Student Motivation Associated With Fitness Testing in the Physical Education Context

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The purpose of the study was to analyze students’ motivation in relation to their participation in fitness testing classes. Participants were 134 Finnish Grade 5 and 8 students. Students completed the contextual motivation and perceived physical competence scales before the fitness testing class and the situational motivation questionnaire immediately after the class. During the fitness test class, abdominal muscle endurance was measured by curl-up test, lower body explosive strength and locomotor skills by the five leaps test, and speed and agility by the Figure 8 running test. For the fitness testing class, students reported higher scores for intrinsic motivation, identified motivation, and amotivation than in their general physical education program. The result of the path analysis showed physical fitness was positively related to perceived physical competence. In addition, perceived competence was found to be a positive predictor of situational intrinsic motivation, but not of other forms of situational motivation. Significant path coefficients in the model ranged from -.15 to .26.

Keywords: fitness testing, motivation, self-determination, perceived physical competence, physical education

Fitness testing is a commonly used practice within the school physical education (PE) curriculum of many countries (Domangue & Solmon, 2010; Morrow, Zhu, Franks, Meredith, & Spain, 2009). The purpose of the study was to analyze students’ motivation in relation to their participation in fitness testing classes. Practitioners in PE believe fitness tests to be an important pedagogical element in encouraging students to improve their fitness and get involved in regular physical activity (Harris & Cale, 2006). However, at the same time, many researchers have strongly criticized the use of fitness tests (e.g., Corbin, 2002; Naughton, Carlson, & Greene, 2006; Rice, 2007). One of their main arguments is that fitness tests may actually contribute to or underpin diminishing interest in PE and physical activity in general. In addition, some authors have suggested
Fitness Testing and Student Motivation

that the use of fitness testing in PE is undermining students’ motivational constructs such as confidence, self-esteem and sense of self as a physical activity participant (Corbin, 2002; Rice, 2007). The general aim of the current research was to provide new evidence in this area through the evaluation of motivational factors associated with the engagement of students in fitness testing classes in Finnish school physical education settings.

Although fitness testing constitutes a controversial element of the PE curriculum (Cale & Harris, 2009), it is surprising that very few empirical studies have investigated students’ motivational experiences during fitness testing classes (Domangue & Solmon, 2010; Wiersma & Sherman, 2008). Hopple and Graham (1995) found that 4th and 5th grade students had negative perceptions of the 1-mile-run test and did not understand the purpose of the test. In addition, they reported that some children disliked the discomfort and pain experienced in fitness tests and, as a result, adopted a variety of avoidance behaviors in test situations. Luke and Sinclair’s (1991) study is another example in which students reported negative attitudes toward fitness tests classes.

Two empirical studies have analyzed the associations among goal orientations and cognitive, affective, and behavioral responses in fitness test situations. Goudas, Biddle and Fox (1994) determined that students who were high in task orientation but low in ego orientation, reported the highest levels of enjoyment and effort irrespective of their result in a 20 meters progressive shuttle running test that was used as the indicator of aerobic fitness. Garn and Sun (2009) investigated the relationship between achievement goals, social goals, and preparation effort and the scores for the PACER aerobic fitness test for a sample of 214 middle school students. Cluster analysis in their study highlighted three distinct profiles; high-goals profile, low-achievement goals and moderate social goals profile, and low-social goals profile. The high-goals profile group reported significantly higher amounts of effort in the PACER test.

Some studies have investigated the role of the provision of information and rewards to students as motivators when assessing their fitness. Whitehead and Corbin (1991) implemented an intervention that involved students in the fitness test situation receiving feedback regarding their performance at a higher (positive feedback) or a lower percentile (negative feedback) rank. Results highlighted that students who were told that they were in a low ranking (“compared to other junior high school boys/girls your score is in the bottom 20% range”) had subsequent decreases in intrinsic motivation. Domangue and Solmon (2010) found that the students who received a fitness award for achieving above the 50th percentile of the national normative fitness standards, reported higher levels of task-involvement, competence, future intentions, effort, and enjoyment than the students who did not receive such an award.

A review of the previous studies on students’ motivation toward fitness testing indicates that none of these studies adopted the self-determination approach, which is the approach regularly used in many contexts of motivational research (see Hagger & Chatzisarantis, 2007). Earlier investigations have shown that there exist both intrinsic and extrinsic motives for participating in fitness testing situations (Domangue & Solmon, 2010; Garn & Sun, 2009). Therefore, the self-determination theory may provide a useful framework for the concurrent analysis of intrinsic and extrinsic reasons for participation in fitness testing.
According to the self-determination theory, individuals have innate psychological needs to be competent, autonomous, and to feel socially related (Deci & Ryan, 1985). Subsequently, the self-determination theory assumes that people try to search for behaviors that foster these attributes, which in turn affect their motivation (Deci & Ryan, 1985, 2000). In the self-determination theory, the need for competence is described as “a propensity to have an effect on the environment as well as to attain valued outcomes within it” (Deci & Ryan, 2000, p. 231). According to Harter (1978), the concept of perceived physical competence describes the perception a person has of his/her abilities resulting from cumulative interactions with the environment. Harter (1978) also suggests that highly competent individuals persist longer in certain activities compared with individuals of low perceived competence. In this study, we adopt Harter’s interpretation of competence because we believe it better reflects the fitness testing situation or environment where students will often evaluate their competence on the basis of their comparisons with the performance of others within their fitness testing situation or setting. Autonomy has been determined as a quality of human functioning that involves the experience of choice or, in other words, the experience of an internal perceived locus of causality. Deci and Ryan (1994) also framed social relatedness upon the proposition that “people are inherently motivated to feel connected to others within a social milieu, to function effectively in that milieu, and to feel sense of personal initiative while doing so” (p. 7).

Self-determination theory also holds that characteristics of the social context may assist in fueling peoples’ basic needs by acting in an autonomy supporting fashion (autonomy supportive climate), or inhibit such needs by significant others behaving in a controlling manner (controlling climate). In fitness testing class, all three psychological needs of the self-determination theory are present. However, it could be argued that in fitness testing, perceived physical competence is the most crucial motivational construct because these situations tend to contribute toward students evaluating their competence with normative statistics or in relation to themselves or others (Goudas et al., 1994). Theoretically, we may then argue that students’ perceived physical competence enhances motivation during fitness testing situations (Deci & Ryan, 1985). There is also empirical evidence that higher need for competence or perceived physical competence is associated with intrinsic forms of motivation (e.g., Ntoumanis, 2005; Standage, Duda, & Ntoumanis, 2003), competence toward motor abilities (e.g., Castelli, Woods, Normeyer, Valley, & Graber, 2007; Raudsepp & Liblik, 2002), and increased physical fitness (Jaakkola & Washington, 2011). Jaakkola and Washington (2011) also showed that perceived physical competence mediates the effect of physical fitness on physical activity intention and physical activity within secondary school aged children. This finding demonstrates that physical fitness is one of the significant antecedents of perceived physical competence within junior high school students. The level of physical fitness, thus, reflects the student’s perception as to whether they perceive themselves as physically competent. Based on the theoretical assumptions and empirical evidence presented above, in this study, we suggest that that physical fitness, perceived physical competence, and motivation during fitness testing classes are related with each other. More specifically, we suggest that physical fitness produces perceived physical competence, which in turn yields motivation in fitness testing class.
According to the self-determination theory, motivation exists as a continuum, ranging from amotivation through four different types of extrinsic motivation (external regulation, introjected regulation, identified regulation and integrated regulation) to true intrinsic motivation (Deci & Ryan, 1985, 2000; Vallerand, 2001). What makes these dimensions different from each other is the increasing level of autonomy or self-determination toward the intrinsic motivation end of the continuum (Deci & Ryan, 1985; Vallerand, 2001). Amotivation is defined as a state in which people lack the intention to behave and thus lack motivation (Deci & Ryan, 2000). Amotivated individuals experience feelings of incompetence, expectancies of uncontrollability and perform activities without purpose. External regulation is occurring if an activity is done because of external factors like rewards, constraints or fear of punishments. Introjected regulation motivational forces are internal but still influenced by esteem-based pressures to act. These include avoidance of guilt and shame or concerns about self- and other approval (Ryan & Connell, 1989). Identified regulation occurs when the individual has recognized and accepted the underlying behavior values or goals (Deci & Ryan, 2000). The behavior then typically takes the form of “I want” (Ryan & Connell, 1989). The final form of extrinsic motivation is integrated regulation. It is the most complete form of internalization of extrinsic motivation. It involves the identification of the importance of behaviors, but also integrates those identifications with other aspects of self. Integrated regulations exist when people have fully accepted the identified behaviors by bringing them into harmony or coherence with other aspects of their goals and values (Deci & Ryan, 2000). Intrinsic motivation represents the most autonomous motive in the continuum, and it refers to engaging in an activity because of the pleasure and satisfaction derived from participation (Deci & Ryan, 2000).

Fitness testing is an example of a teaching and learning situation where participants’ motivation is evident but motives vary substantially between individuals. It constitutes an evaluative context in which the majority of students try to achieve the best result (Roberts, 2001). In addition, in fitness testing, premises of the self-determination theory are observable. Fitness testing classes: a) promote or diminish the perception of competence, autonomy, and social relatedness; and b) produce intrinsic or extrinsic forms of motivation, or amotivation. Although, the self-determination theory framework has not been used to analyze students’ motivation in fitness testing situations, it has been regularly adopted in the physical education (e.g., Ommundsen & Eikanger-Kvalo, 2007; Standage, Duda, & Ntoumanis, 2006) and physical activity contexts (e.g., Fortier & Grenier, 1999; Pelletier, Fortier, Vallerand, & Brière, 2001) to describe participants’ motivation to engage within these settings. In addition, the self-determination approach has often been employed within general education investigations that have examined the effect of grading (Pulfrey, Buch, & Butera, 2011), external rewards (Deci, Koestner, & Ryan, 2001), and testing (Ryan & Weinstein, 2009) on students’ motivation.

The hierarchical model of intrinsic-extrinsic motivation is a motivational framework that is used regularly in conjunction with the self-determination theory (Vallerand, 2001). The model proposes that motivation appears on three hierarchically structured levels that are situational, contextual, and global (Vallerand, 2001). Situational motivation arises from the immediate influence of the situational variables on motivation. An example of motivation at situational level is fitness testing class. Contextual motivation, instead, reflects the determinants and outcomes of
more generalized levels of intrinsic, extrinsic, and amotivation toward specific life contexts, such as education, social relations, and sport. Physical education is also an example of the motivation at the contextual level of generality. The last and the most generalized component of the motivational hierarchy is global motivation that is unrelated to specific contexts. Global motivation refers to a personal tendency of motivation toward life in general. According to the model, there are two mechanisms as to how motivation at a particular level of generality affects motivation at other levels of generality. A top-down effect describes how motivation from a higher level of generality affects motivation at the next lower level in the hierarchy. Recursive effect refers to the process whereby a motivation at the lower level in the hierarchy can affect motivation at the higher level of generality. The model also suggests that there is a specificity effect, which infers that motivation at a particular level is mainly affected by the same motivation context at different levels of generality. For example, the situational motivation toward fitness training should be affected by contextual exercise motivation (Vallerand, 2001).

The hierarchical model of intrinsic-extrinsic motivation has been used widely in studies of participants’ motivational experiences in physical education (Jaakkola, Liukkonen, Ommundsen, & Laakso, 2008), in sports (Kowal & Fortier, 2000), and in college education (Guay, Mageau, & Vallerand, 2003). The model could provide a useful framework in the examination of the students’ motivational experiences during fitness testing class. Using the model, it is possible to investigate how students’ motivation during fitness testing class is related to their contextual motivation toward physical education in general. If contextual motivation toward PE does not differ from situational motivation in fitness testing class, it can be speculated that students’ motivational experiences toward fitness testing is at the same level as their motivation for PE in general. However, if students’ situational motivation in fitness testing class is significantly lower than their contextual motivation toward PE in general, it can be inferred that fitness testing produces lower levels of motivation than their general PE experience. However, this suggestion may also mean that motivational constructs are specific to a context and/or task (Vallerand, 1997).

This study is important for several practical and theoretical reasons. Firstly, few existing articles in the area of fitness testing in physical education have presented contrasting arguments on the effect of fitness testing on students’ motivation and willingness to participate in physical activity (Harris & Cale, 2006; Naughton et al., 2006). Secondly, existing empirical studies on students’ motivational experiences during fitness testing classes indicate that there are no data to support that students value fitness tests or that the testing or results motivate them to be physically active (Cale & Harris, 2009; Keating, 2003). Thirdly, there is no previous research showing how physical fitness and perceived physical competence are associated with motivation during fitness testing class. These shortcomings demonstrate that there is still a need to investigate fitness testing from students’ motivational perspective to learn why and how they are motivated toward testing. From the theoretical perspective, this study can provide information regarding how physical fitness and perceived physical competence and the interaction of these variables turn to different motives during fitness testing class. In addition, given that motivation represents a hierarchical structure, the investigation of whether contexts of physical education and fitness testing produce different motivations is warranted. The results of this
study may allow practitioners to understand motivation in fitness testing, develop pedagogies to conduct fitness tests, and use the information generated as an outcome of testing for motivational purposes.

The Purpose of the Study

Based on the consideration of existing research and theory, we established two research aims. Firstly, we compared students’ situational motivation during the fitness test situation with their contextual motivation toward the typical PE class. Secondly, we investigated the associations among physical fitness, perceived physical competence, and motivation within fitness testing class. For the second research aim, we used gender and grade as covariates to control their effect on motivation. The rationale of the second research task stems from the theoretical predictions and empirical results we have considered. We assumed that high physical fitness would result in higher perceived physical competence, and as a consequence lead to increased intrinsic motivation and identified regulation during fitness testing classes. In addition, we hypothesized that lower physical fitness would result in lower perceived physical competence, and subsequently external regulation and amotivation during fitness testing classes. This type of pattern infers that there are sequential associations among physical fitness, perceived physical competence, and motivation during fitness testing classes. To our knowledge, this is the first attempt to investigate these relationships.

Method

Participants and Settings

The participants of the study were 134 Finnish students. The sample comprised of Grade 5 (34 girls, 28 boys) and Grade 8 (37 girls, 37 boys) students. Data were collected during the Spring semester in the Central Finland area. All data were collected on the same day but at different times and locations.

In Finland, children start school at seven years of age. In elementary school (grades 1–6), students have two hours of obligatory physical education weekly. In secondary school (grades 7–9), the minimum amount of weekly physical education is two hours. During grades 7–9, physical education remains compulsory but the students select from a set of elective units that are developed according to local school curricula. Throughout grades 7–9, boys and girls complete physical education classes in separate gender groups. The Finnish National Board of Education designs the core curriculum goals and content for physical education at all school levels. At the basic education level (grades 1–9), the main emphasis is on learning a wide variety of motor skills (The Finnish National Board of Education, 2004). Fitness education is also a key curriculum target of Finnish school physical education, particularly in secondary school (The Finnish National Board of Education, 2004). The main purposes of fitness testing in Finnish physical education are to inform students about their level of physical fitness and to motivate them to take care of their physical fitness by being physically active. In Finnish physical education, fitness tests are typically implemented twice during the academic year.
Procedures

Students completed the contextual motivation scale (Pelletier et al., 1995) and perceived sport competence (Fox & Corbin, 1989) scale in their classroom before the fitness testing class. Immediately after the class, they filled out the questionnaire analyzing their situational motivation (Guay, Vallerand, & Blanchard, 2000) toward fitness testing class. This questionnaire was answered in the gym. Completing both the contextual and situational questionnaires required five minutes. The data collection was implemented using this procedure to avoid the possibility that students would disrupt their contextual and situational motivational experiences (Vallerand, 2001). The procedure of collecting contextual responses before class and situational responses after the class was also used in Jaakkola et al. (2008) study in Finnish physical education when analyzing the associations among contextual, motivation situational motivation, and students’ heart rates during PE classes. To confirm that the students were able to reflect on their perception of contextual physical education before fitness testing class, and situational motivation after the class, researchers reiterated to them about the context of the scale before the students started to respond to each scale. The specific fitness tests collected during one PE class were the curl-up (abdominal muscle endurance), 5-leaps test (lower body explosive strength, locomotor skills), and Figure 8 running test (speed, locomotor skills, agility). Students participated in the study voluntarily, and their parents completed an informed consent form. The Ethics Committee of the local university reviewed and approved the study. The fitness test data were collected during one 90-minute PE class in the school gym by the researchers under the supervision of the students PE teacher.

Measures

The Sport Motivation Scale. The contextual intrinsic, extrinsic motivation, and amotivation were assessed using the Finnish version of the Sport Motivation Scale (SMS) (Pelletier et al., 1995). The SMS consisted of seven subscales, comprising three types of intrinsic motivation (IM to-accomplish things, IM to-know and IM to-experience stimulation), three forms of extrinsic motivation (identified, introjected, and external regulation), and amotivation. Each dimension consisted of four items, which were rated on a five-point Likert scale (1 = does not correspond at all to 5 = corresponds exactly). All 28 items of the SMS were used and each incorporated the individual item stem of “Why I’m currently participating in physical education?”, which reflects an overall or more generalized perception of physical education. Subscale scores were calculated for amotivation, external regulation, introjected regulation, identified regulation, and intrinsic motivation. Previous studies have indicated that the Finnish version of Sport Motivation Scale demonstrated satisfactory reliability (α=0.71–0.93) and validity in studies including cohorts of 12-year-old and 15-year-old students within the physical education context (e.g., Jaakkola et al., 2008).

The Situational Motivation Scale. The situational intrinsic, extrinsic, and amotivation variables were measured by the Finnish version of the Situational Motivation Scale (SIMS) (Guay, et al. 2000), which consisted of four subdimensions, namely, intrinsic motivation, identified regulation, extrinsic motivation,
and amotivation. All dimensions consisted of four items. Each of the 16 items was rated on a five-point Likert scale (1 = does not correspond at all to 5 = corresponds exactly). The SIMS used in this study had the individual item stem of “Why was I participating in this particular physical education lesson?”, and it reflects student’s perceptions related to the fitness testing class in which they were engaged. Subscale scores were calculated for the all four dimensions. Previous studies have indicated that the Finnish version of SIMS had good reliability (α =0.76-0.90) and validity when used in the context of school physical education (e.g., Jaakkola et al., 2008).

**The Sport Competence Scale.** Perceived physical competence in physical activity was analyzed using the Finnish version of the sport competence subscale of the Physical Self-Perception Profile (PSPP; Fox & Corbin, 1989). Each item was rated on a five-point Osgood scale from “I’m among the best when it comes to athletic ability” (1) to “I’m not among the best when it comes to athletic ability” (5) (scale scores reversed in analyses). The Finnish version of the sport competence subscale consist of five items that had the individual item stem of “What am I like?”. Scale scores were calculated by summing item scores. Previous research has shown that the Finnish version of the sport competence subscale has satisfactory reliability (α=0.73) and validity when used with 12-years-old and 15-years-old students participating in school physical education (Kalaja, Jaakkola, Liukkonen, & Watt, 2010). It is noteworthy that in Kalaja et al. (2010) study, the specific focus was the analysis of students’ physical fitness and motor skills.

**Fitness Tests.** Abdominal muscle endurance was measured by the curl-up test (FITNESSGRAM), where the purpose is to keep heels in contact with the mat, and curl up slowly, sliding fingers across the measuring strip until fingertips reach the other side. After the first phase of the movement, the participant curls back down until their head touches the piece of paper on the mat. The movement should be slow and gauged to the specified cadence of about 20 curl-ups per minute. The teacher uses a prerecorded cadence system. The participant continues without pausing until s/he can no longer continue or has completed 75 curl-ups. The final result is the amount of completed curl-ups.

Lower body explosive strength and locomotor skills were analyzed by five leaps test (Nupponen, Soini, & Telama, 1999), where the task is to leap five times consecutively starting from the initial leaping position with legs parallel to one another. After the first jump, the leaping sequence is a leap with the preferred leg followed by a leap with the opposite leg until the sequence of five leaps is completed. The test is performed on a 6 cm thick gymnastics mat approximately 15 meters in length. The final landing is also completed with both legs parallel. The result is measured as the length of the leap in centimetres from the heel of the leg that is back the farthest upon the final landing phase.

Speed and agility were measured by the figure-8 running test (Tegner, Lysholm, Lysholm, & Gillquist, 1986) where the purpose is to dribble a volleyball around a figure-8 track, first using the feet (30 s), and then using the hands (30 s). The track is marked on the floor with two cones that are five meters apart. Both the participant and the ball have to go around the marker cones. After 30 seconds, the researcher gives a “change” instruction, and the manipulation style is switched to hand-dribbling. In the hand-dribbling test, the ball is not allowed to pass the cones.
Changing of the dribbling hand is allowed. The total dribbling time is one minute. If the ball leaves the test area (i.e., ringed zone constructed of wooden gymnastic benches), the stopwatch is not stopped. The final result is the total number of crossed lines in one minute. For the further statistical analyses of this study, we created a fitness index by standardizing and summing up these three fitness test scores.

**Data Analyses**

Firstly, descriptive statistics, Pearson’s correlation coefficients, and internal consistencies were calculated (Table 1). Secondly, paired samples t tests were conducted to analyze differences between students’ contextual motivation toward PE and situational motivation during fitness testing class. Thirdly, a regressive path model was estimated to test the hypothesized model (Figure 1). The term “path model” indicates a special case of structural equation modeling, one in which only a structural model, not a measurement model, is estimated. The path model was performed using the Mplus statistical package (Version 6.1; Muthén & Muthén, 1998–2011). Parameters were estimated using a maximum likelihood method. A model fits the data well when the p value associated with the chi-square test is nonsignificant. In addition, if the values of the Bentler CFI and TLI are > .95, the value of SRMR is < .08, and the value of the RMSEA is < .06, a good fit between the hypothesized model and the observed data exists (Hu & Bentler, 1999). Gender and grade were used as covariates in all the analyses.

**Results**

Because the data included both fifth graders and eighth graders, we wanted to firstly analyze whether there were significant differences in any of the study variables between these groups. Bonferroni-corrected independent samples t tests demonstrated that there were no significant differences between grade levels (Grade 5, Grade 8) in contextual motivation [intrinsic motivation t(105) = .87, p = .386, d = .17; identified regulation t(105) = .26, p = .793, d = .01; extrinsic motivation t(105) = 1.58, p = .116, d = .30; amotivation t(105) = .39, p = .697, d = .07] or in situational motivation [intrinsic motivation level t(123) = -.62, p = .532, d = -.11; identified regulation t(123) = .69, p = .489, d = .13; amotivation t(122) = -.80, p = .428, d = -.14]. The only statistically significant difference between the two age groups was found in situational extrinsic motivation [t(122) = 2.27, p = .025, d = .41]. Analyses also demonstrated that there were no significant grade level differences in perceived physical competence [t(103) = -1.49, p = .139, d = -.30] or the fitness index [t(128) = -1.52, p = .113, d = -.27]. These analyses gave support to keep both grade levels in the same group in the subsequent analyses.

Descriptive statistics, internal consistencies, and correlations between motivational scores were calculated and presented in Table 1. Cronbach’s alpha coefficients demonstrated that all scales were internally consistent (α > .70), confirming the reliability of the scales. In addition, the results showed that the interrelations among subscales of the SMS and the SIMS followed the theorized simplex-matrix, in which those subscales that are adjacent along the self-determination continuum were expected to correlate more positively than those more distant along the continuum. Moreover, perceived physical competence was moderately and positively related to contextual
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<td>-</td>
<td></td>
<td></td>
<td>8.43</td>
<td>1.11</td>
<td>6–11</td>
<td></td>
</tr>
<tr>
<td>12 Curl-up (z)</td>
<td>.16</td>
<td>28**</td>
<td>.19*</td>
<td>-.07</td>
<td>-.28**</td>
<td>.17*</td>
<td>.21*</td>
<td>-.04</td>
<td>-.14*</td>
<td>.36**</td>
<td>.42**</td>
<td>-</td>
<td></td>
<td>37.73</td>
<td>19.75</td>
<td>3–75</td>
<td></td>
</tr>
<tr>
<td>13 8-run (z)</td>
<td>.06</td>
<td>.22*</td>
<td>.02</td>
<td>.03</td>
<td>-.13</td>
<td>.13</td>
<td>.15*</td>
<td>-.04</td>
<td>-.10</td>
<td>.26**</td>
<td>.47**</td>
<td>.38**</td>
<td>-</td>
<td>6.85</td>
<td>.59</td>
<td>5.59–9.78</td>
<td></td>
</tr>
<tr>
<td>14 Fit Index (z)</td>
<td>.09</td>
<td>.19</td>
<td>.15</td>
<td>-.14</td>
<td>-.25**</td>
<td>.10*</td>
<td>.12*</td>
<td>-.08</td>
<td>-.03</td>
<td>.24**</td>
<td>.71**</td>
<td>.66**</td>
<td>.77**</td>
<td>.71</td>
<td></td>
<td></td>
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</tbody>
</table>

Note 1. * < .05; ** < .001.
Note 2. Pearson’s correlation coefficients for fitness scores are standardized and means and standard deviations are unstandardized.
intrinsic, identified, introjected regulation and negatively and moderately related to amotivation, but not significantly related to contextual extrinsic regulation. Subsequently, perceived physical competence was positively related to situational intrinsic and identified regulation and negatively related to extrinsic regulation and amotivation. These correlations, however, were low. It is noteworthy that the associations between contextual and situational motivations were low. The only situational motivation that correlated significantly with contextual motivations was situational amotivation. In addition, perceived physical competence correlated positively and moderately with fitness test scores. Correlations between contextual motivations and fitness test scores, and situational motivations and fitness test scores were low. Contextual and situational amotivation were typically negatively correlated with fitness test scores.

Paired samples $t$ tests were conducted to test whether students perceived the fitness testing situation as more motivating than physical education in general. Statistical significance level was Bonferroni-corrected ($p$ had to smaller than .0125) to adjust for an inflated alpha level. Paired samples $t$ tests revealed a significant effect for intrinsic motivation [$t(106) = 2.93, p = .004, d = .28$] and identified regulation [$t(107) = 4.01, p < .001, d = .40$], with higher scores for situational motivation than contextual motivation. In contrast, the results showed that students were more amotivated toward fitness testing than toward PE in general [$t(107) = 2.80, p = .006, d = .39$]. There was no significant difference between students’ extrinsic contextual and extrinsic situational regulations [$t(106) = .74, p = .460, d = .37$].

**Path Analyses**

The hypothesized model was estimated with a regression path from fit index via perceived physical competence to situational motivation dimensions. The model fit was good, resulting in the following indices: $\chi^2(4) = 1.844, p > .0765; CFI = $
1.00; TLI = 1.00; SRMR = .016, and RMSEA = 0. The results showed fit index to be positively related to perceived physical competence (β = .26). In addition, perceived physical competence was found to be a positive predictor of situational intrinsic motivation (β = .12). There were no statistically significant relationships found between perceived physical competence and other forms of situational motivation (β ranged between .05 and .06). The study also showed boys to have higher perceived physical competence (β = .20) while 8th grade student had higher levels of fitness (β = .22) compared with 5th grade students. Finally, the results showed perceived competence to mediate the relationship between fit index and intrinsic motivation (standardized estimate .06; standard error .03; p = .001). It is noticeable, however, that although the regression coefficients were moderate in effect, the squared multiple correlations showed that that the effect sizes for perceived competence ($R^2 = .12$) and intrinsic motivation ($R^2 = .12$) were small.

**Discussion**

This study had two research aims: (1) to compare students’ situational motivation during a fitness test situation with their motivation in a general PE context; (2) to investigate the associations among physical fitness, perceived physical competence, and motivation during fitness testing class. This was the first attempt to use the self-determination theory (Deci & Ryan, 1985, 2000) and the hierarchical model of motivation (Vallerand, 2001) to investigate students’ motivational experiences in fitness test situations. In addition, this was the first study to analyze how physical fitness, perceived physical competence, and motivation during fitness testing class were related with each other.

The results of this study demonstrated that, on average, students perceived higher intrinsic and identified motivation in fitness testing classes than in the general PE program. These results do not support previous findings or propositions that students only derive negative experiences from engagement in school based fitness testing (Corbin, 2002; Hopple & Graham, 1995; Luke & Sinclair, 1991; Rice, 2007). The current results may be due to the possibility that fitness testing classes are situations where students have opportunities to fulfill their needs to be competent, autonomous, and to feel relatedness (Deci & Ryan, 1985, 2000). Fitness testing class may promote students’ competence, because it may offer more challenge than PE in general. Students are able to test their limits and challenge themselves in different tasks. Positive experiences from this type of situation may promote students’ perceptions of competence. In addition, fitness tests in Finland normally involve students completing the tasks in pairs. Students may select their own partner and decide by themselves in what order or what pace to complete of the tests. The nature of the organization of the fitness test classes may then include more possibilities to fulfill the needs to be autonomous and feel relatedness than classes that are typically teacher-oriented (Jaakkola & Watt, 2011) and, therefore, can make a strong contribution to the fulfillment of their psychological needs. From the self-determination perspective, the implementation of fitness testing classes can generally be more motivating for students than PE in general.

Findings of the current research also revealed that amotivation during fitness testing was at a higher level than in the general PE program, indicating that, on average, fitness testing also promotes negative motivational experiences. This was
an unexpected finding given that students also perceived more intrinsic forms of motivation in fitness testing class than in their normal PE. However, the finding is in line with previous research showing that fitness tests can be a negative experience for students (Corbin, 2002; Hopple & Graham, 1995; Luke & Sinclair, 1991; Rice, 2007). Results highlighted that fitness tests, in concurrence with intrinsic motivation, stimulated amotivation. This may be due to the fact that fitness testing probably causes fatigue, which might be linked with students’ negative motivational experiences.

The results of this study also indicated that physical fitness was positively related to perceived competence, which in turn had a positive association with situational intrinsic motivation toward fitness testing class. It should be acknowledged, however, that although being statistically significant, these effect sizes were only small. These results infer that physical fitness is one factor affecting students’ physical perception of themselves. In addition, these findings indicate that perceived physical competence, although being weak, has an association with self-determined motivation during fitness testing classes. Theoretically, this is logical because the self-determination theory suggests that competence is one cornerstone of intrinsic motivation (Deci & Ryan, 1985, 2000).

An interesting outcome of this study was that the associations between contextual and situational motivations were low. Although fitness testing is one part of the PE curriculum, students have rather different motivational experiences between the context of PE and the fitness testing situation. On the other hand, these low correlations do not support the claim within the hierarchical model of intrinsic-extrinsic motivation that there should be a specificity effect, which infers that motivation at a particular level is mainly affected by the same motivation context at different levels of generality (Vallerand, 1997). This pattern of associations was not found in our data. However, it can be speculated that PE in general is not purely the upper level context for fitness testing because PE curriculum involves other goals (e.g., social, affective) and content.

Although effect sizes of this study are small, they have some practical implications. Firstly, this study demonstrated that physical fitness is a significant antecedent of perceived physical competence. This association was small but still it encourages sport pedagogists to include fitness training and education within the PE curriculum. It seems that through developing students’ fitness, it is possible to make a positive contribution to their physical perception of themselves. The finding that perceived physical competence was positively associated with intrinsic motivation in fitness testing class also has some practical implications. It is evident that physical education teacher education (PETE) programs are in a strong position to prepare future teachers to contribute toward school students’ perception of competence, which can consequently have a positive effect on self-determined forms of motivation in relation to fitness testing. More specifically, it is crucial that PETE students learn how to create a positive motivational climate, which can enhance school students’ perceived physical competence. The principles of the TARGET model of Epstein (1989), serve as appropriate tools to facilitate students’ perceptions of competence. By emphasizing personal development, effort and co-operation, it is possible to create perceptions of competence even if a student’s skills or physical fitness are low. This may be especially important for students of lower competence. If school students have higher physical competence, it seems that they are also more motivated toward fitness testing, which according to previous literature, represents one
of the most controversial elements of PE (Corbin, 2002; Naughton et al., 2006; Rice, 2007).

Limitations and Future Research

The first limitation of the study is that the sample comprised both Grade 5 and Grade 8 students. Although there were no differences between grade levels in measured variables, previous research has shown that the phase of physical development can affect students’ motivation toward fitness tests (Garn & Sun, 2009; Wigfield, Lutz, & Wagner, 2005). During adolescence, students tend to increase their focus on social comparison when determining competence (Nicholls, 1989). The increase of normative awareness of competence can then influence the activities students engage in and the amount of effort they are willing to make during physical education (Garn & Sun, 2009). Therefore, it may be that motivational experiences vary between fifth and eighth grade students. Although this limitation exists, it should be noted that the variable of grade was controlled in our path analysis. The second limitation of this study may be an order effect, which implies that in recall questionnaire studies, the order of delivering the instruments may have an impact on participants’ ratings (Pustejovsky & Spillane, 2009). More specifically, the authors state that the ratings to the questionnaires delivered first may have affected the ratings. Pustejovsky and Spillane (2009) suggested that fatigue is one possible reason for order effect. Post fitness testing fatigue is evident and may bias students’ responses to the situational motivation scale. The third limitation is that the test situations in this study did not include aerobic fitness testing. Both Hopple and Graham’s (1995) and Garn and Sun’s (2009) studies involved aerobic fitness tests to look at students’ motivational experiences. Aerobic fitness tests are typically the most physically challenging and exhausting tests (Silverman, Keating, & Phillips, 2008) and may lead to more negative motivation.

In the future, it would be valuable to implement intervention studies to analyze the effect of different teachers behaviors on students’ motivation in fitness testing situations. These interventions could extend the work of Domangue and Solmon (2010) and Whitehead and Corbin (1991) in determining what type of teacher feedback during fitness testing situations leads to higher or lower levels of student motivation.

References


