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ARTICLE

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Full Length Research Paper

Longitudinal changes and predictors of adolescents' enjoyment in physical education

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Longitudinal studies on adolescents' enjoyment in physical education (PE) are lacking. This study examined students' self-reported enjoyment and predictors of enjoyment in PE in school among students from age 14 to 19, using questionnaires and interviews. From the results, enjoyment in PE increases among girls during high school, while students that participate weekly in organized sport report greater enjoyment in PE than those who are not, at the age of 14; but there is no such group difference in high school. Furthermore, the findings from the interview analysis highlight the importance of greater autonomy in high school.

Key words: Enjoyment, physical education, adolescents, student characteristics.

INTRODUCTION

It is widely recognized that schools may play an important role in nurturing adolescents' physical health and in shaping adolescents' well-being in physical activity (Dulagil et al., 2016). White (2013) pointed out that when adolescents enjoy school, they are more likely to perform better. However, several researchers have highlighted that little agreement exists in the research literature on how to best define and measure adolescents' well-being (Fraillon, 2004; Pollard and Lee, 2003; White, 2013). In relation to physical education (PE), a major question is how well the student "like" or enjoy PE, how satisfied they are with being a part of the PE-context – in other words, their general attitude toward the subject as a major indicator of enjoyment in PE. There exists a lack of longitudinal studies on adolescents' enjoyment in PE and factors that predict adolescents' enjoyment in PE. The aim of the study is to examine longitudinal changes in adolescents' enjoyment in PE, and factors that predict adolescents' enjoyment in PE.

In Norwegian school laws, enjoyment at school is highlighted as an important factor to create good learning conditions (Helsedepartementet, 2014). The school is a place where youths spend most of their lives, it is therefore an important arena to create good physical health, quality of life, and to prevent drop out from school (Helsedirektoratet, 2015; Huebner and Gilman, 2006). The curriculum for PE in Norwegian schools highlights that the main aim of the subject is to inspire all students to have a physically active lifestyle, and a lifelong enjoyment of being physically active (Utdanningsdirektoratet, 2015). Research has also suggested that enjoyment in PE is considered necessary for the adoption and maintenance of an active lifestyle (Carlin et al., 2015; Kjønniksen et al., 2009). The link between participation in PE and students' enjoyment is also supported empirically by Wabakken (2010). In his theory of flow, Csikszentmihalyi (2008) points out that flow is closely related to enjoyment and well-being, and

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that human development is strongly related to the feeling of enjoyment and well-being.

Previous research has shown that, although most adolescents seem to thrive and seems to like PE in Norwegian schools (Ingebrigtsen and Sæther, 2006; Kjønneksen et al., 2009), there are also many adolescents who do not like PE (Hallum, 1984; Holm, 2005; Säfvenbom et al., 2014; Wabakken, 2010). The proportions vary; approximately 60 to 90% of students reported to like PE and 10 to 30% reported otherwise. Different operationalizations of enjoyment may explain some of these differences. Several studies indicate that enjoyment in PE may decrease with age among school children (Flagestad, 1996; Holm, 2005; Säfvenbom et al., 2014), even if the decrease is minimal in two of these studies. In a recent study (Säfvenbom et al., 2014), 10% of students reported that they did not like PE in middle school, and 14% of the students reported that they did not like PE in high school. However, none of these studies are longitudinal; that is, they do not follow the level of enjoyment among the same students during lower secondary school and high school. A longitudinal study would use the same questions and reply options, thereby avoiding the problem of different operationalizations as in previous studies. To better understand the impact of PE, Green (2014) emphasized the need for more longitudinal research on adolescents.

Ideally, PE in schools should be organized in such a way that all student groups would like PE; although the research is limited in this area. Most of these studies did not include multivariate analyses, or used enjoyment as the dependent variable. The studies showed that in Norwegian schools, boys reported to like PE more than girls (Flagestad, 1996; Flagestad and Skisland, 2002; Kjønneksen et al., 2009; Säfvenbom et al., 2014; Wabakken, 2010), although the differences were slight in most of these studies. Some studies also indicate that students who are involved in organized sports will most likely enjoy PE better than students who do not participate in such organized sports (Biddle et al., 2011; Flagestad, 1996; Flagestad and Skisland, 2002; Larsson and Redelius, 2008; Säfvenbom et al., 2014). This finding is not surprising, since PE is often perceived as a subject for participation in organized sports activities (Kirk, 2005; Moen, 2011). With such a starting point, participation in unorganized physical activity may not predict enjoyment in PE. It is also reasonable to assume that students with high level of physical fitness and high activity level may thrive better in PE than students with low level of physical fitness, as suggested by Bjerke et al. (2016). Latty et al. (2007) found significant associations between overweight and depression; adolescents who are not overweight may thrive better in PE than students who are overweight.

Previous research suggests that listening to students' wishes and interests is an important aspect of achieving

high levels of enjoyment in PE (Holstad, 2012; Markussen et al., 2008; Myrlund, 2008; Tenvig, 2013; Træland, 2012). Several studies point to the self-determination theory of Deci and Ryan (2000) as important for creating enjoyment in PE (Bagøien et al., 2010; Ciyin and Erturan-Ilker, 2014; Erturan-Ilker, 2014; Holstad, 2012; Jang et al., 2010; Koka, 2014; Mouratidis et al., 2008; Standage et al., 2012). Deci and Ryan (2000) pointed to three basic needs in all humans: autonomy, relatedness, and competence. These factors are essential for optimal motivation, integration, wellness, and enjoyment, and they lead to intrinsic motivation.

Research question

The research question of the study is two-folded: What are the longitudinal changes in adolescents' enjoyment in PE from the age of 14 to the age of 19, and which factors predict adolescents' enjoyment in PE? Regarding the research question, these factors are limited to available data like gender, participation in organized sports and unorganized physical activity, weekly physical activity level, physical fitness (VO₂peak (mL·kg⁻¹·min⁻¹) which are considered as the best indicator according to Åstrand and Rodahl (2003)), and overweightedness. In addition, this study will include interview data from students in an attempt to explain differences in the enjoyment in PE.

METHODOLOGY

Design

The quantitative data were from a larger research project that included a group of randomly selected students (N = 116) and measurements of enjoyment in PE, VO₂peak, physical activity level, participation in unorganized physical activity and organized sport, height, and weight. The students were tested at six time points - at the end of each school year from eighth grade to the third year of high school. Interview data from 26 students were also included. The triangulation approach was used to identify factors that could explain any differences in the enjoyment of PE, between lower secondary school and high school.

Subjects

The quantitative data were based on 116 eighth-grade students in six randomly selected classes (three teams with two classes each) in two lower secondary schools in a town in the middle of Norway (age = 14 ± 0.5 years, weight = 54.2 ± 10.9 kg, height = 1.63 ± 0.08 m). The distribution of boys and girls was relatively equal in the sample (61 boys and 55 girls), as well as the distribution of urban and rural students. The numbers of students with valid test data during the data collection were 105 students in eighth grade, 103 students in ninth grade, 106 students in 10th grade, 79

students in first year of high school, 65 students in second year of high school, and 88 students in third (and last) year of high school. Students dropped out of the study for various reasons - illness, injury, pregnancy, and relocation - thereby explaining the presence of invalid data.

Complete measurements for all six test years were obtained from only 41 students. To achieve a necessary response rate of over 50% (Johannessen et al., 2010), students who had valid measurements at three time points were included – the end of eighth grade, 10th grade, and third year of high school. With such a strategy, the changes in enjoyment were examined with measures at the first year of lower secondary school (14 years old), at the end of lower secondary school/start of high school (16 years old), and at the end of high school (19 years old). Valid data for these three measurement time points were obtained from 68 students, yielding a response rate of 59%. However, to elucidate whether enjoyment in PE varied in relation to the students' gender, VO₂peak, sport participation, participation in unorganized activity, activity level, and overweightedness, students with valid questionnaire data and oxygen uptake data were selected for each of the three measurement time points so as to achieve a higher number of respondents (eighth grade: N = 105 students, 57 boys and 48 girls; 10th grade: 103 students, 56 boys and 47 girls; third year of high school: N = 88 students, 42 boys and 46 girls).

Of the 68 students with valid data for the three measurement time points, 26 students at the end of their second year of high school (17 years old) were selected via stratified sampling for inclusion in the interview study. Thirteen students (seven girls and six boys) had low levels of physical fitness (42.6 ml·kg⁻¹·min⁻¹, SD = 8.5), and 13 students (seven boys and six girls) had high levels of physical fitness (56.4 ml·kg⁻¹·min⁻¹, SD = 7.9).

Procedures

Questionnaire responses and measurements of physical fitness (VO₂peak), height, and weight were obtained from each subject at the same time. Data collections occurred during a two-month period (April to May) in 8th grade, 9th grade, 10th grade, 1st year of high school, 2nd year of high school, and 3rd year of high school. All tests and measurements were performed in the same room, with the same test procedures, with the same test equipment, and with the same test leader at all six measurement time points.

The height of the subjects was measured to the nearest 0.5 cm with a measuring tape that was permanently connected to the wall. The subjects did not wear shoes when their height and weight were measured. The weight of the subjects was measured with a digital scale (seca, City, Country) accurate to 0.1 kg. The subjects' body mass index (BMI) values were calculated according to international standards (Cole et al., 2000), and the cutoff for overweightness was set according to Cole et al. (2000).

Oxygen uptake measurements were carried out on a treadmill (Woodway S5; Woodway, Waukesha, WI, USA). The number of individuals in the test lab was limited to two individuals (the test leader and one student) so as to keep the oxygen level in the air stable and to avoid disturbances of the tests. Before testing, the students were given information about the test conditions. They were advised to avoid strenuous exercise the day before testing and to eat 2 to 3 h before testing. The students were also informed that they could participate in PE before testing but that only light activity was permitted. The test outfits consisted of running shoes, shorts or training pants, and a T-shirt or jumper. Oxygen uptake was measured with Oxycon Pro (Erich Jaeger GmbH, Hoechberg, Germany). An incline of 10.5% was used on the treadmill

according to the test procedures. Girls who did not train or were obese started with a speed of 4 km/h, those who trained one to two times a week started with a speed of 5 km/h, and those who trained three to four times a week started with a speed of 6 km/h. For boys, the same categories were used but at a 1 km/h higher speed. The speed on the treadmill was increased by 1 km/h every minute - except sometimes at the end of the test when the speed was sometimes increased by only 0.5 km/h. The criterion for the maximal oxygen uptake was a flattening/decrease of the O₂ curve with increasing speed (respiratory exchange ratio [RER] > 1.00). The average of the two highest consecutive measurements was recorded as the maximum oxygen uptake. The test had a duration time of 5 to 6 min.

At the end of the test protocol, the students answered a questionnaire that was designed to examine their enjoyment in PE on a 4-point scale. The adolescents were asked the following question: "How would you rate your enjoyment in physical education?" The response options were "very good," "good," "poor," and "very poor." The following question about physical activity level was also included: "How many days a week are you physically active that you become sweaty or out of breath?" The response options were "never," "one day a week," "two to three days a week," "four to five days a week," and "six to seven days a week." In addition, the following questions about participation in organized sports and unorganized physical activities/sports were included: "How often do you participate in organized sport?" "How often do you participate in unorganized physical activity?" The response options for both of these questions were "never," "rarely," "one to three days a month," "one day a week," "two to three days a week," "four to six days a week," and "every day."

Each informant was interviewed once in an individual interview at a place chosen by the student. In general, the duration of each interview was between 45 and 60 min. All the students were asked open-ended questions about their experiences with PE, particularly in high school but also in lower secondary school. Follow-up questions were asked in relation to the students' responses. At the end of the interview, each student was asked the following three questions: "Is there anything you feel different in physical education between lower and upper secondary school?" "In what way?" "What does this mean to you?" The answers to these three questions were especially important in the analysis, in relation to self-determination theory. Other data related to the students' descriptions of PE in lower and upper secondary school were also included in the analysis.

Statistical and qualitative analysis

Quantitative analysis

Because the data did not fulfill the assumption of the parametric test, a nonparametric test (Wilcoxon Signed Rank Test) was conducted to examine whether the students' enjoyment in PE changed during the three measurement time points, with Bonferroni corrections. The following variables were transformed into dummy variables for logistic regression analyses: enjoyment in PE (did not like it very much/like it very much), overweightness (not overweight/overweight), physical activity level (less than four days a week/four days a week or more), participation in organized sports (no weekly participation/weekly participation), and participation in unorganized physical activity (no weekly participation/weekly participation). The Spearman rank correlation was used to identify bivariate associations between the enjoyment in PE, and the independent variables as a criterion for inclusion in logistic regression and to identify the multicollinearity between the independent variables. Furthermore, logistic regression was

performed to calculate odds ratios (ORs) with 95% confidence intervals (CIs) for the enjoyment in PE at the three measurement time points (8th grade, 10th grade, and 3rd year of high school) as the outcome variables. The data fulfilled the assumptions for logistic regression analysis, according to Peduzzi et al. (1996). The independent variables (gender, VO₂peak, participation in organized sport, participation in unorganized physical activity, physical activity level, and overweightness) that showed bivariate associations with the enjoyment in PE at the three measurement time points, were included in the logistic regression analysis (Johannessen, 2009). Finally, the Chi-Square test was used to examine the association in the enjoyment in PE, between the 68 students with valid data for the three measurement time points, and the 37 students that only had valid data for eighth grade. Statistical significance was set at $p \leq 0.05$. SPSS version 22 was used to perform the analyses. Statistical analysis was performed with SPSS statistical software version 24 (IBM SPSS, Chicago, IL, USA).

Qualitative analysis

The interviews were transcribed and analyzed in QSR NVivo 10, a software analysis program that helps structure analytical findings (Klemp, 2012). The interviews were analyzed based on analysis of meaning, as described by Johannessen et al. (2010). This process entailed giving codes to the students' statements and then classifying them into categories. The data were sorted according to these categories so as to uncover patterns, similarities, relationships, or differences between the statements.

Ethical considerations

The subjects were fully informed about the protocol before participating in this study. Approval to use the data and conduct the study was given by the Norwegian Social Science Data Services (NSD) and the Norwegian Regional Committees for Medical and Health Research Ethics.

RESULTS

The development of enjoyment in PE

The analyses of the results in Table 1 show no significant differences in enjoyment in PE from eighth grade to 10th grade ($Z = -0.73$, $p = 0.465$) or from 8th grade to 3rd year of high school ($Z = -1.57$, $p = 0.117$). However, students reported that they liked PE more in their third year of high school, than while in 10th grade ($Z = -2.35$, $p = 0.019$); but the significant values were at a borderline level. Analysis shows that this change occurred only among girls ($Z = -2.31$, $p = 0.021$) and not boys ($Z = -1.07$, $p = 0.285$).

An important question is, 'Are there associations in enjoyment in PE between the 68 students with valid measurements for the three measurement time points (Table 1) and the 37 students with valid data in eighth grade but not in 10th grade and 3rd year in high school?' In other words, is the dropout rate random? Statistical analyses show no association in enjoyment in PE in 8th

grade between the 68 students and the 37 students who were measured in 8th grade, but who dropped out subsequently ($\chi^2 = 3.75$, $p = 0.153$).

Predictors of enjoyment in PE

Table 2 shows the baseline characteristics of the participants included in the Spearman analyses and the logistic regression analyses. The characteristics were included on the basis of theoretical and previous empirical findings, as discussed in the introduction.

Table 3 shows that five of the six independent variables have bivariate associations with enjoyment in PE in eighth grade. Further descriptive analyses of these variables show that whereas 66.7% of boys reported that they liked PE very much in eighth grade, 45.8% of girls reported that they liked PE very much for the same time point. The analyses also reveal that 72.7% of those who participated in organized sport reported that they liked PE very much, but only 14.8% of those who did not participate in organized sport reported such an experience. Whereas 76.9% of those who were physically active four days a week or more reported that they liked PE very much, 45.5% of those with a lower activity level reported such an experience. The eighth grade students who reported that they liked PE very much had a higher VO₂peak ($M = 51$, $SD = 7$) than those who did not report that they liked PE very much ($M = 45.4$, $SD = 9$). Finally, whereas 30.8% of those who were overweight reported that they liked PE very much, 60.9% of those who were not overweight reported that they liked PE very much.

Four of the six independent variables show bivariate associations with enjoyment in PE in 10th grade. Further descriptive analyses of these variables show that 65.5% of boys reported very good enjoyment in PE, but only 39.6% of girls reported very good enjoyment in PE. The analyses also reveal that whereas 64.1% of those who participated in organized sport reported that they enjoyed PE very much, 41% of those who did not participate in organized sport reported such an enjoyment in PE. In addition, differences with respect to physical activity level were detected, with 68.9% of those who were physically active four days a week or more reporting very good enjoyment in PE, but only 42.6% of those with a lower activity level reporting very good enjoyment in PE. The 10th grade students who reported they liked PE very good had a higher VO₂peak ($M = 52.1$, $SD = 7.7$) than those who did not report that they like PE very good ($M = 45.1$, $SD = 9.6$).

Finally, only VO₂peak showed bivariate associations with enjoyment in PE in third year of high school. Further descriptive analyses show that students who reported very good enjoyment in PE in third year of high school, had a higher VO₂peak ($M = 46.7$, $SD = 8.5$) than those

Table 1. Reported enjoyment in PE among boys and girls in eighth grade, 10th grade, and third year of high school.

Parameter	Very poor (%)	Poor (%)	Good (%)	Very good (%)	N
Boys, eighth grade			25.7	74.3	33
Girls, eighth grade		3	48.5	48.5	35
Boys, 10th grade			34.3	65.7	33
Girls, 10th grade		9.1	51.5	39.4	35
Boys, third year of high school			22.9	77.1	33
Girls, third year of high school		6.1	33.3	60.6	35

Table 2. Baseline characteristics of the participants included in the Spearman analyses and the logistic regression analyses.

Parameter	Eighth grade (n = 105)	10th grade (n = 103)	Third year of high school (n = 88)
Enjoyment in PE			
Not very good, %	43.3	46.7	30.3
Very good, %	56.7	53.3	69.7
Gender			
Girls, %	46.2	44.8	52.3
Boys, %	53.8	55.2	47.7
Participation in organized sport			
<Weekly, %	26.2	38.2	60
Weekly, %	73.8	61.8	40
Participation in unorganized physical activity			
<Weekly, %	22.5	31.4	33.3
Weekly, %	77.5	68.6	66.7
Physical activity level			
<4 days a week, %	63.5	57.1	54.7
≥4 days a week, %	36.5	42.9	45.3
VO _{2peak} , M (SD)	48.7 (8.3)	49 (9.3)	45.7 (8.6)
Overweightness			
Not overweight, %	88.5	79.8	76.1
Overweight, %	11.5	20.2	23.9

who did not report very good enjoyment in PE ($M = 42.9$, $SD = 8.6$). There was no multicollinearity between the independent variables at each of the three measurement time points. Only the independent variables that showed bivariate associations with the dependent variable enjoyment in PE, at each of the three measurement time points (Table 3) were included in the logistic regression analyses (Tables 4 to 6).

The logistic regression analyses in Table 4 show that

four of the five independent variables associated with enjoyment in PE in eighth grade (Table 3) did not predict enjoyment in PE, when the effects of each of the other variables were controlled for. Only students' weekly participation in organized sport predicted enjoyment in PE. The ORs in Table 4 show that the odds of reporting very good enjoyment in PE in eighth grade are nearly 12 times greater for weekly participation in organized sport than for no weekly participation in organized sport.

Table 3. Spearman analyses of correlations between enjoyment in PE (not very good/very good) and possible predictors of enjoyment in PE.

Possible predictors of enjoyment in PE	Enjoyment PE eighth grade ^a (n = 105)	Enjoyment PE 10th grade ^b (n = 103)	Enjoyment PE Third year high school ^c (n = 88)
Gender	0.210*	0.259**	0.166
Participation in organized sport	0.514**	0.225*	0.129
Participation in unorganized physical activity	0.055	0.157	0.087
Physical activity level	0.307**	0.260**	-0.006
VO _{2peak}	0.268**	0.372**	0.238*
Overweightness	-0.200*	-0.067	-0.059

^aCorrelated against the independent variables (predictors) at the same measurement time point in eighth grade.

^bCorrelated against the independent variables (predictors) at the same measurement time point in 10th grade.

^cCorrelated against the independent variables (predictors) at the same measurement time point in third year of high school. *p < 0.05.; **p < 0.01.

Table 4. Factors associated with enjoyment in PE, eighth grade.

Very good enjoyment, eighth grade			
Possible predictors of enjoyment ^a	OR	95% CI	P value
Boys	1.96	0.59, 6.50	0.271
Weekly participation in organized sport	11.90	3.36, 42.06	0.000
Physically active ≥4 days a week	1.90	0.65, 5.57	0.245
VO _{2peak}	1.03	0.95, 1.13	0.125
Overweightness	0.69	0.13, 3.75	0.663

^aMeasured in eighth grade.

Table 5. Factors associated with enjoyment in PE, 10th grade.

Very good enjoyment, 10th grade			
Possible predictors of enjoyment ^a	OR	95% CI	P value
Boys	1.88	0.55, 6.38	0.312
Weekly participation in organized sport	1.34	0.46, 3.94	0.593
Physically active ≥4 days a week	1.89	0.59, 6.02	0.281
VO _{2peak}	1.06	0.97, 1.14	0.193

^aMeasured in 10th grade.

Table 6. Factors associated with enjoyment in PE, third year of high school.

Very good enjoyment, third year of high school			
Possible predictor of enjoyment ^a	OR	95% CI	P value
VO _{2peak}	1.06	0.99, 1.13	0.083

^aMeasured in third year of high school.

The logistic regression analyses in Table 5 show that none of the four independent variables that showed bivariate associations with enjoyment in PE in 10th grade,

had no effect on enjoyment in PE, when the effects of each of the other variables were controlled for. The logistic regression analyses presented in Table 6 show

that VO₂peak had no effect on enjoyment in PE in third year of high school.

Interview results

The results from the interview analyses showed that approximately two thirds of the students stated that PE was organized differently in high school than in lower secondary school. Most of the students in high school noted the following differences: fewer students in PE class in high school, students' increased influence on the selection of activities in high school, and more variation in PE activities in high school. Most of these students appreciated the changes and reported that this way of organizing PE generated more satisfaction, and more enjoyment in PE among students. Some students, as Vida, also pointed out that they received more feedback from their PE teacher in high school than they had in lower secondary school:

"In lower secondary school, there was less feedback [than in high school] on what you could do better. I feel that in high school . . . you decide more what you like to do [in PE] – that is, it was a little stricter in lower secondary school. . . . Because we receive more feedback in high school, I think I have more opportunities to develop myself" (Vida).

Furthermore, Vida attributed her increased motivation to engage in physical activity in high school to the different organization of PE. When Vida was asked about what she meant that PE was "stricter" in lower secondary school, she stated the following:

"Now in high school, we have been given more involvement in terms of what activities we should do. In lower secondary school, I feel that there were less adaptation and customization according to the students' wishes".

Øystein, another interviewee, stated that "in lower secondary school, we always played soccer or handball" and claimed that there were fewer opportunities for codetermination in lower secondary school than in high school. Two other students, Oleander and Owe, provided similar statements, pointing out that there was less variation in activities in lower secondary school than in high school (for example, much more soccer in lower secondary school than in high school). Paal is a typical example of an interviewee who reported to like PE better in high school than in lower secondary school. When Paal was asked whether he felt there were any differences in PE between lower and upper secondary school, he answered as follows:

"Yes, totally different in high school. In high school, it's

actually so much better than in lower secondary school. In middle school, there were 46 students in the class, and we did the same [activities] in every physical education lesson . . . only soccer, running, and ball games. It affected my motivation for physical education negatively. I did not really enjoy physical education at all in lower secondary school. My motivation for physical education is much better now in high school".

Marlene, another interviewee, also highlighted that her enjoyment in PE was higher in high school than in lower secondary school, because there were fewer students in the PE lessons, which allowed more contact and dialogue with the PE teacher.

Most of the students reported that greater autonomy in PE in high school increased their enjoyment in PE.

However, some students reported the opposite effect; that is, this strategy decreased their enjoyment in PE. They explained that greater autonomy in high school coincided with a reduction in the intensity level of the PE lessons, which they viewed as a negative.

DISCUSSION

Development of enjoyment in PE during lower secondary school and high school

The first main finding is that, in general, the adolescents reported that they enjoyed PE very good and good during all time at school. This finding is supported by several previous research studies (Bjerke et al., 2016; Ingebrigtsen and Sæther, 2006; Kjønneksen et al., 2009). Secondly, another main finding is that the reported enjoyment in PE increases from the end of lower secondary school to the third year of high school among girls. The results of the present study indicate that the positive change of enjoyment in PE among girls is preferable in relation to fulfilling the aim of PE in Norwegian schools: to inspire all students to have a physically active lifestyle and a lifelong enjoyment of being physically active (Utdanningsdirektoratet, 2015). The increase in girls' enjoyment in PE is especially positive because other studies have reported that girls find PE to be more problematic than boys (Flagestad, 1996; Flagestad and Skisland, 2002; Kjønneksen et al., 2009; Säfvenbom et al., 2014; Wabakken, 2010). The interview analyses support the positive change of enjoyment in PE among girls, and indicate that this finding could have something to do with the way PE is organized. Approximately two thirds of the students stated that PE was organized differently in high school than in lower secondary school. Most of the students reported that there were fewer students in PE class in high school, that they had greater influence on the selection of activities in high school, and that they

experienced more variation in PE activities in high school. Several of the students appreciated these changes and reported that this organization of PE generated more satisfaction and greater enjoyment. This finding is in line with self-determination theory (Deci and Ryan, 2000), where autonomy is highlighted as a basic need in all humans and is essential for optimal motivation, integration, wellness, and well-being. An autonomy-related organization of PE increases the intrinsic motivation for doing activities in PE because it stimulates interest and provides its own reward by satisfying individuals' basic needs for autonomy, competence, and relatedness. The theory has been supported empirically by many PE related studies (Bagøien et al., 2010; Ciyin and Erturan-Ilker, 2014; Erturan-Ilker, 2014; Koka, 2014; Mouratidis et al., 2008; Standage et al., 2012). The interview results of the present study indicate that PE, as it is currently organized, seems to create better conditions for autonomy in high school than in lower secondary school. During the interview, some students also pointed out that they received more feedback from their PE teacher in high school than in lower secondary school. Deci and Ryan (2000) claimed that positive feedback increases intrinsic motivation because humans have a fundamental psychological need to be competent. Furthermore, feedback has been shown to be particularly important for learning in school (Hattie and Goveia, 2013; Zeng et al., 2009).

Factors that predict very good enjoyment in PE

The third main finding is that multivariate analyses show that weekly participation in organized sports was the only variable that predicted enjoyment in PE – but only in eighth grade (Tables 4 to 6). Nearly 73% of those who participated weekly in organized sport reported very good enjoyment in PE, whereas only 15% of those who did not participate weekly in organized sport reported very good enjoyment in PE in eighth grade. For students in 10th grade and in third year of high school, no such significant relationships were detected. The group differences in eighth grade are supported by previous research (Biddle et al., 2011; Flagestad, 1996; Flagestad and Skisland, 2002; Larsson and Redelius, 2008; Säfvenbom et al., 2014). However, the results of the present study provide accurate and concrete evidence of the impact that sport participation has on enjoyment in PE, by showing that the odds of students reporting very good enjoyment in PE in eighth grade are nearly 12 times greater when students participate weekly in organized sport compared with no weekly participation in organized sport. These results support the findings of previous research studies in which PE is perceived as a subject of organized sports activities (Kirk, 2005; Moen,

2011). As the authors of these studies, this perception is also found to be problematic. The lack of an association between participation in unorganized physical activity and enjoyment in PE (Table 3), underpins this reasoning. To achieve lifelong motivation for physical activity among all students, PE must offer activities other than sports activities.

As seen in Tables 4 to 6, gender, VO₂peak, overweightedness and physical activity level were not predictors of enjoyment in PE, when the effects of the other possible predictors were controlled for. The absence of such group differences in enjoyment among others are surprising, in a positive way, especially because previous research indicate such differences (Biddle et al., 2011; Bjerke et al., 2016; Flagestad, 1996; Flagestad and Skisland, 2002; Kjønneksen et al., 2009; Larsson and Redelius, 2008; Latty et al., 2007; Little et al., 2016; Säfvenbom et al., 2014; Wabakken, 2010). As earlier pointed out, the fostering of an autonomy supportive environment by PE teachers in high school may help explain the lack of group differences at high school.

Limitations of the study

The study discusses students' outlook towards physical education, and some critical analyses is necessary with such a design. Such a design does not measure the quality of the PE, but the subjective experiences of the students. Another limitation of this study is that enjoyment in PE is measured with only question, not several questions. Asking more questions would promote a wider measure of enjoyment, as a phenomenon. However, it is argued that answering the general question "How would you rate your enjoyment in physical education?" is the major and most important question that seek to find the adolescents general attitude toward the subject – a question that is of great importance to inspire all students to have a physically active lifestyle and a lifelong enjoyment of being physically active (Utdanningsdirektoratet, 2015).

The interview data included only three questions about differences between lower secondary school and high school, but other data gathered during the 45 to 60 min interviews with the 26 students about their experiences in PE in lower secondary school and high school, were also included in the analysis. Nonetheless, asking more questions in relation to self-determination theory would have been preferable so as to promote a deeper understanding of the differences between PE in lower secondary school and high school.

An important question regarding the development of enjoyment is whether the dropout rate of students from the present study was random. Statistical analyses show no association in enjoyment in PE between the 68

subjects included in the analysis in Table 1 and the 37 students who dropped out. In other words, the dropout rate seems to be random and therefore is not problematic.

Conclusion

The results show that enjoyment in PE increases among girls during high school. While students that participate weekly in organized sport report greater enjoyment in PE than those who did not at the age of 14, no such group difference appears at high school. The finding that the odds of reporting very good enjoyment in PE in eighth grade were nearly 12 times greater for students who participated in weekly organized sport (compared with those students who did not), is problematic. The discovery of no group differences in enjoyment in high school is considered to be positive, because the main aim of PE is to inspire all students to have a physically active lifestyle and a lifelong enjoyment of being physically active, not only those students who are athletically gifted. The findings are discussed in relation to self-determination theory, where the interview data analyses seem to support the provision of more autonomy support in high school. There is a lack of longitudinal studies and a lack of multivariate analyses on this topic, and the present study contributes with new knowledge. Further studies should include more subjects and more possible predictors of enjoyment in PE.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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