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Original Article

Enjoyment and anxiety in Finnish physical education – achievement goals and self-determination perspectives

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Abstract:
Approach: The sample of the study included 1148 (565 boys and 583 girls, Mage = 11.27, SD = .32) Grade 5 Finnish PE students who completed a battery of questionnaires including motivational climate, basic psychological needs satisfaction, motivational regulations, goal orientations, perceived competence, enjoyment, and anxiety towards PE. Structural equation modeling was used to investigate two proposed motivational sequences. Purpose: The purpose of this study was to predict students' enjoyment and anxiety in physical education (PE) through the motivational sequences proposed by self-determination and achievement goal theories. Results: SEM demonstrated a good model fit to the data for the self-determination motivational sequence ($\chi2$ (11) = 13.33, P = 0.27; CFI = 0.99; TLI = 0.99; RMSEA = 0.01). More specifically, the three basic psychological needs and intrinsic motivation were positively linked to enjoyment, whereas amotivation was negatively linked. Furthermore, need for competence and relatedness were negatively linked to anxiety, whereas introjected regulation and amotivation were positively linked to anxiety. Subsequently, the achievement goals model fitted the data well: $\chi2$ (19) = 29.59, P = 0.06; CFI = .99; TLI = 0.99; RMSEA = 0.03. Task-involving climate was positively, and ego-involving climate negatively, associated with enjoyment. Additionally, ego-involving climate was positively linked to anxiety. The SEM also revealed an indirect positive association from task-involving climate via task orientation to enjoyment. Conclusions: Results of this study demonstrate that satisfaction of basic psychological needs and perception of task-involving motivational climate are crucial for positive affect in PE.
Keywords: enjoyment, anxiety, motivation, physical education.

Introduction

Obligatory school physical education (PE) is probably the most effective context to enhance physical activity (PA) engagement within children and adolescents because many of its goals are related to PA participation and it reaches the entire age cohort of youth (Sallis et al., 2012). It has been suggested that positive affective experiences in PE lessons are crucial to evoke students' intention to be physically active later in their lives (McKenzie, 2007). Therefore, establishing positive affective experiences have been identified as one of the most important goals of PE (Chen, 2013). This study was designed to investigate students' affective responses in PE through two dominant social-cognitive motivational theories; the self-determination theory (SDT; Deci & Ryan, 1985) and the achievement goal theory (AGT; Nicholls, 1989), which have been extensively used to describe and explain human behavior in several contexts such as physical education and physical activity.

Enjoyment. The concept of enjoyment reflects a multidimensional affective construct related to enthusiasm, competence and excitement towards an activity such as school PE (Hashim, Grove & Whipp, 2008). It expresses states as "happiness," "liking", "pleasure" and "fun" (Scanlan & Simmons, 1992). Enjoyment has been advocated as one of the most important affective outcomes of quality physical education (Cairney et al., 2012; Dishman et al., 2005). Past evidence has consistently shown that enjoyment is associated with increased student physical activity levels in PE and leisure time (Garcia Bengoechea, Sabiston, Ahmed & Farnous, 2010; Jaakkola,Yli-Piipari, Barkoukis & Liukkonen,2017; Rowland & Freedson, 1994; Wallhead & Buckworth, 2004).

Anxiety. Although the typical PE lesson is considered a fun lesson for most students, for several students it may elicit negative feelings such as anxiety. Anxiety has been defined as a negative emotional state emotional elicited by an otherwise objective stimulus which is interpreted as a threat to the self, and is accompanied by feelings of worry, apprehension and nervousness (Spielberger, 1972). Perceptions of low competence, peer comparison and social evaluation may result in feelings of anxiety during the PE lesson (Barkoukis, 2007). Anxiety has been found to negatively influence the quality of participation in PE lessons and has been associated with avoiding participating in the lesson (Cox, Ullrich-French, Madonia & Witty, 2011). Past evidence has shown that negative affect, such as depression and anxiety, negatively influence children and

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adolescent physical activity participation (Jerstad, Boutelle, Ness, & Stice, 2010; Sallis, Prochaska, & Taylor, 2000).

The Achievement Goal Theory. The main premise of the AGT is that individuals' main motive in achievement settings is to demonstrate competence (Nicholls, 1989). The AGT also details that individuals' cognitive, affective, and/or behavioral experiences in achievement situations are determined by both a) the perceptions of the features of the social environment where the person interacts (i.e., motivational climate) and b) their goal orientations (i.e., the competence-related aims that guide behavior). The AGT defines motivational climate as a situational-induced environment directing the goals of an action in achievement situations, and it can be separated into task- or ego-involving perspectives (Ames, 1992). A task-involving climate puts emphasis on personal development, effort, learning and individual improvement, whereas ego-involving climate stresses social and normative comparison. In the PE context, task-involving motivational climate has been found to be positively associated with enjoyment (Jaakkola et al.,2017; Jaakkola, Wang, Soini & Liukkonen, 2015; Digelidis, Papaioannou, Laparidis & Christodoudis, 2003) and unrelated or negatively related with anxiety (Liukkonen, Barkoukis, Watt & Jaakkola, 2010). In contrast, ego-involving motivational climate has been found to be unrelated or negatively related with enjoyment (Digelidis et al., 2003; Liukkonen et al., 2010) and positively related with anxiety (Liukkonen et al., 2010).

Another main feature in the AGT is the notion of goal orientations. According to the theory, there are two main goal orientations namely task and ego orientations (Nicholls, 1989). Task oriented individuals tend to adopt a self-referenced perception of ability whereby competence and subsequent satisfaction are obtained when he/she improves their performance, learns new skills, and does their best. An ego oriented person, instead, tends to adopt a socially or normatively referenced perception of ability meaning that she/he perceives competence and satisfaction when accomplishing the task normatively, with less effort than others, or within a socially acceptable manner. In the PE context, task orientation has been found to be positively related with enjoyment (Biddle, Wang & Kavussanu, 2003; Digelidis et al., 2003; Wang, Liu, Chatzisarantis, & Coral, 2010) and negatively with anxiety (Barkoukis, 2003; Ommundsen, 2001). In contrast, ego orientation has been found to be unrelated or negatively related with enjoyment (Digelidis et al., 2003; Wang et al., 2010) and positively related with anxiety (Ommundsen, 2001).

AGT also details that perceived competence serves as a moderator in the process where motivational climate and a person's goal orientations produce cognitive, affective and behavioral outcomes (Duda&Balaquer, 2007; Roberts, 1992). For example, high ego-oriented individuals with a low level of competence towards activity are fearful of social evaluation in the ego-involving motivational climate, and are likely to experience high anxiety because their self-worth is under threat (Duda & Balaquer, 2007). However, it is reported that high ego orientation has no detrimental effect on a persons' cognitive, affective and behavioral outcomes, if she/he perceives a high level of competence (Nicholls, 1989). Additionally, AGT outlines that high task orientation can prevent people from experiencing negative responses, regardless of their perceptions of competence (Roberts, 1992). In the present study, the moderating role of perceived competence is investigated by analyzing the differences in the perceptions of motivational climates, goal orientations, enjoyment and anxiety between groups of students with low or high levels of physical activity competence.

The Self-Determination Theory. SDT is a meta-theory, including six mini-theories, used to understand and explain interactions among social environment, motivation and optimal functioning (Ryan & Deci, 2017). A fundamental tenet of the theory is the existence of three major types of motivation existing in any life context, including PE, and influencing human behavior and functioning. These types of motivation are labelled intrinsic motivation, extrinsic motivation and amotivation (Deci & Ryan, 2000). Intrinsic motivation occurs if an activity is engaged for its own sake, pleasure or excitement. Extrinsic motivation, on the other hand, reflects activity engagement in order to obtain rewards or avoid punishment. SDT also outlines that extrinsic motivation can be divided into four qualities which are integrated regulation (*behavior has integrated into harmony or coherence with other aspects of the self*), identified regulation (*behavior due to personal importance and values*), introjected regulation (*behavior due to feeling of guilt if not doing it*) and external regulation (e.g. *behavior due to rewards, avoiding punishment, external pressure*). The level of self-determination is the element that makes these regulations different for human well-being, which increases on a continuum from extrinsic regulation to integrated regulation. Amotivation is defined as a state in which people lack the intention to behave and thus lack motivation (Deci & Ryan, 2000). Persons who are amotivated typically experience a sense of lack of control, feelings of incompetence and perform activities without purpose. Studies in PE settings have indicated that autonomous regulations (intrinsic, integrated and identified regulations) have a positive relationship with enjoyment, whereas more controlling regulations (introjected and external regulations, and amotivation) have found to be negatively associated with enjoyment (Cox, Smith, & Williams, 2008; Gråsten, Jaakkola, Liukkonen, Watt, & Yli-Piipari, 2012; Yli-Piipari, Wang, Jaakkola & Liukkonen, 2012). Similarly, controlled forms of regulation have been associated with the experience of anxiety in educational settings (Black & Deci, 2000; Cox, Ullrich-French, & Sabiston, 2013; Niemec & Ryan, 2009).

Furthermore, SDT details that needs for autonomy(i.e., *a person's urge to be causal agent of one's own life and act in harmony with one's integrated self*; deCharms, 1968), competence(i.e., *an individual's aspiration to control the outcome and experience mastery perceptions when interacting with the social environment*; White,

1959), and social relatedness (i.e, *a natural need to be connected to, to interact, and to experience caring for others*; Baumeister & Leary, 1995) represent cornerstones of human motivation and well-being(Ryan & Deci, 2017).According to the theory, a social environment that supports basic psychological needs' satisfaction leads to autonomous motivation and in turn to positive cognitive, affective and behavioral outcomes. Conversely, an environment thwarting psychological needs leads to controlling motivation, and subsequently negative outcomes. Studies have demonstrated that satisfaction of autonomy (Ommundsen & Kvalo, 2007), competence (Leptokaridou et al., 2015) and relatedness (Cox et al., 2008) have been associated with enjoyment in PE context. On the other hand, thwarting the basic psychological needs has been associated with increases in individuals' anxiety in several settings, including sport (Quested et al., 2011; Ryan & Deci, 2000).

Rationale and research tasks. Currently, the literature on motivation indicates that the entire sequence of social and cognitive variables should be taken into account when predicting outcomes arising from motivational process (social factors > cognitive factors > outcomes) (Duda & Balaquer, 2007; Ryan & Deci, 2017). It has been proposed that only this procedure allows us to understand causal mechanisms in human behavior and experience (e.g., Mageau & Vallerand, 2003). In this study we utilize the motivational sequences derived from the AGT (motivational climate >goal orientations> enjoyment) and the SDT (psychological needs > motivational regulations > enjoyment) to predict enjoyment and anxiety in PE. Although there is a plethora of studies using variables of the AGT and the SDT when analyzing enjoyment and anxiety in PE context, we found only one study to utilize the complete sequence of social and cognitive variables when investigating affective responses in PE. Wang et al. (2010) investigated associations among motivational climates, approach and avoidance achievement goals and enjoyment within 12-20 years-old students in Singapore. They found positive paths from task-involving motivational climate to task approach and avoidance goals, and from ego-involving motivational climate to ego approach and avoidance goals. Subsequently, Wang et al. (2010) reported a positive path from task approach goal to PE enjoyment, and negative path from ego avoidance goal to PE enjoyment. However, it should be noted that Wang et al. (2010) did not analyze students' perceived competence in their study. To our knowledge, there are no studies that utilized the entire sequence of the AGT when analyzing students' experiences of anxiety in PE, or the entire sequence of the SDT when examining students' experiences of enjoyment or anxiety in PE.

Therefore, the aim of this study was to predict enjoyment and anxiety in Finnish PE through the motivational sequences proposed by AGT and SDT. This study utilizes motivational sequences of the AGT and the SDT because we believe that the concurrent investigation of these dominant motivational theories will provide more comprehensive understanding of the social and cognitive antecedents of students' affect during their PE. More specifically, we investigated; 1) associations among task- and ego-involving motivational climates, task and ego goal orientations, enjoyment and anxiety, and 2) associations among basic psychological needs, motivational regulations, enjoyment and anxiety. Based on previous evidence that perceived competence moderates associations among motivational climate, goal orientation, and motivational outcomes (Nicholls, 1989), we use perceived competence as grouping variable in the AGT sequence.

Material & methods

Participants

Participants of this study included 1148 (565 boys and 583 girls, mean age = 11.27, SD = .32) Grade 5 Finnish PE students from Southern, Western, Northern and Eastern counties of Finland. The sample is nationally representative because its distribution reflects relative population characteristics of each four counties. These four counties constitute 96 % of the entire Finnish population. The sample included 35 schools and 67 PE classes.

Procedure

Researchers collected all data during PE classes. Students' guardians were informed on study protocol and their written consent for the participation was obtained. The students were informed that their involvement in the study is voluntary and that their responses would be kept confidential. Participants did not report any confusion related to instructions or clarity of items. The ethics committee of the University of Jyväskylä granted permission to conduct the study.

Instruments

Basic Psychological Needs. The Finnish version of the Basic Psychological Needs in Physical Education Scale (BPN-PE; Vlachopoulos, Katartzi, &Kontou, 2011) was used to analyze students' basic psychological needs for autonomy, competence and relatedness in PE. The BPN-PE consists 12 items measuring autonomy (4 items; e.g., "*We do things in class that interest me*"), competence (4 items; e.g., "*I get better at things I am taught that other kids in my class have trouble with*") and relatedness (4 items; e.g., "*I feel like I have a close bond with the other kids in my class*". All items of the BPN-PE are rated on a 5-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree.

Motivational regulations. The Finnish version of the Revised Perceived Locus of Causality Scale (PLOC-R; Vlachopoulos, Katartzi, Kontou & Goudas, 2011) was used to measure students' motivational regulations in PE. The PLOC-R includes the item stem: "*I take part in PE…*", and comprises 19 items which measure intrinsic motivation (4 items; e.g., "*Because PE is exciting*"), identified regulation (4 items; e.g.,

"*Because it is important to me to do well in PE*"), introjected regulation (4 items; e.g., "*Because I would feel bad about myself if I didn't*"), external regulation (3 items; e.g., "*Because in this way I will not get a low grade*"), and amotivation (4 items; e.g., "*But I can't see what I'm getting out of PE*"). All items are rated on a 5-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree.

Motivational climate. Motivational climate in PE was measured by using the Finnish version of the Motivational Climate in Physical Education Scale (MCPES; Soini,Liukkonen, Watt, Yli-Piipari & Jaakkola,2014). The MCPES includes four dimensions namely autonomy climate, relatedness climate, and task- and ego-involving climate. Only the task-involving (5 items; e.g., "*Learning new things makes me want to learn more*") and ego-involving (e.g., "*During PE lessons the students compete with each other in their performance*") subscales of the MCPES were used for the purposes of this study. The MCPES has the item stem "*In my PE classes*…". Each item of the MCPES is rated on a five-point scale ranging from 1 = strongly disagree to 5 = strongly agree. The Finnish version of the POSQ has been found to be a valid and reliable tool when used with adolescent students during PE classes (Soini et al., 2014).

Goal orientations. Goal orientations were measured via the Finnish version of the children's version of the Perception of Success Questionnaire (POSQ; Roberts, Treasure & Balaque, 1998). The POSQ includes subscales of task orientation (6 items; e.g., *I feel most successful in PE when I really improve*) and ego orientation (6 items; e.g., "*I feel most successful in PE when I do better than the others*"). The POSQ has the item stem "*I feel most successful in PE classes when…*". Each item of the MCPES is rated on a five-point scale ranging from 1 = strongly disagree to 5 = strongly agree. The Finnish version of the POSQ has been found to be a valid and reliable tool when used with adolescent students during PE classes (Yli-Piipari, Leskinen, Jaakkola & Liukkonen, 2012).

Perceived competence. Perceived competence towards physical activity engagement was analyzed by using the Finnish version of the sport competence dimension of the Physical Self-Perception Profile (PSPP; Fox & Corbin, 1989). Each of the five items of the PSPP are rated on a five-point Osgood scale from 1 = I'm among the best when it comes to athletic ability to 5 = I'm not among the best when it comes to athletic ability. The individual item stem of the scale is:"What am I like?" The Finnish version of the perceived competence scale has been found to be a valid and reliable tool when used with 13-year-old students during PE classes (Kalaja, Jaakkola, Liukkonen & Watt, 2010).

Enjoyment. The Finnish version of the Enjoyment subscale from the Sport Commitment Questionnaire - 2 (SCQ; Scanlan et al., 1992) was used to analyze Enjoyment in PE. The Scale comprises five items (e.g., "*Physical education is fun"*) which are rated on a 5-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. The POSQ has the item stemof "In my PE classes…". The Finnish version of the enjoyment scale has been found to be a valid and reliable tool when used with 13-year-old students during PE classes (Kalaja et al., 2010).

Anxiety. The Finnish version of the Physical Education State Anxiety Scale (PESAS; Barkoukis, 2007; Barkoukis, Tsorbatzoudis, Grouios, 2008; Barkoukis, Tsorbatzoudis, Grouios & Rodafinos,2005) was used to measure anxiety in PE. The scale assesses three dimensions of anxiety with 6 items of each. PESAS measures somatic anxiety reflecting perceptions of bodily symptoms (e.g., *"I have a sense of pressure in the chest*), worry representing negative expectations about performance and the consequences of possible failures (e.g., *"I'm afraid of making mistakes while performing the exercises"*), and cognitive processes evaluating symptoms related to the processing of information during physical education classes (e.g., *"I have difficulties concentrating in the proposed exercises"*). Participants responses are anchored on a 5-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. A composite score was computed for each anxiety dimension. PESAS has been used in the past with Finnish students and demonstrated adequate psychometric properties (Yli-Piipari, Liukkonen, Watt, Jaakkola & Nurmi, 2009).

All instruments of this study have been translated into Finnish language using the back translation procedure. Measures were first translated into Finnish by a panel of experts in sport pedagogy/psychology, and subsequently translated back into English by a first-language English-speaking translator. The back-translated English version was then compared to the original version for consistency. After this procedure all unclear items were reconsidered by the panel.

Statistical analyses

Before conducting statistical analyses, the normality of the data was checked, missing values were computed and outliers were removed. Descriptive statistics were used to summarize the data. Pearson's correlation coefficients and structural equation modeling (SEM) were applied to investigate the associations among study variables. We created two SEMs; model 1 reflected the self-determination theory and investigated relations among basic psychological needs, motivational regulations, enjoyment and anxiety, whereas model 2 expressed the achievement goal theory and analyzed relationships among motivational climates, achievement goals, perceived competence, enjoyment and anxiety. For model 2 (the achievement goal theory) we used amultigroup structural equation modeling (Bentler, 1995) to test whether the associations between motivational climates, achievement goals, enjoyment and anxiety varied in high and low perceived competence groups.

To determine the appropriateness of two SEM models, the Tucker-Lewis Index (TLI), Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA) scores were computed (Muthén&Muthén, 1998-2014). The CFI and TLI indices vary from 0 to 1, and indices greater than 0.90 represent acceptable model fit. Additionally, an RMSEA index score of lower than 0.10 is shows satisfactory model fit. Lastly, the normed chi-square index ($\chi 2/df$) representing parsimonious fit is suggested to be below the marginal maximum of 3.00. For the multigroup SEM of model 2, students were divided into two equal size groups based on their responses to perceived competence scale (median split). Mplus 7.2 software was used to conduct statistical analyses (Muthén & Muthén, 1998-2014).

Results

Descriptives and correlations

Descriptive statistics showed that students perceived relatively high enjoyment, intrinsic motivation, relatedness need satisfaction, task-involving motivational climate and task orientation in PE. Results also demonstrated that students scored relatively low on amotivation, external regulation and all three dimensions of anxiety. Associations among study variables showed that enjoyment correlated positively and moderately to highly with intrinsic motivation, all psychological needs, task-involving motivational climate, task orientation, and perceived competence, and negatively and lowly to moderately with amotivation, external regulation, ego-involving motivational climate, and anxiety. Results also indicated that sumscore of anxiety correlated positively and moderately with amotivation, external regulation, introjected regulation, and ego-involving motivational climate, and negatively and lowly to moderately with enjoyment, intrinsic motivation, all psychological needs, task-involving motivational climate, task orientation, and perceived competence. It should also be noted that somatic and cognitive anxiety and worry correlated positively and highly with each other. Descriptives and correlations among study variables are presented in Table 1.

Table 1. Descriptive statistics and correlations among study variables.

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	M	SD
1. Enjoyment	-															4.07	1.00
2. Anxiety	-.33***	-														1.89	.62
3. Autonomy need	.59***	-.23***	-													3.00	.80
4. Competence need	.45***	-.29***	.48***	-												3.42	.86
5. Relatedness need	.52***	-.36***	.54***	.57***	-											3.73	.83
6. Intrinsic motivation	.75***	-.23***	.55***	.46***	.49***	-										3.89	.85
7. Identified regulation	.38***	-.03	.37***	.47***	.40***	.53***	-									3.64	.90
8. Introjected regulation	.02	.29***	.09**	.13***	.06*	.12***	.42***	-								2.58	.96
9. External regulation	-.31***	.39***	-.24***	-.16***	-.26***	-.29***	.06*	.42***	-							1.96	.95
10. Amotivation	-.40***	.43***	-.30***	-.25***	-.33***	-.40***	-.17***	.19***	.49***	-						1.52	.66
11. Task climate	.57***	-.25***	.47***	.48***	.52***	.57***	.52***	.14***	-.20***	-.38***	-					4.11	.73
12. Ego climate	-.13***	.35***	-.03	-.01	-.16***	-.07*	.07*	.16***	.24***	.21***	-.10**	-				2.32	.96
13. Task orientation	.52***	-.25***	.48***	.47***	.50***	.51***	.43***	.13***	-.23***	-.35***	.65***	-.06	-			3.98	.83

14. Ego orientation	.08*	.06*	.13***	.29***	.14***	.09**	.21***	.16***	.09**	.05	.10**	.46***	.30***	-	2.46	1.00
15. Perceived competence	.36***	-.39***	.30***	.47***	.39***	.31***	.24***	.02	-.21***	-.26***	.30***	-.04	.35**	.22***	- 3.48	.81

P <. 05*, P <. 01**, P < .001***

Structural equation modeling (SEM)

Descriptive statistics demonstrated that all scale scores were not normally distributed. Therefore, we applied the mean and variance adjusted weighted least squares estimation method (WLSMV) as suggested by Muthen & Muthen (1998-2012). Additionally, we used squared multiple correlations (R^2) to calculate the proportion of explained variance of dependent variables. Subsequently, for the model 2 (the achievement goal theory), the equality of the coefficients between low and high perceived competence groups was compared by using the χ^2 difference test (WLSMV difference testing).

Model 1. The self-determination theory. The results of the proposed model demonstrated a good fit to the data: ($\chi2$ (11) = 13.33, p = 0.27; CFI = 0.99; TLI = 0.99; RMSEA = 0.01). Direct associations among study variables were revealed, whereby, all three basic psychological needs were positively linked with enjoyment. Additionally, intrinsic motivation was positively and amotivation negatively associated with enjoyment. Subsequently, needs for competence and relatedness linked negatively and introjected regulation and amotivation positively with anxiety. The SEM also indicated indirect associations among study variables; all three psychological needs were positively associated with enjoyment via intrinsic motivation, all three psychological needs linked positively with enjoyment and negatively with anxiety via amotivation, and need for competence associated positively with anxiety via introjected regulation. Squared multiple correlations revealed that psychological needs and motivational regulations explained 66 % of variance in enjoyment and 31% of variance in anxiety. The final model is presented in Figure 1. Correlations among basic psychological needs and among motivational regulations are presented in Table 2.

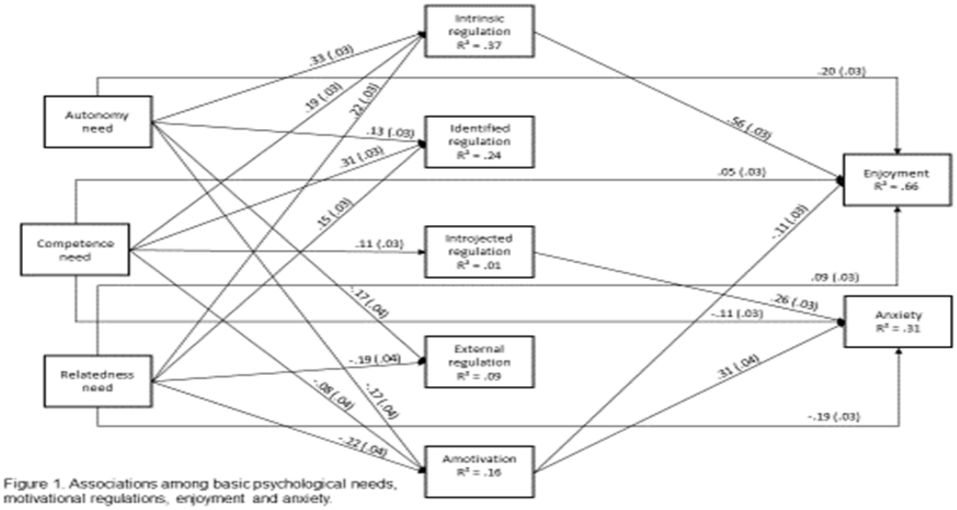

Fig.1. Associations among basic psychological needs, motivational regulations, enjoyment and anxiety

Table 2. Table 2. SEM correlations for basic psychological needs and motivational regulation variables.

Variables	r(SE)
Autonomy need > Competence need	.42 (.01)
Competence need > Relatedness need	.51 (.02)
Relatedness need > Autonomy need	.49 (.02)
Intrinsic regulation >Identified regulation	.34 (.03)
Intrinsic regulation > Introjected regulation	.08 (.04)
Intrinsic regulation > External regulation	-.17 (.05)
Intrinsic regulation >Amotivation	-.22 (.03)
Identified regulation > Introjected regulation	.45 (.03)
Identified regulation > External regulation	.08 (.04)
Introjected regulation >External regulation	.51 (.03)
Introjected regulation> Amotivation	.25 (.03)
External regulation > Amotivation	.48 (.03)

Model 2. The achievement goal theory. For the model 2, we applied the multigroup SEM method (Bentler, 1995) to test whether the associations between the study variables varied in the subgroups of high and low perceived competence groups. The equality of the coefficients between these two models was compared by using the WLSMV difference testing. We firstly constructed separate models for the high and low perceived competence groups. After this procedure, we investigated both models and modification indices to determine which parameters should be fixed to be equal across ability groups and which should be free in each group. The subsequent tests for equivalence were made against this initial model (configural model; Horn & McArdle, 1992) which fitted the data well (χ^2 (13) = 19.08, p = 0.12; CFI = 0.99; TLI = 0.99; RMSEA = 0.03). Next, one at a time we examined the equality of the paths and the correlations, for both subgroups. Finally, the χ^2 difference test indicated that these paths were equal for the high and the low perceived competence groups ($\Delta\ \chi^2$ (6) = 11.89, p = 0.06). The final model with these equality constraints had a good fit to the data:(χ2 (19) = 29.59, P = 0.06; CFI = 0.99; TLI = 0.99; RMSEA = 0.03).

The high and the low perceived competence groups had several similarities. Task-involving motivational climate was positively, and ego-involving climate negatively, associated with enjoyment. Ego-involving climate was positively linked with anxiety. The SEM also revealed an indirect positive association from task-involving climate via task orientation to enjoyment. Furthermore, there was a positive association between task orientation and enjoyment, and between ego-involving climate and ego orientation. In the low perceived competence group, there was a negative association between task-involving climate and anxiety. In the high perceived competence group, task orientation was negatively linked to anxiety. Squared multiple correlations showed that motivational climates and achievement goals explained 34% and 32% of variance in enjoyment, and 16% and 18% of variance in anxiety for low and high perceived competence groups respectively. The final model is presented in Figure 2.

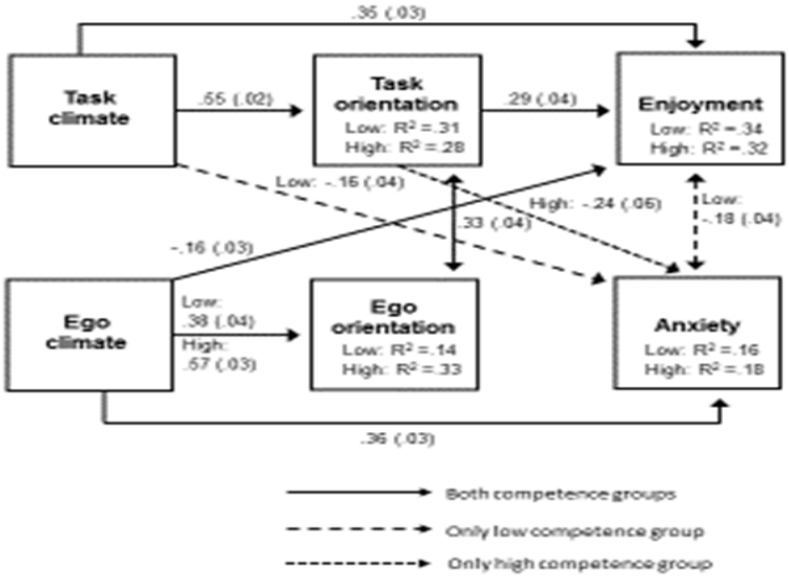

Fig. 2. Associations among motivational climate, achievement goal, enjoyment and anxiety

Discussion

The aim of this study was to predict enjoyment and anxiety in Finnish PE through the motivational sequences proposed by AGT and SDT. To our knowledge, this was one of the initial attempts to the test the entire motivational sequences of the AGT the SDT when examining students' affect in PE. The results of the analyses confirmed the propositions of both theories. With respect to the AGT task-involving climate was positively associated with task orientation and enjoyment, whereas ego-involving climate was positively associated with ego orientation and anxiety, and negatively with enjoyment. With respect to SDT, need satisfaction was generally positively associated with autonomous motivation and enjoyment and negatively with anxiety. Additionally, need satisfaction was negatively linked with controlled motivation.

The Achievement Goal Theory. Results of this study indicated direct positive association between task-involving motivational climate and enjoyment, and direct negative association between ego-involving motivational climate and enjoyment. Additionally, results showed an indirect association from task-involving motivational climate via task goal to enjoyment. These findings are in line with previous studies conducted in PE context and demonstrate that class climate emphasizing personal development and improvement, effort and learning instead of social and normative comparison is crucial for students' positive experiences in PE (Jaakkola et al., 2017; Jaakkola et al., 2015; Digelidis et al., 2003; Wang et al., 2010). Additionally, it is important to recognize that similar associations were found in high and low perceived competence groups. This finding indicates that a general perception of competence in physical activity settings does not moderate associations

among motivational climates, goal orientations and enjoyment within Grade 5 PE students. This relationship pattern is in contrast to previous research that has demonstrated such an association (Duda & Balaquer, 2007). The contradictory result might be due to the current study being implemented in PE context, whereas Duda and Balaquer (2007) conducted their study involving adolescent athletes, a setting in which perceived competence may be influenced by the competitive context.

The results of this study also demonstrated direct positive association between ego-involving motivational climate and anxiety. This finding is in accordance with previous studies (Papaioannou & Kouli, 1999) and indicates that emphasizing social and normative comparison and competition is associated with negative affective responses in PE. It is noteworthy that this finding emerged in both perceived competence groups. This result indicates that perceived competence does not moderate the association between ego-involving climate and anxiety; emphasizing social and normative comparison and competition in PE seems to produce negative affect for low and high competence students. Results of this study also showed a direct negative path from task-involving motivational climate to anxiety. This association, however, was only found in the low perceived competence group and indicates that emphasizing personal development, improvement, effort and learning can prevent low competence students from experiencing anxiety in PE.

The Self-Determination Theory. Results showed that all three basic psychological needs and intrinsic motivation were directly positively whereas amotivation negatively linked with enjoyment. Additionally, results of this study demonstrated significant indirect associations; positive paths from all basic psychological needs via intrinsic motivation to enjoyment, and negative paths from all basic psychological needs via amotivation to enjoyment.It is noteworthy that psychological needs and motivational regulations explained 66 % of variance of enjoyment, which can be considered as a very large amount of explained variance. These findings are in line with the theory (Ryan & Deci, 2017) and reinforce that satisfaction of basic psychological needs is associated with positive outcomes from activity engagement. Furthermore, these findings highlight the mediating role of motivation. Autonomous types of motivation magnify the effect of need satisfaction and produce positive affective experiences during PE lesson, whereas amotivation seems to counter the positive effects of need satisfaction. Therefore, it seems important for PE teachers the promotion of autonomous forms of motivation during the lesson and undermine amotivation.

This study also found that needs for competence and relatedness linked negatively with anxiety. Additionally, three indirect paths were revealed. All three basic psychological needs were associated with anxiety via amotivation. These findings support theoretical principles of the SDT demonstrating that amotivation links with maladaptive affective responses in PE (Ryan & Deci, 2017). Importantly, the results also imply that the effect of need satisfaction is mediated by the type of motivational regulations students endorse. It is also possible that students' motivational regulations define their affective experiences during the lesson. Taken together, these results support the SDT's theoretical assumptions and are in accordance with previous empirical findings showing that autonomous motivation leads to positive affective responses during the PE lesson, whereas amotivation leads to negative ones (Cox et al., 2008; Leptokaridou et al., 2015; Ommundsen & Kvalo, 2007).

Practical implications. The findings of the present study clearly indicate that adaptive motivational patterns (i.e., need satisfaction and intrinsic motivation) are associated with positive affective experiences during PE lessons. Hence, PE teachers should endorse teaching approaches that promote these motivational patterns. The TARGET model proposed by Epstein (1989) has been proliferated as a suitable approach to produce such adaptive motivational patterns. For instance, past evidence has confirmed TARGET's ability to increase perceptions of task-involving motivational climate and subsequently produce positive outcomes in PE, such as high enjoyment and performance, and low anxiety (Barkoukis, Tsorbatzoudis & Grouios, 2008; Barkoukis, Koidou, Tsorbatzoudis & Grouios, 2012; Braithwaite,Spray, & Warburton, 2011).The results of this study encourage PE teachers to utilize the TARGET model to create opportunities for students to experience positive affect. Additionally, studies using the SDT framework have indicated that need satisfaction can also contribute to positive affective experiences in PE (Standage, Duda, & Ntoumanis, 2005). This study demonstrated that PE teachers can significantly contribute to the development of positive affective responses in PE by emphasizing task-involvement and promoting intrinsic motivation.

Limitations and future studies. One limitation of this study is the cross-sectional design of data collection process. It should be acknowledged that it is difficult to draw causal conclusions when using cross-sectional design. Another limitation of this study is that we did not use the 2 x 2 framework for achievement goals which divides both types of goals into approach and avoidance dimensions (Elliot &McGregor, 2001). In future, longitudinal follow-up studies are needed to better understand the development of students' motivational and affective experiences in PE. Additionally, there is a need to conduct intervention studies to improve students' motivation and positive experiences in PE. These studies may produce important knowledge on the antecedents of children's and adolescents' engagement in the PE lesson.

Conclusions

Results of this study demonstrate that satisfaction of basic psychological needs and perception of task-involving motivational climate are crucial for positive affect in PE. The current findings also demonstrate that ego-involving motivational climate contribute to increased anxiety and lower levels of enjoyment in PE. Overall,

a deeper understanding of the role of enjoyment and anxiety in students' PE experience may serve to encourage PE teachers to satisfy students' basic psychological needs and to emphasize personal development and improvement, effort and learning when conducting PE.

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