisarantis et al. 2003; Hagger et al. 2002a). Although behaviours can be experienced as autonomous or controlling, it is also proposed that people can assimilate or *internalise* behaviours that are controlled motivated and incorporate them into their repertoire of behaviours that are self-determined and integrated into their personal system. SDT is central to the TCM as it provides a basis for the transfer of autonomous motivation across contexts (Ryan and Connell 1989). Social contexts that support autonomous motivation, such as the behaviours of teachers in educational contexts, promote autonomous motivation and behavioural persistence within that context (Deci et al. 1991; Reeve 2002).

The theory of planned behaviour

The purpose of the theory of planned behaviour (TPB; Ajzen 1991) is to identify and explain the proximal interpersonal determinants of specific, consciously enacted behaviours. The theory has been extensively used to model the processes leading to individuals' behavioural self-regulation and adopted as a basis for intervention (Hagger et al. 2009, 2010). Central to the theory is the premise that a person's intention or stated plan is the most proximal predictor of behaviour. Intention is influenced by three sets of belief-based social cognitive constructs, namely, attitudes, subjective norm, and perceived behavioural control (PBC). Attitudes are a person's general beliefs that the target behaviour will result in certain desirable outcomes, conceptually similar to outcome expectancies cited by Bandura (1997). Subjective norms reflect a person's beliefs that significant others desire them to perform the target behaviour. PBC represents a person's beliefs that they have the capacities, faculties, abilities, and resources to engage in the target behaviour and has been overtly compared with Bandura's (1997) self-efficacy construct (Ajzen 1991). Intention is hypothesized to mediate the effects of these belief-based constructs on actual behaviour. The hypothesized relationships among the TPB constructs has been supported in meta-analytic studies across a variety of behaviours (e.g. Armitage and Conner 2001; Hagger and Chatzisarantis 2009b; Hagger et al. 2002b; McEachan et al. 2011). In the TCM, the TPB delineates the proximal predictors of intentional behaviour in non-educational, extra-curricular contexts.

The hierarchical model of motivation

Vallerand (2007) adopted premises from SDT and developed a model based on the relative level of generality of the motivational constructs, their antecedents, and their impact on outcomes from the theory. In the resulting hierarchical model of intrinsic and extrinsic motivation, autonomous motivation from SDT is proposed to operate at three levels of generality: global, contextual, and specific. Motivation at the global level represents generalised tendencies to be autonomously motivated and is expected to have an effect on behavioural engagement across a number of contexts. Motivation at the contextual level reflects reasons to participate in a variety of behaviours in a particular context. Contexts refer to behavioural categories encompassing a number of given behaviours or actions in

specific settings, such as educational (e.g. in the classroom) or extramural (e.g. at home, after school) contexts. At the situational level, motivation is conceptualised as the impetus to engage in specific bouts of a given behaviour and, by definition, motivation at this level is highly specific is less likely to be transferred across behaviours or contexts. A key aspect of the model is that motivation at each level affects cognitive, emotional, and behavioural outcomes specific to that level (Vallerand 2007). This provides an explicit theoretical corollary for the transfer of motivation from one context to another at this level. Cognitive outcomes, according to Vallerand, include motivational states and his model, therefore, provides a framework for the transfer of motivation from one context to motivation and key outcomes in another.

Four premises for integration

The integration of the three component theories to form the TCM is based on the hypothesis that SDT and the TPB offer complimentary explanations for motivated behaviour. This is a major purpose of the integration of theories; to arrive at more comprehensive explanations for behaviour (Hagger 2009). The hierarchical model serves as a unifying framework that provides a basis for the trans-contextual components of the model. We have proposed (e.g. Hagger and Chatzisarantis 2007; Hagger et al. 2003, 2005) four premises for the integration of these theories: (1) When forming the social cognitive judgments in the TPB, individuals draw from their perceptions as to whether the behaviour is autonomous or controlled as outlined in SDT; (2) The motives from SDT act as distal, formative influences of the key antecedents of intention from the TPB because they reflect the belief-systems that underpin these variables; (3) The context-level motives from SDT affect judgments regarding future behavioural engagement from the TPB because such judgments reflect situational-level social cognitive (e.g. attitudes, PBC) and motivational constructs (e.g. intention); and (4) At the empirical level, measures of motivation from SDT typically reflect an individual's *current* perceived motivational status while the TPB constructs are measured as expectancies regarding *future* behavioural engagement. The next section will briefly outline each premise and state the hypotheses of the TCM. The main hypotheses of the model are illustrated in Fig. 1 and we will refer to the figure as we introduce the hypotheses.

Focusing on the *first premise*, according to SDT, autonomous motivation provides a basis for the formation of social cognitive judgments toward participating in specific behaviours in the future. This is based on the proposition that motivation from SDT needs to be channelled into intentions in order for the appropriate need-satisfying behaviour to be enacted (Vallerand 2007). Autonomous motivation should therefore act as the impetus in the formation of judgments and expectations regarding future behavioural engagement (Deci and Ryan 1985, 2000). To illustrate this, Deci and Ryan (1985) propose that social cognitive theories like the TPB identify the immediate psychological antecedents of behaviour, but neglect the origins of such antecedents. Similarly, Ajzen (1991) suggests that the formation of the social cognitive constructs from the TPB draws from dispositional constructs like personality as well as beliefs regarding the behaviour.

Therefore, contextual autonomous motives may serve as a source of information for people when forming the specific, situational judgments and expectations regarding future behavioural engagement. Ajzen therefore predicted that the TPB constructs will mediate the effects of external variables on intentions and behaviour, a hypothesis that has been verified in empirical tests (e.g. Chatzisarantis et al. 2004; Orbell et al. 2006). Thus, it is expected in

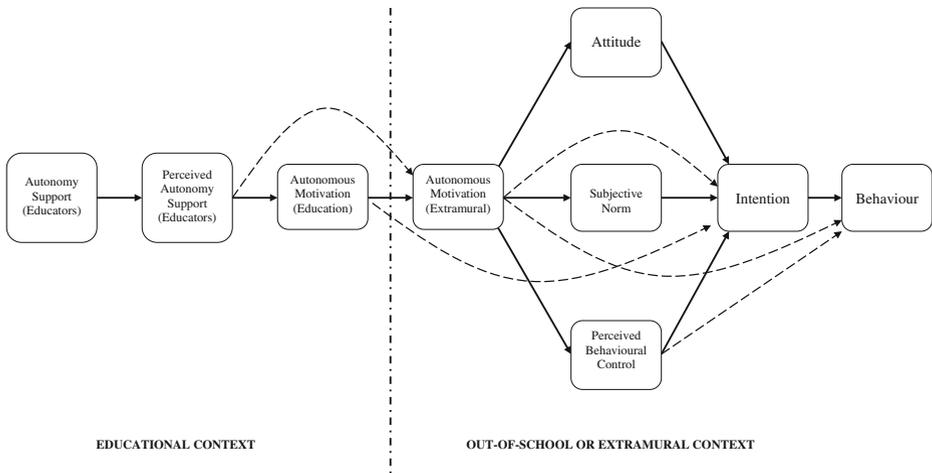


Fig. 1 The trans-contextual model. *Solid unidirectional arrows* the hypothesized relations among the model variables. *Broken unidirectional arrows* direct, unmediated effects which should be of a size that is relatively trivial or non-significant

a model that integrates these theories that the TPB constructs of attitudes, subjective norm, and PBC will mediate the effects of autonomous motivation from self-determination theory on intentions and behaviour, as seen in previous research (Hagger et al. 2002a, 2003, 2006). This is illustrated on the right-hand side of Fig. 1 by the solid unidirectional arrows emanating from autonomous motivation to attitudes, subjective norms, and PBC in out-of-school or extramural contexts, and the arrows from intentions to actual behaviour. The broken arrows from autonomous motivation to intention and behaviour represent direct, unmediated effects which should, according to the theory, be of a size that is relatively trivial or non-significant.

In the *second premise* for integration, we propose that autonomous motivation from SDT acts as a distal, formative influence on the key antecedents of intention from the TPB, namely, attitudes and PBC because they reflect the belief-systems that underpin these variables. According to Ajzen (1991), attitudes and PBC are underpinned by beliefs that the behaviour will result in certain outcomes and that the behaviour is under the volitional control of the individual. However, like many social cognitive theories, the TPB does not explicitly specify the reasons for which these outcomes are pursued (Deci and Ryan 1985). For example, the theory does not make the distinction between outcomes that people *choose* to seek and are perceived as originating from the self (autonomous outcomes) and beliefs about outcomes that people feel obliged to pursue (controlled outcomes; Chatzisarantis et al. 2003; McLachlan and Hagger 2010a). Individuals might harbour beliefs that a certain behaviour is performed for either autonomous or controlled reasons. For example, in the health-related physical activity context—a context which the TCM has been previously validated, people may cite the following belief: “I participate in physical activities to lose weight”. For some people, this belief may be interpreted as autonomous because they personally value being healthy, but for others it may be perceived as controlling because they pursue the outcome for externally referenced reasons such as to look good for others. As a consequence, SDT offers an interpretation of whether such beliefs are interpreted as autonomous or controlling. According to the theory, motivation at the contextual level to participate in behaviours for autonomous or controlling reasons

predisposes people to form beliefs congruent with their motivation. On this basis, contextual-level autonomous motives are hypothesised in the TCM as a distal influence on attitudes and PBC.

Notwithstanding this conceptual link, there is also considerable empirical support for the links between autonomous motivation from SDT and attitudes and PBC from the TPB. The research consistently shows positive relations between these constructs (see Hagger and Chatzisarantis 2009b). This seems to support the premise that autonomous motives tend to be positively related to the proximal antecedents of intention. However, such relations do not shed light on the previously cited mechanism based on the underpinning belief systems of the antecedents. This is because the consistently positive relations may mask the fact that a minority of individuals tend to endorse externally referenced or controlled beliefs with respect to the behaviour. In response to this, we conducted two lines of research to demonstrate that the beliefs that underpin attitudes tend to be those that are autonomous and that those beliefs are linked to autonomous motivation. First, research examining the TPB has suggested that only a few most frequently cited or *modal* beliefs are linked to direct, global measures of attitudes and PBC (Hagger et al. 2001). The direct, global measures tend to be those that are most frequently measured when it comes to empirical tests of the theory (Ajzen 2003). A cursory content analysis of the beliefs that are typically correlated with the global measures has revealed that these beliefs are those likely to be interpreted as autonomous (McLachlan and Hagger 2011). Second, in order to corroborate our analysis and align it directly with SDT, we conducted a brief study in which individuals were asked to cite the typical reasons (outcomes) for which they pursued physical activity (McLachlan and Hagger 2010a). We classified these as autonomous (i.e. pursued for personally valued reasons), and controlled (i.e. pursued for externally referenced reasons) to produce a binary autonomous vs. controlled coding for the outcomes. Point biserial correlations revealed significant correlations between this coded variable and an explicit measure of autonomous reasons for engaging in physical activity (Keatley et al. 2011). This provided corroborating evidence that the outcomes that people naturally pursue with respect to behaviours tend to be positively related to attitudes and are also related to autonomous motivation from SDT. This provides some evidence to support the link between autonomous motivation and attitudes from the TPB in the TCM.

In the *third premise* for integration, we propose that measures of autonomous motivation from SDT are located at the context level while the TPB constructs are located at the situational level. This distinction is based on hypotheses from Vallerand's (2007) hierarchical model of motivation. Measures of autonomous motivation often reflect motivation in a given context, such as PE or leisure time physical activity. Measures of the TPB constructs tend to make reference to a specific bout of behaviour in the context in which the action will be performed, the target of the action, and the time frame in which the action will be performed. The specificity of these measures makes them more akin to the situational level in Vallerand's model. Further, since Vallerand specifies that the effects of motivational constructs flow from a higher level of generality (e.g. contextual level) to a lower level of generality (e.g. situational level), it is expected that motivation from SDT will influence the TPB in that direction. Finally, and most importantly for the TCM, Vallerand hypothesised that there was cross-contextual interplay between motivation at the contextual level, suggesting that autonomous motivation in one context can promote autonomous motivation in others. This provides a basis for the transfer of autonomous motivation from educational to out-of-school/extramural contexts, a central hypothesis of the TCM. This is depicted on the left-hand side of Fig. 1 by the solid arrow from autonomous motives in an educational context to autonomous motives in an out-of-school or extramural context.

The *fourth premise* for integration makes reference to the typical means by which constructs of the component theories of the TCM are measured. Autonomous motivation is typically measured as an individual's cited reasons for acting in the relevant context. Such motives reflect the person's general reasons for acting with respect to any relevant behaviour in that context. In contrast, measures of constructs from the TPB reflect expectations for acting in the future. Such judgments do not reflect an individual's overall reasons for acting, but his/her beliefs with respect to engaging in the target behaviour at some future point in time given the current available information. The constructs, therefore, differ in terms of their focus (current contextual reasons vs. anticipated future engagement). It is therefore unsurprising that the constructs exhibit discriminant validity, but they likely offer complimentary explanations of the processes that lead to intentional behaviour.

Perceived autonomy support

One of the key hypotheses of the TCM is that the support for autonomous motivation by key social agents in the educational environment like teachers and educators will promote motivation within the educational context and further afield. One of the means to evaluate the extent to which social agents support autonomous motivation is through perceived autonomy support. This is based on the premise that autonomy support by significant others will affect motivation via the mediation of perceived autonomy support. This is illustrated by the solid lines to the far left of Fig. 1 from autonomy support (educators) to perceived autonomy support and from perceived autonomy support to autonomous motivation within educational contexts. Research has shown that perceived autonomy support is fostered through the provision of autonomy support by significant others in motivational contexts (Reeve 2002). In addition, studies have shown that perceived autonomy support predicts autonomous motivation which, in turn, influences behavioural engagement and persistence (e.g. Hagger and Chatzisarantis 2009b; Hagger et al. 2003). It is important to note that autonomous motivation is hypothesized to mediate the effect of perceived autonomy support on behavioural outcomes within the educational context, suggesting that self-determined motivation from SDT is necessary to translate perceptions regarding autonomy support from significant others into behaviour within a particular context, a premise that has received previous empirical support (Standage et al. 2003). The TCM further advances this hypothesis by proposing that perceived autonomy support in educational contexts will affect autonomous motivation and intentional behaviour in related but separate contexts via the mediation of autonomous motivation in the educational contexts. It is also hypothesized that perceived autonomy support in education will have a significant total effect on intentions and behaviour in extramural contexts via the mediation of the proposed motivational sequence. This is illustrated in Fig. 1 by the arrowed lines from actual and perceived autonomy support in educational contexts on the far left of the diagram to intention and behaviour in extramural contexts on the far right.

Empirical tests

The majority of empirical tests of the TCM have been in the physical education (PE) and exercise for health contexts. The purpose of these studies was to respond to the question as to whether fostering motivation toward physical activity in PE will lead to increased

motivation and physical activity participation outside of the school context. These tests of the TCM confirmed whether support for autonomous motivation toward health-related physical activity by teachers in PE lessons not only resulted in increased perceptions of autonomy support and autonomous motivation toward physical activities in the PE context, but also led to increased autonomous motivation toward physical activity and actual physical activity intentions and behaviour in an extramural or 'leisure time' context. Only recently have there been attempts to replicate the TCM in other educational contexts. In this section we will review studies, adopting prospective and intervention designs that have aimed to validate the premises from the TCM and outline the converging evidence for the model in numerous samples.

Three-wave prospective studies

Initial validation of the TCM hypotheses was conducted using a three-wave prospective correlational design in a representative sample of UK secondary school pupils (Hagger et al. 2003). Participants completed measures of perceived autonomy support from their PE teachers and autonomous motivation in PE contexts. One week later, participants completed a measure of autonomous motivation toward physical activities in an extramural or 'leisure time' physical activity context and measures of attitudes, subjective norms, PBC, and intentions with respect to future participation in leisure time physical activity based on the TPB (Ajzen 2003). The 1 week interim period was included to minimise the effects of common method variance that often arise from the concurrent administration of similar measures such as the measures of autonomous motivation in two contexts. Participants completed self-report measures of their physical activity behaviour in the leisure time context 5 weeks later to facilitate the medium-term prediction of physical activity participation.

After confirming the discriminant validity of the SDT (autonomous, controlled motivation) and TPB (attitude, PBC, and intention) constructs, a path analysis revealed that perceived autonomy support in the PE context predicted autonomous motivation in the same context consistent with previous research (Standage et al. 2003). Autonomous motivation in PE was also found to affect autonomous motivation in a leisure time context confirming the trans-contextual transfer of motivation. Autonomous motivation in leisure time was also found to influence intention and behaviour via the mediation of the proximal determinants of intentions, namely attitudes and PBC. These effects were based on the three premises outlined previously and were consistent with studies that have supported the integration of these theories (Hagger and Chatzisarantis 2009b; Hagger et al. 2002a). Overall, the significant correlation between perceived autonomy support in PE and leisure time physical activity behaviour was accounted for by the proposed motivational sequence. This supports the premise that the motivational constructs from the model were necessary to understand the mechanisms behind the influence of perceived autonomy support in PE on leisure time physical activity behaviour. These data provided initial support for the TCM.

Since the initial validation study, the TCM has been replicated on numerous occasions using similar methods and designs. Many of these studies have been replications of the premises of the trans-contextual in PE and leisure time physical activity contexts in different samples, including different cultures (e.g. Barkoukis and Hagger 2009; Barkoukis et al. 2010; Hagger et al. 2005; Pihu et al. 2008; Shen et al. 2008; Wallhead et al. 2010). Generally, these studies have found converging evidence for the premises of the TCM and corroborated the initial tests of the model in PE and leisure time physical activity contexts.

Sources of autonomy support

One of the limitations of the original tests of the TCM was that autonomy support was only considered as emanating from one source, namely teachers in educational contexts. No attempt was made to control for the effects of autonomy support from other salient social agents (Hagger et al. 2003, 2005). Given that research in SDT has indicated that autonomy support from significant others like peers and parents have pervasive effects on autonomous motivation and behavioural engagement in educational contexts (Reeve 2002; Reeve and Jang 2006), this is a significant omission. It raises the question as to whether the effects of perceived autonomy support from such significant others is likely to have a more pervasive effect on autonomous motivation toward activities in extramural contexts to the perceived autonomy support from teachers in educational contexts. This may be the case since autonomy support offered by these social agents is likely to be more proximal to the activity in the extramural context than that offered by teachers, which is relatively distal by comparison.

Considering this limitation, we tested an extended TCM that accounted for the effects of perceived autonomy support from two additional sets of social agents, parents, and peers, in an extramural physical activity context. We therefore included measures of autonomy support from parents and peers in a correlational study adopting a three-wave prospective design in samples of school-aged children from Estonia, Hungary, and the UK. Path analyses supported the hypothesis that perceived autonomy support from peers and parents had significant effects on autonomous motivation in the extramural context. Importantly, results revealed significant indirect effects of perceived autonomy support from teachers in the PE context on autonomous motivation in the extramural context in all three samples. As hypothesized, autonomous motivation in the educational context mediated the effect of perceived autonomy support from teachers on autonomous motivation in the extramural context. These findings provided further support for the TCM and extended the hypotheses of the model by accounting for perceived autonomy support from other sources and providing evidence that, notwithstanding these effects, perceived autonomy support from teachers in the educational context had a pervasive impact on autonomous motivation in out-of-school, extramural context. This also indicates that the TCM may serve as a blueprint for the development of interventions administered in educational contexts that will have pervasive effect on autonomous motivation for activities in an extramural context.

Interventions based on the theory

Although the three-wave prospective studies reported previously provided considerable support for the premises of the TCM, they suffered from the typical limitations of the correlational data, namely, that the findings do not provide unequivocal evidence to support a causal pattern of relations. This means that we were unable to confirm that the antecedent factors in the model (e.g. perceived autonomy support in educational contexts) affected a change in key dependent variables (e.g. intentions, actual behaviour in out-of-school, extramural contexts). Furthermore, the model tested only the effects of perceived autonomy support in the educational context as opposed to *actual* autonomy support. This means that correlational tests of the model did not account for the first step in the model which autonomy support from educators affects perceived autonomy support in an educational context, as depicted on the far left of Fig. 1. If the model is able to capture the processes by which autonomy supportive behaviours displayed by teachers in educational contexts affects autonomous motivation in extramural contexts, then it needs to be tested using an

experimental or intervention design that manipulates actual autonomy support in an educational context to engender a change in key target variables in the model (e.g. perceived autonomy support) which, in turn, affects key outcome variables (e.g. autonomous motivation, intentions, and behaviour in an extramural context).

In response to this gap in the literature, we conducted an experimental study in the context of PE and leisure time physical activity. A cluster-randomized design was adopted with school classes randomized to one of the three experimental conditions: autonomy support, normal teaching style, and salient belief provision. For the autonomy support condition, groups of teachers allocated to the condition were instructed to adopt autonomy-supportive behaviours when teaching their lessons using the techniques outlined by Reeve (2002). Specifically, teachers were instructed to adopt the following autonomy-supportive behaviours identified in previous research: providing students with a personally meaningful explanation for engaging in tasks, promoting students' task-directed talking in class, providing encouragement to boost or sustain students' goal setting and task engagement, avoiding directive instructions and commands, acknowledging of the students' perspective through empathic statements, and offering students facing difficulties hints to promote self-directed generation of solutions (McLachlan and Hagger 2010b; Reeve and Jang 2006). This condition was contrasted with a control group of teachers that did not receive training or instruction on autonomy support and adopted their regular teaching style. An additional experimental condition was included in which teachers advocated activities by making reference to participants' salient beliefs about the target behaviour based on the TPB (Hagger et al. 2001). Specifically, teachers were asked to make frequent reference to the modal beliefs students previously cited for their participation in physical activities (Hagger et al. 2001). Measures of the TCM constructs were administered to students in each class before the commencement of the teaching interventions and 1 week later after the intervention. Five weeks after the beginning of the experiment, self-reported physical activity behaviour was measured.

As predicted, students assigned to the autonomy support exhibited significantly higher levels of perceived autonomy support, autonomous motivation in the educational and extramural contexts, and attitudes and intentions in the extramural context relative to the 'normal' teaching style condition. In addition, participants allocated to the salient belief support condition also demonstrated significantly higher levels of attitude and intentions relative to the 'normal' teaching style group but on a par with the autonomy support group. This group, however, exhibited no changes in perceived autonomy support or autonomous motivation in the educational and extramural contexts. Results supported the predictive validity of the manipulations in targeting and changing the specific components of the TCM that they were designed to manipulate. This suggests that the TCM can be used as a framework for developing interventions that can target constructs as any stage of the proposed motivational sequence. Importantly, though, it means that manipulations that affect the distal motivational constructs in an educational context, in this case school PE, can lead to changes in motivation, intentions, and actual behaviour in an extramural context, in this case leisure time physical activity. This provides support for the trans-contextual nature of the manipulations and provides impetus for the use of interventions delivered in an educational context to affect motivation and behaviour outside of school. The evidence also provides a blueprint for the development of 'hybrid' interventions that incorporate multiple treatments in both educational and extramural contexts to maximise the effectiveness of interventions on behaviour change, an endeavour that has received recent attention in the intervention literature (e.g. Hagger et al. 2011a, b; Prestwich et al. 2003).

Extending the model and future research

Thus far we have outlined the purpose of, and need for, a theory that outlines the trans-contextual effects of motivation, provided a theoretical basis for a TCM that fits this purpose, and provided empirical evidence in support of the model. Despite the growing empirical support for the TCM and the premise that autonomous motivation in one context may engender motivation in another, typified in a meta-analysis that provided support for the key hypotheses of the model across studies (Hagger and Chatzisarantis 2007), there are still areas in which there is a relative dearth of data. In our view, there are two areas where research intensity would be most effectively directed: (1) empirical tests of the model using experimental and intervention designs and (2) application of the model in more diverse educational contexts. In this section, we examine the merits of each of these two areas and why they are important to further understanding of the trans-contextual motivational process.

Experimental and intervention research

To date, we only know of one study that has examined the effect of manipulating autonomy support in an educational context on perceived autonomy support and autonomous motivation in the same context and autonomous motivation, attitudes, subjective norms, PBC, intentions and actual behaviour in an extramural context (Chatzisarantis and Hagger 2009). All other tests of the model have adopted the three-wave prospective design pioneered in the first test of the theory. While the prospective tests of the model have their place insofar as they have provided preliminary support for its basic premises, the lack of studies utilising experimental or intervention designs is problematic because hampers researchers' capacity to infer causality and yields evidence based on prediction rather than actual change. The inability to infer causality is a problem that has always been levelled as a criticism of correlational data in psychology (Hagger and Chatzisarantis 2009a). The use of regression and so-called 'causal' modelling data-analytic techniques, like path analysis, may seek to 'predict' an outcome variable on the basis of numerous independent variable, but the fact remains that correlation does not imply causation even if the variables are ostensibly error-free latent variables or are measured prospectively such that there is a 'time ordering' of the variables. From an empirical perspective, true causal effects can only be inferred on the basis of designs that effect a change in a particular independent variable and observing its effects on a dependent or outcome variable whilst maintaining all other extraneous variables that may affect the system constant. In the context of the TCM, therefore, one can only infer the trans-contextual transfer of motivation across contexts if one is able to manipulate autonomous motivation in the educational context and observe its concomitant effects on autonomous motivation in an extramural context. The Chatzisarantis and Hagger (2009) test did just that and demonstrated that not only did training teachers to be more autonomy supportive in PE result in greater levels of perceived autonomy support relative to controls, but also lead to higher levels of autonomous motivation in the PE and extramural contexts and increased leisure time physical activity participation compared to the control group. Future research needs to replicate these findings, particularly across a number of educational contexts.

Another interesting feature of our intervention study was that it also demonstrated that the intervention component based on the TPB led to changes in the attitude component alone, not only providing support for the specificity of the intervention components, but also that the TCM can provide a blueprint for interventions that target different constructs. Technically, then, interventions can target any one of the components and at any stage of the motivational sequence. It is therefore possible that interventions can be planned such

that one component targets autonomous motivation in educational settings while another targets autonomous motivation in an extramural context (e.g. by providing autonomy support from peers or parents, see Hagger et al. 2005) or the variables from the TPB. Data from subsequent tests of the TCM indicate that autonomy support from sources that are present in extramural contexts also have pervasive influences on autonomous motivation in that context. One can therefore envisage an elaborate intervention in which autonomy support for a particular educational activity is provided in both educational and extramural contexts from social agents. Such approaches are often used in complex interventions that involve many networks and agencies such as the school and the family, although none have adopted a specific theory that charts potential trans-contextual effects (Brug et al. 2010).

Another problem with correlational tests of the TCM is the over-reliance on self-reported measures, particularly the focus on *perceived* rather than *actual* autonomy support. While there is considerable research that suggests that the provision of autonomy support affects the perceived autonomy support of participants (McLachlan and Hagger 2010b; Reeve 2002; Reeve and Jang 2006), an exclusive focus on perceived autonomy support means that the effects of the environment in providing autonomy support cannot be unequivocally verified. In fact, there is some evidence that support for autonomy does not always lead to changes in autonomy support (Taylor and Ntoumanis 2007). It is therefore very important that future studies are conducted in which autonomy support is manipulated by changing the teaching and demonstrating behaviours of the social agents that provide support for motivation in educational contexts (McLachlan and Hagger 2010b). This is the most effective means to test whether changes in autonomy support in the educational context changes both perceived autonomy support, thereby corroborating the manipulation itself, and autonomous motivation in education and, crucially for the TCM, autonomous motivation in an extramural context.

Application of the model to more diverse educational contexts

A further limitation of the current empirical evidence supporting the TCM is that it tends to be confined to a narrow set of contexts. All of the preliminary tests of the model were conducted in the PE context with out-of-school leisure time physical activity as the related extramural behaviour. This is clearly an important endeavour given that promoting self-regulation of physical activity participation is instrumental in helping children and adolescents maintain a healthy body weight and stem the increasing incidence of juvenile obesity. However, one of the cornerstones of the theory is that the effects are generalisable and universal. This means that the trans-contextual motivational processes should not only hold across samples and national groups, as corroborated in a number of studies, but also across educational contexts. It stands to reason, therefore, that support for autonomy toward any educational activity in an educational context should promote autonomous motivation toward that activity in the educational context as well as toward similar activities in a related out-of-school context. Following this hypothesis, we would therefore expect that autonomy support for solving math problems in the classroom should not only translate into autonomous motivation toward solving problems in the classroom but also promote out-of-school learning activities such as completing math homework assignments or learning multiplication tables. Similarly, autonomy support for reading and comprehension of English literature in the classroom should not only promote autonomous motivation toward reading and comprehension exercises in the classroom but also enhance extramural at-home reading.

Given the lack of diverse tests of the TCM, we have sought to apply the TCM in more diverse educational and extramural contexts. For example, we have recently tested the TCM

in the context of sports coaching and injury rehabilitation (Chan et al. 2011). We have demonstrated that perceived support for autonomy from coaches by athletes receiving instruction in a sports training context leads to increased autonomous motivation in the sports context but also increased autonomous motivation and intentions to attend physiotherapy for injury rehabilitation in an extramural (non-sport) context. This has provided support for the TCM in a non-traditional educational context in which coaches instruct athletes on sports skills and training which leads to motivation in a related non-educational context, injury rehabilitation. However, there still remains much to be done to support the generalizability of the TCM in traditional educational contexts toward mainstream subjects in the sciences and humanities. We therefore encourage researchers in educational contexts interested in the processes by which the promotion of motivation in the classroom leads to education-related activities outside-of-school to adopt the model and test it in diverse educational settings.

Implications for practice

The TCM has important lessons for teachers and educators interested in utilising the educational context and their role as important social agents to promote autonomous motivation toward adaptive, education-oriented activities in extramural contexts. If one of the primary goals of education is to prepare young people for the demands of the workplace and other contexts where important 'life skills' are required, then promoting motivation for self-directed learning through education is essential. To this end, educators and teachers need to become familiar with and utilise the kinds of behaviours that promote autonomous motivation. There are numerous studies that have outlined the kinds of behaviours that promote autonomous motivation and self-directed learning and many have been adopted in interventions in which teachers have been trained to be autonomy supportive. These behaviours included, but are not limited to, providing a rationale for activities, promoting task-relevant discussion, encouraging engagement and goal setting in tasks, avoiding demanding instructions and commands, acknowledging perspective and demonstrating empathy, and offering hints but not answers to help student overcome problems (McLachlan and Hagger 2010b; Reeve and Jang 2006).

When training teachers to adopt autonomy supportive behaviours it is important to be able to evaluate and assess whether teachers have sufficiently changed their teaching approach and are consistently adopting the behaviours. In intervention terms, this is referred to as 'treatment fidelity', which means the extent to which an intervention protocol, in this case the behaviours aimed at promoting autonomous motivation, have been adopted and executed in the way in which it was specified (Hagger 2010). Numerous coding systems exist to identify and assess whether social agents delivering a programme of autonomy supportive behaviours do so consistently in the field. These systems often require a series of expert raters to evaluate the teacher's behaviours during an observed lesson using a coded checklist. The checklist often provides scores for the frequency of particular behaviours and, to the extent that the social agent displays these behaviours at a threshold frequency during the lesson, the total score enables a researcher to quantify whether the educator or teacher has adequately adopted and displayed the behaviours necessary to promote autonomous motivation in students. Developing interventions that instruct educators on autonomy-supportive behaviours and using evaluative tools to evaluate the efficacy of such intervention are two important practical steps to take to ensure that autonomous motivation is developed in students within educational context but also in related extramural contexts.

Conclusion

In this review, we presented a TCM of motivation, the aim of which was to map the processes by which distal environmental supports for autonomous motivation from instructors and social agents in educational contexts leads to autonomous motivation toward related activities in extramural contexts as well as intentions and future behaviour. The model is unique and adds to current understanding by providing empirically testable hypotheses for the mechanisms involved in motivational transfer from one context to another and the factors that assist in the development of autonomous motivation. We have outlined the unique integration of three different theoretical perspectives that form the basis of the model and demonstrated the correlational and experimental evidence that supports the model. Furthermore, we have suggested how research in this area can be moved forward, particularly the need for more experimental support and tests in a more diverse range of educational settings. The model has clear implications for practice in that it provides a basis for educators to intervene to promote learning and engagement in school as well as outside of school. The future of the model remains bright as an empirically supported multi-theory integrated model that helps understand motivation across contexts and provides a blueprint for interventions designed to promote extramural learning.

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Current themes of research:

Self-regulation. Health behaviour. Motivation. Self-determination. Self-control. Behaviour change. Theoretical integration.

Relevant publications:

- Barkoukis, V., Hagger, M.S., Lambropoulos, G., & Torbatzoudis, H. (2010). Extending the trans-contextual model in physical education and leisure-time contexts: examining the role of basic psychological need satisfaction. *British Journal of Educational Psychology*, *80*, 647–670. doi:10.1348/000709910X487023.

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Current themes of research:

Motivation. Intrinsic motivation. Physical education. Behavioural economics. Autonomy support. Psychological needs. Prospect theory.

Relevant publications:

- Wang, C.K.J., Liu, W.C., Chatzisarantis, N.L.D., & Lim, B.S.C. (2010). Influence of perceived motivational climate on achievement goals in physical education: A structural equation mixture modeling analysis. *Journal of Sport and Exercise Psychology*, 32, 324–338.
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