

Research article

Associations among Basic Psychological Needs, Motivation and Enjoyment within Finnish Physical Education Students

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Abstract

The purpose of this study was to analyse the associations between basic psychological needs, motivational regulations and enjoyment within Finnish physical education (PE) students. The participants of the study were 260 Grade 5 students ($M_{\text{age}}=11.86$, $SD=0.28$) and 242 Grade 8 students ($M_{\text{age}}=14.93$, $SD=0.37$) who completed a questionnaire prior to their regular PE classes. This cross-sectional study incorporated a multigroup structural equation modelling (SEM, path model) separately for Grade 5 and 8 students, using gender as a grouping value. Results indicated that among Grade 5 students autonomy was directly associated with enjoyment. In addition, there was an indirect path from autonomy to enjoyment via intrinsic regulation in the boys group, and an indirect path from relatedness to enjoyment via intrinsic regulation in the girls group. Among Grade 8 students, need for competence was directly associated with enjoyment for the boys. Results also revealed negative associations from autonomy to enjoyment via amotivation for the girls group, and via external regulation for the boys group. For both Grades 5 and 8 SEM revealed additional, gender specific associations. The results of this study highlight the importance of students' need satisfaction and autonomous motivation as factors that could facilitate enjoyable experiences in PE classes.

Key words: psychological needs, motivation, enjoyment, physical education.

Introduction

Physical activity (PA) recommendations set by health experts indicate that school-aged children and adolescents should engage in moderate-to-vigorous PA for at least 60 minutes daily (World Health Organization, 2012). Although it is widely acknowledged that PA has positive effects on health, a substantial number of children fail to meet the recommendations (Hallal et al., 2012). For example, in Finland 49% of primary school and 18% of junior high school students achieve the national recommendations for PA (Tammelin et al., 2016). A notable decline in PA occurs when adolescents transit from childhood to adulthood (e.g. Currie et al., 2008). Across this age period, school physical education (PE) offers an ideal platform for enhancing PA engagement because it effectively reaches the entire age cohort. A key element underpinning PA engagement is enjoyment (Hashim et al., 2008; Wallhead and Buckworth, 2004). Therefore, more studies are needed to understand the factors associated with PE enjoyment.

In this study, in order to examine enjoyment in PE, we utilize the Self-Determination Theory (SDT) as a broad

framework to understand and explain human motivation and behaviour (Deci and Ryan, 1985; 2000; Ryan and Deci, 2017). Recent meta-analyses by Owen et al. (2014) and Ng et al. (2012) have shown that SDT has proven to be a valuable tool for studies in the PA context, and more specifically, it has been used in order to study enjoyment in PE settings (e.g. Leptokaridou et al., 2015; Gråsten et al., 2017). According to the SDT, humans have three fundamental psychological needs that are autonomy, competence and relatedness which, when satisfied, lead to well-being and when thwarted, lead to ill-being (Ryan and Deci, 2017). Autonomy is described as a feeling of personal agency and ability to make your own decisions in different activities. Competence can be seen as a feeling of effectiveness when interacting with the environment and engaging in optimally challenging tasks. Relatedness is described as a sense of belonging and connectedness with the important people around you. Fulfilment of these needs guide and provide energy when engaging in certain behaviour, such as PA (Ryan and Deci, 2017). Previous studies have revealed that fulfilment of students' psychological needs have a positive impact on enjoyment in PE context. More specifically, enjoyment has been linked with the perception of autonomy (Ommundsen and Kvalø, 2007), competence (Leptokaridou et al., 2015) and social relatedness (Cox et al., 2008; 2009).

According to Ryan and Deci (2017) human behaviour can be intrinsically motivated, extrinsically motivated or amotivated. Intrinsically motivated behaviour is present when engaging in activity for itself out of pure interest and enjoyment (Ryan and Deci, 2017). An example of this intrinsically regulated behaviour is a student who performs physical activities or tasks without any external rewards. On the other hand, as Deci and Ryan (2000) have argued, some motives are more instrumental. Therefore, a student could be doing the activity to get a good grade. Different forms of these more external motives can be divided into four different types of extrinsic regulations, which fall along a continuum of internalization. The more internalized the extrinsic motivation, the more autonomous one will be when engaging in activity. Consequently, if the internalization is forestalled, the motivation will be more controlled. There are two forms of controlled motivation: external regulation, where activities are performed for external prompts or factors (e.g., to gain rewards or to get a good grade), and introjected regulation, where activities are performed through internal pressure or self-set contingencies (e.g., feeling of guilt). Similarly, there are two forms of autonomous motivation: identified regulation,

which reflects behaviour that is personally important and valued, and integrated regulation, where activities assimilate with personal goals, attitudes and values. *Integrated regulation is not included in this study because it is a type of motivation which is usually not encountered with children, as they may be too young to have achieved a sense of integration within self* (Vallerand and Losier, 1999).

In addition, there is a state of amotivation, where the individual has no intentions or tendency for certain behaviour or engage in activities without a purpose (Ryan and Deci, 2017). Previous research has shown that these different types of motivational regulations have been associated with affective consequences, such as enjoyment. Studies completed in the PE context have indicated that enjoyment has been positively associated with autonomous forms of motivation and negatively with controlling forms of motivation (Gråsten et al., 2012; Yli-Piipari et al., 2012; Cox et al., 2008).

Enjoyment, when considered as a representation of positive affect, can be described as a multidimensional construct related to excitement, enthusiasm and perceptions of competence (Hashim et al., 2008). In this study, enjoyment was operationalized as a positive affective response that reflects more generalized feelings of fun, liking and pleasure. This construct is more general than a specific emotion (e.g. excitement) but more specific than global positive affect (Scanlan and Simons, 1992). Previous studies have shown that enjoyment in PE has found to be related with PA engagement both in school PE (Hashim et al., 2008; Dishman et al., 2005) and during leisure-time (Sallis et al. 1999; Wallhead and Buckworth, 2004; Hashim et al., 2008).

There is a strong body of research showing associations among basic psychological needs, motivational regulations and enjoyment in the PE context (e.g. Leptokariidou et al., 2015; Cox et al., 2008; Ommundsen and Kvalo, 2007). However, it is a shortcoming that there are no studies which have included all basic psychological needs and motivational regulations when investigating enjoyment in PE. For example, in a study conducted by Gråsten and Watt (2017) the variables of motivational climate, basic psychological needs, intrinsic motivation and affective, cognitive and behavioural outcomes were examined, but other than intrinsic regulation no other regulations were included. Ryan and Deci (Ryan and Deci, 2017) proposed, however, that to understand human motivation the whole motivational process (i.e., basic psychological needs, motivational regulations), needs to be involved in the analysis when investigating possible cognitive, affective or behavioural outcomes produced by motivation. Therefore, to fill the gaps in the literature, we utilized the whole motivational process proposed in the SDT (Ryan and Deci, 2017) when explaining students' enjoyment in PE. Additionally, previous studies have shown that motivational experiences related to PE vary within different age groups (Ntoumanis et al., 2009; Yli-Piipari et al., 2012). Therefore, we will investigate associations among study variables separately by using student samples from Grade 5 and Grade 8. The primary aim of this study was to test the SDT based motivational model in the PE context by analyzing the associations between basic psychological needs (competence,

autonomy and relatedness), motivational regulations (intrinsic regulation, identified regulation, introjected regulation, external regulation and amotivation) and enjoyment in PE within Grade 5 and 8 Finnish students. Because previous research has demonstrated differences between boys and girls regarding enjoyment in PE (Carroll and Loumidis, 2001), psychological needs (Carroll and Loumidis, 2001; Fairclough, 2003) and motivational regulations (Yli-Piipari, 2011), we used gender as a grouping variable in the analysis and investigated whether the boys and the girls motivational experiences vary within different age groups.

Methods

Participants and procedures

Participants of the study were Grade 5 (130 boys and 130 girls, mean age 11.86 years, SD = 0.28) and Grade 8 (109 boys and 133 girls, mean age 14.93 years, SD = 0.37) students from Central and Southern Finland. Data was collected by a member of the research team prior to regular PE classes. Parents were informed about the study in advance and their written consent for the participation of their child was required. Study protocols were explained to the students, reinforcing that participation was voluntary and that their responses were kept confidential. Students had an opportunity to ask if they had trouble understanding some of the questions. Prior to the study, research protocols were approved by the ethics committee of the local University.

Measurements

Basic Psychological Needs: The Finnish version of the Basic Psychological Needs in Physical Education scale (BPN-PE) (Vlachopoulos et al., 2011) was used to measure the extent of participants' fulfillment of the needs for autonomy, competence and relatedness in PE. The scale includes 12 items which tap into the satisfaction of autonomy (4 items; e.g., "PE class is taught the way I like it to be taught"), competence (4 items; e.g., "I am able to do well even in the PE lessons considered difficult by most kids in my class") and relatedness (4 items; e.g., "I feel like I have a close bond with the other kids in my class"). Items were rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Initial evidence for the validity and reliability of the BPN-PE scale has been demonstrated among Greek elementary ($\chi^2 = 140.47$, $df = 51$, $CFI = 0.972$, $RMSEA = 0.046$), middle ($\chi^2 = 278.24$, $df = 51$, $CFI = 0.948$, $RMSEA = 0.072$) and high school ($\chi^2 = 183.01$, $df = 51$, $CFI = 0.977$, $RMSEA = 0.055$) students in the PE context (Vlachopoulos et al., 2011).

Motivational regulations: To measure motivation for PE participation, the Finnish version of the Revised Perceived Locus of Causality Scale (PLOC-R) (Vlachopoulos et al., 2011) was used. The scale uses the following stem: "I take part in PE..." and comprises 19 items which measure students amotivation (4 items; e.g., "But I really don't know why"), external regulation (3 items; e.g., "So that the teacher won't yell at me"), introjected regulation (4 items; e.g., "Because it would bother me if I didn't"), identified regulation (4 items; e.g., "Because it is important to me to try in PE") and intrinsic regulation (4 items; e.g., "Because PE is fun"). Items were rated on a 5-

point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Vlachopoulos et al. (2011) have demonstrated initial evidence for the validity and reliability of the instrument among elementary ($\chi^2 = 277.2$, $df = 142$, $CFI = 0.94$, $RMSEA = 0.048$), middle ($\chi^2 = 432.1$, $df = 142$, $CFI = 0.93$, $RMSEA = 0.066$) and high school ($\chi^2 = 386.4$, $df = 142$, $CFI = 0.94$, $RMSEA = 0.063$) students in PE context.

Enjoyment: Enjoyment in PE was measured with the Finnish version of the Enjoyment subscale from the Sport Commitment Questionnaire -2 (Scanlan et al., 1993; 2016). The Scale comprises five items (e.g., I enjoy PE classes) which are rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Individual stem of “In my PE classes...” was used to reflect the PE context. The Finnish version of the Sport Enjoyment scale have been found to be a valid and reliable tool when used with 13-year-old students ($\chi^2 = 0.74$, $df = 2$, $CFI = 1.00$, $TLI = 1.00$) during PE classes (Kalaja et al., 2010).

Translation and validation of the scales: Basic Psychological Needs in Physical Education scale (BPN-PE; Vlachopoulos et al., 2011) and Revised Perceived Locus of Causality Scale (PLOC-R; Vlachopoulos et al., 2011) have not been previously used in the Finnish language. Scales were translated using back-translation procedure suggested by Brislin (1986). Firstly, all items were translated by a bilingual researcher from English to Finnish, then another bilingual researcher back-translated the items to English. After that, the original and the back-translated versions were compared. Items that were shown to have a number of possible meanings in Finnish were discussed by the panel of experts in order to redraft them to be as accurate as possible in meaning, compared to the original English version.

Analyses

Before major statistical analyses were completed, normality of data, outliers and missing values were examined. Because study variables were not normally distributed, we used the mean and variance adjusted weighted least squares estimation method (WLSMV) as suggested by Muthén and Muthén (2012) in further analyses. No significant outliers were detected based on the standardized values (± 3.00) (Tabachnick and Fidell, 2012). Missing completely at random test (MCAR; Little and Rubin, 2002) indicated that missing values were missing completely at random ($\chi^2 = 1608.6$, $df = 1574$, $p = 0.266$). Descriptive statistics were used to summarize the data. Confirmatory factor analysis (CFA) and Cronbach's alpha coefficients were used to

examine the construct validity and reliability of the scales. Analyses of the relationships among study variables involved the determination of Pearson's correlation coefficients and the use of structural equation modeling. As recommended by Bentler (1995), a multigroup structural equation modeling (SEM) was used to analyze whether the associations between the study variables varied between boys and girls in different age groups. To determine the appropriateness of CFA and SEM models, the Chi-square test (χ^2), Tucker-Lewis Index (TLI), Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA) scores were calculated (Muthén and Muthén, 2012). The TLI and CFI indices varies from 0 to 1 and fit indices greater than 0.90 are indicative of acceptable model fit. In addition, an RMSEA score of lower than 0.10 is indicative of a representative model. Finally, the normed chi-square index (χ^2/df) representing parsimonious fit should be below the marginal maximum of 3.00 (Kline, 2011). Statistical analyses were conducted using the Mplus 7.11 program (Muthén and Muthén, 2012).

Results

Validity and reliability of the scales

Confirmatory factor analyses (CFA) were conducted in order to examine how well the three-factor structure of the BPN-PE, five-factor structure of the PLOC-R and one-factor structure of enjoyment in PE fitted to the data. Factors were allowed to correlate and no correlated residuals were permitted. The goodness-of-fit indices are shown in Table 1. The results indicated that all three measurements fitted the data well. A reliability analyses using Cronbach's alpha coefficients were conducted for dimensions in BPN-PE, PLOC-R and Enjoyment in PE. Results indicated that the coefficients were satisfactory among all variables and the alpha-values ranged 0.63 to 0.95.

Descriptive statistics and correlations

Descriptive statistics showed that both Grade 5 and 8 students scored high on autonomy, competence and relatedness (see Table 2). There were also high scores with enjoyment and autonomous forms of motivation; intrinsic and identified regulation. Low scores were found on amotivation and external regulation among both Grade 5 and 8 students. The associations among study variables showed that among Grade 5 students enjoyment correlated positively with autonomy, competence and relatedness. There was also a positive correlation between enjoyment and intrinsic regulation and identified regulation. A negative correlation

Table 1. Confirmatory factor analyses for BPN-PE, PLOC-R and the Enjoyment Scale.

		Chi-square test (CMIN)	Chi-square test (p-value)	Degrees of freedom (df)	CMIN/df	Tucker-Lewis Index (TLI)	Comparative Fit Index (CFI)	Root Mean Square Error of Approximation (RMSEA)
5th grade	BPN-PE	66.14	0.034	47	1.40	0.99	1.00	0.04
	PLOC-R	265.13	0.000	129	2.06	0.94	0.95	0.07
	Enjoyment	18.79	0.002	5	3.76	1.00	1.00	0.10
8th grade	BPN-PE	106.58	0.000	48	2.22	0.98	0.99	0.07
	PLOC-R	389.43	0.000	136	2.86	0.95	0.96	0.09
	Enjoyment	11.15	0.049	5	2.23	1.00	1.00	0.07

Table 2. Means, Standard deviations and Cronbach's Alphas for all variables.

	Grade 5 (N=260)			Grade 8 (N=238)		
	α	M	SD	α	M	SD
1. Autonomy	0.75	3.16	0.86	0.82	3.09	0.87
2. Competence	0.86	3.64	0.85	0.88	3.38	0.90
3. Relatedness	0.74	3.94	0.72	0.81	3.58	0.85
4. Amotivation	0.63	1.47	0.61	0.80	1.87	0.92
5. External regulation	0.64	2.02	0.99	0.68	2.59	1.07
6. Introjected regulation	0.67	2.68	0.97	0.76	2.73	1.03
7. Identified regulation	0.70	3.79	0.84	0.84	3.40	1.03
8. Intrinsic regulation	0.73	4.14	0.73	0.89	3.59	1.10
9. Enjoyment	0.91	4.30	0.81	0.95	3.64	1.14

α = Cronbach's Alpha, M=mean, SD= standard deviation

Table 3. Descriptive statistics and correlations among study variables for Grade 5 students.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	M	SD	M	SD
										(boys)	(boys)	(girls)	(girls)
1. Autonomy	-	.40***	.45***	-.19*	-.14	.19	.26***	.41***	.52***	3.22	0.84	3.14	0.86
2. Competence	.47***	-	.51***	-.28***	-.15	.09	.32***	.39***	.38***	3.78	0.76	3.52	0.89
3. Relatedness	.44***	.38***	-	-.34***	-.23**	-.09	.27**	.44***	.47***	4.00	0.69	3.90	0.75
4. Amotivation	-.28***	-.12	-.17	-	.59***	.19*	-.02	-.32***	-.35***	1.41	0.61	1.53	0.63
5. External regulation	-.28**	-.23**	-.32***	.40***	-	.45***	.16	-.39***	-.32***	1.97	1.00	2.09	1.00
6. Introjected regulation	-.03	-.05	.07	.36***	.46***	-	.43***	-.06	-.02	2.58	0.93	2.77	1.01
7. Identified regulation	.26**	.28**	.21*	-.07	.15*	.19*	-	.17	.26**	3.92	0.80	3.67	0.88
8. Intrinsic regulation	.46***	.28***	.28***	-.30***	-.26**	-.02	.35***	-	.70***	4.25	0.71	4.05	0.72
9. Enjoyment	.55***	.31***	.43***	-.38***	-.39***	-.19*	.31***	.69***	-	4.42	0.72	4.17	0.83

* p < 0.05, ** p < 0.01**, *** p < .001***, M=mean, SD= standard deviation. Lower side = Grade 5 boys (n=130), Upper side = Grade 5 girls (n=130).

Table 4. Descriptive statistics and correlations among study variables for Grade 8 students.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	M	SD	M	SD
										(boys)	(boys)	(girls)	(girls)
1. Autonomy	-	.52***	.57***	-.50***	-.36***	.21*	.56***	.65***	.73***	3.10	0.80	3.06	0.91
2. Competence	.66***	-	.57***	-.31***	-.32***	.21*	.56***	.60***	.61***	3.36	0.85	3.38	0.89
3. Relatedness	.51***	.61***	-	-.26**	-.28**	.17	.54***	.55***	.58***	3.65	0.79	3.52	0.87
4. Amotivation	-.42***	-.42***	-.37***	-	.52***	.03	-.43***	-.57***	-.62***	1.86	0.91	1.84	0.89
5. External regulation	-.48***	-.42***	-.37***	.58***	-	.18*	-.30**	-.43***	-.49***	2.53	1.05	2.65	1.07
6. Introjected regulation	.25**	.15	.10	-.02	.16	-	.46***	.12	.19*	2.57	0.97	2.88	1.07
7. Identified regulation	.71***	.56***	.58***	-.39***	-.37***	.40***	-	.70***	.69***	3.26	0.99	3.51	1.01
8. Intrinsic regulation	.58***	.60***	.50***	-.43***	-.38***	.28**	.67***	-	.80***	3.62	1.01	3.56	1.11
9. Enjoyment	.70***	.70***	.58***	-.51***	-.52***	.22*	.62***	.67***	-	3.70	1.06	3.60	1.16

* p < 0.05, ** p < 0.01**, *** p < .001***, M=mean, SD= standard deviation. Lower side = Grade 5 boys (n=130), Upper side = Grade 5 girls (n=133).

was found between enjoyment and amotivation, introjected regulation and external regulation. Among Grade 8 students there were positive correlations between enjoyment and autonomy, competence and relatedness. Amotivation and external regulation correlated negatively with enjoyment, and intrinsic, identified and introjected regulations positively with enjoyment. Correlations among study variables are presented in Tables 3 and 4.

Structural equation modeling (SEM)

Before conducting the SEM analyzes, we used descriptive statistics to evaluate the data and results revealed that all scales were not normally distributed. Therefore, as suggested by Muthen and Muthen (2012), we applied the mean and variance adjusted weighted least squares estimation method (WLSMV). Also, squared multiple correlations (R^2) were used to calculate the proportion of explained variance of dependent variables. The equality of the coefficients between these two models was compared by using the χ^2 difference test (WLSMV difference testing).

We started by creating separate models for Grade 5 boys and girls, and for Grade 8 boys and girls. After analyzing the models and modification indices we determined

which parameters should be fixed and which should be estimated freely in each group. These initial models (a so-called configural model; Horn and McArdle, 1992) revealed that data was a good fit for the Grade 5 students [χ^2 (40) = 43.60, $p = 0.32$; CFI = 0.996; TLI = 0.993; RMSEA = 0.026], and the Grade 8 students [χ^2 (40) = 57.05, $p = 0.04$; CFI = 0.963; TLI = 0.933; RMSEA = 0.060]. We proceeded by individually examining the equality of the correlations and paths for both subgroups. Finally, the χ^2 difference test result indicated that these paths were equal for the boys and the girls [Grade 5: χ^2 (8) = 6.93, $p = 0.54$; Grade 8: χ^2 (10) = 6.68, $p = 0.76$]. With these equality constraints the final models had a good fit to the data for Grade 5 students [χ^2 (48) = 48.35, $p = 0.46$; CFI = 1.00; TLI = 1.00; RMSEA = 0.01] and for Grade 8 students [χ^2 (49) = 52.21, $p = 0.35$; CFI = 0.99; TLI = 0.99; RMSEA = 0.02].

There were both direct and indirect statistically significant paths for boys and girls in the model of Grade 5 students. For both boys and girls, there was a direct positive path from autonomy to enjoyment. In the boys group, an indirect positive path was found from autonomy to enjoyment via intrinsic regulation, and for the girls group an indirect positive path was found from relatedness to enjoy-

ment via intrinsic regulation. The SEM also revealed additional paths between basic psychological needs and motivational regulations. To begin with, a positive path from autonomy to identified regulation was found for both genders. Additionally, boys demonstrated a negative path from autonomy to amotivation, and to external regulation. Regarding the girls group, negative paths from relatedness to amotivation and to external regulation were found. An additional negative path was identified from introjected regulation to enjoyment in the boys group. The model also revealed some additional correlations among basic psychological needs, and among motivational regulations. For both boys and girls, statistically significant correlations were found among all the three psychological needs. Results related to motivational regulations showed both boys and girls demonstrated statistically significant correlations between following variables: amotivation and external regulation; amotivation and introjected regulation; external regulation and introjected regulation; introjected regulation and identified regulation; and finally between external regulation and identified regulation. In the boys group, a positive correlation was found between identified regulation and intrinsic regulation, and a negative between amotivation and intrinsic regulation. In addition, girls demonstrated a negative correlation between external regulation and intrinsic regulation. Squared multiple correlations showed that significant variables explained enjoyment, 83% for boys and 82% for girls. The final model for Grade 5 is presented in Figure 1.

In the Grade 8 model results revealed both direct and indirect statistically significant paths for both genders. A direct positive path was found from competence to enjoyment, but only in the boys group. Data for the boys also demonstrated a negative indirect path from autonomy to enjoyment via external regulation. Another negative indirect path was found in the girls group from autonomy to enjoyment via amotivation. The SEM also revealed additional direct paths between the needs and the regulations. A negative path was found from autonomy to external regulation for both boys and girls. In the girls group, there was a positive path from autonomy to intrinsic regulation. In the boys group, a positive path from competence to intrinsic regulation, and a negative path from competence to amotivation were found. There was one more additional path in the boys group from introjected regulation to enjoyment. In addition, the model revealed correlations among basic psychological needs, and among motivational regulations. More specifically, correlations were found among autonomy, competence and relatedness for both genders. Concerning the regulations, both genders showed correlations between amotivation and external regulation, and between introjected regulation and identified regulation. In addition, the boys group demonstrated correlations between intrinsic, identified and introjected regulation, and girls between external and introjected regulations. Squared multiple correlations showed that significant variables explained enjoyment, 82% for boys and 92% for girls. The final model for Grade 8 is presented in Figure 2.

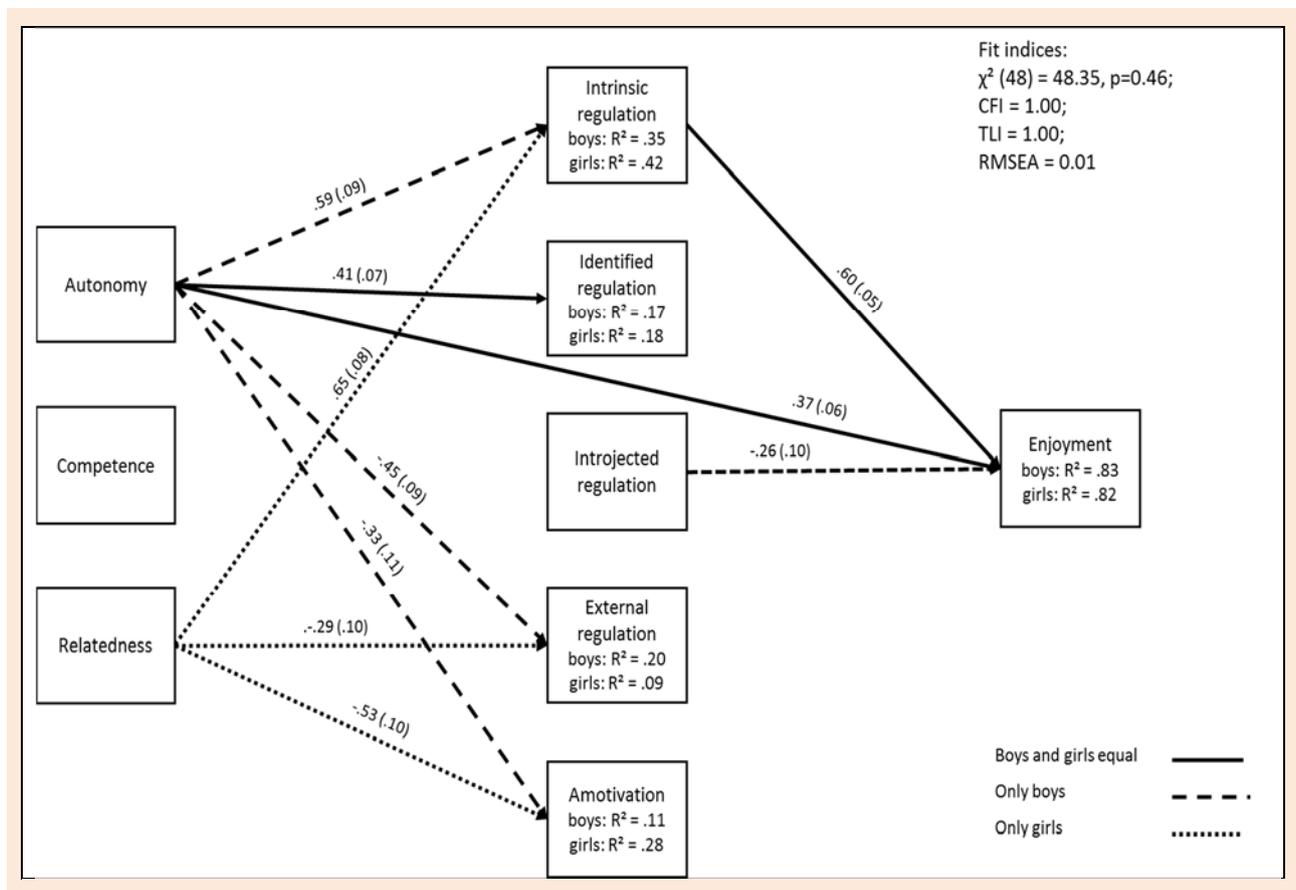


Figure 1. Multigroup Structural Equation model for Grade 5.

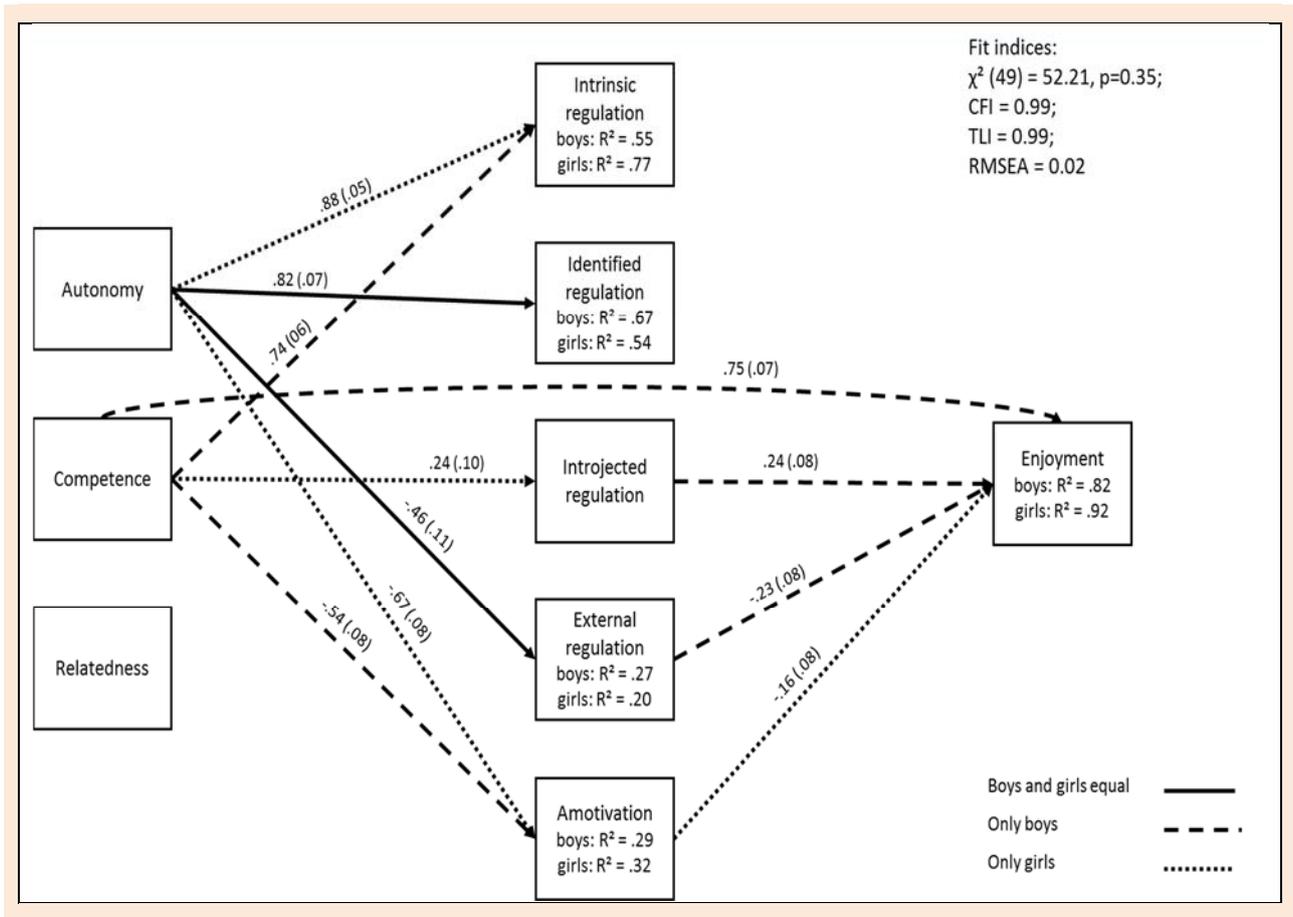


Figure 2. Multigroup Structural Equation model for Grade 8.

Discussion

The aim of this study was to investigate associations between basic psychological needs, motivational regulations and enjoyment in school PE context. To broaden the existing research, the entire motivational process as framed within the SDT was utilized as a theoretical foundation to investigate enjoyment in PE.

Generally, the results of this study are in line with the theoretical assumptions described in the SDT (Ryan and Deci, 2017) where it is argued that needs satisfaction would directly and indirectly promote PE enjoyment, and in contrast, needs frustration would lead to decreased enjoyment. More specifically, although statistically significant associations among basic psychological needs, motivational regulations and PE enjoyment varied in different age and gender groups, the results of our study indicate that satisfaction of students’ needs for autonomy, competence or relatedness were only positively associated with more autonomous forms of motivation and enjoyment in school PE. These results are in line with previous empirical studies related to the PE context. Vlachopoulos et al. (2011), for example, showed positive links from the variables of needs for autonomy and competence to subjective vitality in PE among a sample of Greek students. Additionally, Standage and Gillison (2007) provided evidence that needs for autonomy and competence had positive indirect effects on self-esteem and health related quality of life. Also as expected, results of this study revealed only negative asso-

ciations between needs satisfaction, more controlling forms of motivation and enjoyment. Similar results have been documented in several other studies in different cultures (e.g. Leptokaridou et al., 2015; Ommundsen and Kvalo, 2007). In the following section, the findings from the current study are discussed in detail separately for Grade 5 and Grade 8 students.

Among Grade 5 students, the model indicated that the need for autonomy was directly associated with PE enjoyment. The need for autonomy was also linked to enjoyment via intrinsic motivation, but only in the boys group. These findings demonstrate, that for boys who are just reaching puberty, the provision of opportunities to make choices and supporting feelings of personal agency in their learning situations are important elements in enhancing autonomous motivation and positive affect in PE. Similar results have been demonstrated in a previous study conducted by Leptokaridou et al. (2015), who showed that need for autonomy positively predicted enjoyment among Greek Grade 5 and 6 students. Additionally, the results of this study revealed an indirect path from the need for relatedness to PE enjoyment via intrinsic motivation in the girls group. This means that the role of important others and the sense of relatedness is especially important for the Grade 5 girls’ positive affect in PE. The results concerning Grade 5 students are intriguing regarding the role of competence need satisfaction. Ryan and Deci (2017) have argued that satisfaction of all three psychological needs are needed for enhancing intrinsic motivation and well-being in general.

It is therefore interesting, that in the current sample of Grade 5 students the role of need for competence was not identified as a significant contributor towards PE enjoyment or autonomous motivation. This is somewhat contradictory to previous results. For example, Cairney et al. (2012) found that higher levels of perceived competence were associated with higher levels of PE enjoyment among Canadian Grade 4 students. Results also indicated that autonomy for the boys, and relatedness for the girls were negatively associated with external regulation and amotivation, which are usually seen less desirable in terms of optimal motivation (Ryan and Deci, 2017). In other words, this indicates that boys who feel that their autonomy need is satisfied and girls who perceive their relatedness need is satisfied might have less negative motivational experiences in PE.

Findings for the Grade 8 sample showed that there was a direct positive link between the need for competence and enjoyment, but the effect was evident only in the boys group. This finding is consistent with previous studies, that have linked the need for competence with intrinsic motivation (e.g. Taylor et al., 2010; Fairclough, 2003; Caroll and Loumidis, 2001) and points out that when students feel they can perform and excel in given situations, have clearly set goals, and are engaged in optimally challenging tasks they perceive the environment as more enjoyable. Although the Grade 5 model indicated that the role of need for competence was less meaningful in that younger age group, the model for Grade 8 students showed that competence was a significant contributor towards enjoyment in PE, especially for boys. One reason for this might be that the role of competence is more evident when students get older and their self-perceptions towards physical activity develop (Nicholls, 1989). From practical perspective, it would be rational for teachers conducting PE lessons to emphasize elements that enhance competence need satisfaction, especially with secondary school students. Additionally, the results indicated two indirect paths from basic psychological needs to enjoyment. More specifically, autonomy was negatively linked to enjoyment via external regulation for boys, and via amotivation for girls. These findings are also consistent with the SDT (Ryan and Deci, 2017) where it is argued that when the need for autonomy is not satisfied, it will lead to amotivation and external regulation, and subsequently decreased enjoyment. Specifically related to the boys was a positive connection between introjected regulation and enjoyment, which is somewhat peculiar as introjected regulation means that the motivation is resulting from an internal pressure (Ryan and Deci, 2017). This could be explained possibly through the reasoning that although students feel obligated to take part in compulsory school PE, the lesson content (e.g. football, skating) may nevertheless lead to enjoyable experiences. Interestingly, the need for relatedness was not associated with PE enjoyment or motivational regulations among Grade 8 students, although it is detailed in SDT (Ryan and Deci, 2017) that all the three basic needs are needed for optimal well-being. One reason for this could be that in order to experience the PE lesson as fun and pleasurable, the

students' sense of agency, and perceived competence are more important factors than belonging within a safe group.

Results of this study have several practical implications especially for PE teachers. When formulating these implications, the results pertaining to each age group and both genders should be considered. Among Grade 5 boys, the need for autonomy can be supported by creating opportunities for choice and emphasizing a sense of agency or ownership in the learning situation. Also, it includes using non-controlling language and feedback (Reeve and Halusic, 2009). Studies have shown that teachers' provision of autonomy support leads to positive consequences (e.g. Ulstad et al., 2016) and should therefore be enforced in PE teacher education and in-service training. Among Grade 5 girls, and in addition to fostering the need for autonomy, the need for relatedness can be enhanced when students' feel the context as trustworthy and feel the approval and appreciation of important others around them (Ryan and Deci, 2017). In educational settings, as well as in PE, this includes teacher and peers showing interest, affection and caring, and demonstrating satisfaction and appreciation of the time spent together in learning situations (Haerens et al., 2013; Cox and Williams, 2008; Ryan and Deci, 2017). Previous studies have shown that students who perceive a sense of relatedness with their teachers are more positively engaged in PE (e.g. Shen et al., 2012). For Grade 8 boys, the need for competence can be supported by providing learning goals that are optimally challenging, and also by providing structure, stating clear expectations of learning goals, giving detailed instructions, and offering guidance when performing activities. The provision of feedback in order to enhance need for competence and perceived control has also been proven effective (Jang et al., 2010).

The results must be interpreted relative to the limitations of the study. Specifically, the study design was cross-sectional and therefore not suitable for conclusions concerning causal links between the study variables. Also, the representativeness of the results is limited because the sample of students were conveniently, and not randomly selected. Future studies could evaluate the SDT based motivational sequence, including social factors, based on a longitudinal design. It would also be interesting to see the effects of modifying the teachers' pedagogical approaches and therefore intervention studies are needed in the future. In addition, the school PE motivational model could be assessed in specific situations during PE lessons, for example during different phases in the delivery of the content or in relation to a variety of sports or physical activities.

Conclusion

In this study, enjoyment in PE among Grade 5 and 8 boys and girls was investigated through the lens of self-determination theory. Overall, the findings support notions derived from the SDT whereby basic psychological needs for autonomy, competence and relatedness are seen as important antecedents for optimal motivation and well-being. Fulfilment of these psychological needs has a positive impact for affective consequences, such as enjoyment. This effect is

also influenced by type of motivation, where autonomous motivation leads to more favorable outcomes and controlled motivation to less favorable. Although the results were generally representative of the SDT, some important gender-specific differences were found among both age groups. Results of this study are especially relevant for teachers planning and conducting PE lessons for pre-adolescent and adolescent age groups. In conclusion, practitioners should concentrate on fulfilling students' psychological needs in order to enhance enjoyment in PE.

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Key points

- This study investigated enjoyment in PE among Grade 5 and Grade 8 boys and girls from the view-point of the self-determination theory (SDT).
- Generally, the findings are in line with the theoretical assumptions described in the SDT where it is argued that needs satisfaction would directly, and indirectly via autonomous motivation, promote PE enjoyment.
- Findings indicated some differences among boys and girls in both age-groups regarding the links between different psychological needs, motivational regulations and enjoyment. Results are especially interesting for teachers planning and conducting PE lessons for these age-groups.

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