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**Author(s):** Virtanen, Tuomo; Kiuru, Noona; Lerkkänen, Marja-Kristiina; Poikkeus, Anna-Maija;  
Kuorelahti, Matti

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Tuomo E. Virtanen, Noona Kiuru, Marja-Kristiina Lerkkanen,  
Anna-Maija Poikkeus & Matti Kuorelahti

## Assessment of student engagement among junior high school students and associations with self-esteem, burnout, and academic achievement

### Abstract

*The aim of the study was to investigate the structure of affective and cognitive engagement using the Student Engagement Instrument (SEI; Appleton, Christenson, Kim, & Reschly, 2006) and to examine the associations to behavioral engagement, as well as student-reported self-esteem, burnout, and academic achievement among Finnish junior high school students. The analyses were carried out in the main sample of 2,485 students, as well as in an independent sample of 821 students. The results showed that the original five-factor structure of the SEI construed along three affective and two cognitive engagement factors fit the current data relatively well. Affective and cognitive student engagement correlated positively with an independent measure of behavioral engagement. Furthermore, affective and cognitive engagement were positively associated with student-reported self-esteem and academic achievement, and negatively with school burnout. The findings provided corroborating evidence for the psychometric properties and utilization of the SEI instrument for assessing the engagement of junior high school students.*

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M.A.E. Tuomo E. Virtanen (corresponding author) · Prof. Dr. Marja-Kristiina Lerkkanen · Prof. Dr. Anna-Maija Poikkeus, Department of Teacher Education, University of Jyväskylä, P.O. Box 35, FI-40014, Finland  
e-mail: [tuomo.e.virtanen@jyu.fi](mailto:tuomo.e.virtanen@jyu.fi)  
[marja-kristiina.lerkkanen@jyu.fi](mailto:marja-kristiina.lerkkanen@jyu.fi)  
[anna-maija.poikkeus@jyu.fi](mailto:anna-maija.poikkeus@jyu.fi)

Dr. Noona Kiuru, Department of Psychology, University of Jyväskylä, Finland  
e-mail: [noonah.kiuru@jyu.fi](mailto:noonah.kiuru@jyu.fi)

Dr. Matti Kuorelahti, Department of Education, Special Education, University of Jyväskylä, Finland  
e-mail: [matti.kuorelahti@jyu.fi](mailto:matti.kuorelahti@jyu.fi)

## **Keywords**

*Affective engagement; Cognitive engagement; Behavioral engagement; Student-Engagement-Instrument*

# **Untersuchung des Zusammenhangs von Student Engagement mit Selbstwertgefühl, Burnout und Schulleistung bei Schülerinnen und Schülern der Mittelstufe**

## **Zusammenfassung**

*Ziel der Studie war es, die Struktur von affektivem und kognitivem Engagement unter Nutzung des Student Engagement Instruments (SEI; Appleton, Christenson, Kim & Reschly, 2006) sowie die Verbindungen zu verhaltensbezogenem Engagement, Selbstwertgefühl, Burnout und Schulleistung unter Schülerinnen und Schülern der Mittelstufe in Finnland zu untersuchen. Die Analysen wurden mit einer Hauptstichprobe von 2485 Schülerinnen und Schülern sowie mit einer unabhängigen Stichprobe von 821 Schülerinnen und Schülern durchgeführt. Die Ergebnisse zeigen, dass die ursprüngliche Fünf-Faktoren-Struktur des SEI mit drei affektiven und zwei kognitiven Engagement-Faktoren die vorliegenden Daten am besten abbildet. Affektives und kognitives Student Engagement korrelierten positiv mit einer unabhängigen Messung von verhaltensbezogenem Engagement. Darüber hinaus wurde für affektives und kognitives Engagement ein positiver Zusammenhang mit dem von den Schülerinnen und Schülern selbstberichteten Selbstwertgefühl und ihrer Schulleistung sowie ein negativer Zusammenhang mit Schul-Burnout festgestellt. Die Befunde bekräftigen die Eignung des SEI als psychometrisches Instrument zur Messung von Student Engagement von Schülerinnen und Schülern der Mittelstufe.*

## **Schlagworte**

*Affektives Engagement; Kognitives Engagement; Verhaltensbezogenes Engagement; Student-Engagement-Instrument*

## **1. Introduction**

Student engagement has been characterized as a composite of psychological processes, involving the attention, investment, and effort expended by students in their school work (Marks, 2000). Engagement has been linked with many desired schooling outcomes such as academic success (Fredricks, Blumenfeld, & Paris, 2004; Skinner, Furrer, Marchand, & Kindermann, 2008; Wang & Holcombe, 2010), and school completion (Archambault, Janosz, Fallu, & Pagani, 2009; Finn, 1989; Rumberger & Lim, 2008). Engagement is widely acknowledged to be a multi-

factoral *meta construct* (Fredricks et al., 2004). Most typically three dimensions or subtypes are included in conceptualizing student engagement. The affective (psychological) subtype refers to partly overlapping constructs such as a sense of school belonging and feelings of being accepted by teachers and classmates and receiving support from them (Appleton et al., 2006; Finn, 1989; Finn, 1993; Fredricks et al., 2004; Libbey, 2004). The cognitive subtype of engagement captures the extent to which individuals are motivated, plan, monitor, and regulate their cognition, and value education (Fredricks et al., 2004; Libbey, 2004). The behavioral subtype of engagement is described in terms of observable indicators (Jimerson, Campos, & Greif, 2003) such as attentiveness, school compliance (Wang & Eccles, 2012), and school attendance (Archambault, Janosz, Morizot, & Pagani, 2009).

One of the most widely known measures of engagement is the Student Engagement Instrument (SEI; Appleton et al., 2006), which is a self-report scale for measuring students' affective and cognitive engagement with school. The SEI was developed in the United States (US), and accumulating evidence has been gathered for its utility and validity across multiple North American populations (Betts, Appleton, Reschly, Christenson, & Huebner, 2010; Carter, Reschly, Lovelace, Appleton, & Thompson, 2012; Reschly, Betts, & Appleton, 2014). Thus far, only one study has been conducted in another cultural context by Moreira, Vaz, Dias, and Petracchi (2009) using a sample of Portuguese students. The number of factors reported in prior studies for the SEI varies depending on the subject populations. The first large-scale study by Appleton et al. (2006) carried out among an ethnically and economically diverse urban sample of US ninth grade students reported a structure in which the 35 SEI items loaded on three affective engagement factors (Teacher-Student Relationships, Family Support for Learning, and Peer Support at School), and three cognitive engagement factors (Future Aspirations and Goals, Control and Relevance of the School Work, and Extrinsic Motivation). A further study by Betts and colleagues (2010) among US middle and high school students indicated that the reliability of the Extrinsic Motivation factor may be compromised because of two reverse-scored items, and in subsequent analyses, the Extrinsic Motivation factor has been excluded (Betts et al., 2010; Reschly et al., 2014). Some researchers (Carter et al., 2012; Grier-Reed, Appleton, Rodriguez, Ganuza, & Reschly, 2012) have favored a four-factor solution of the SEI, which excludes both the Extrinsic Motivation factor and the Control and Relevance of the School Work factor due to the latter factor's item redundancies with other factors.

Most of the research on student engagement has focused on observable behavioral indicators of engagement (see Appleton et al., 2006) or has combined various factors of engagement to form a single, global scale (Marks, 2000), and the more inferential, not easily observable subtypes of affective and cognitive engagement are targeted less often, although they have been shown to be related to valued outcomes of schooling (e.g., Finn, 1989). The need for a theoretically sound and psychometrically strong instrument for the assessment of affective and cognitive engagement is evident. Systematic data collected with such an instrument would be useful for the early identification of students with low affective and/or cognitive

student engagement, and classrooms with collective low engagement. Given that changes in students' behavior are expected to be preceded by changes in affective and cognitive engagement (see Li, Lerner, & Lerner, 2010; Walker & Greene, 2009; Wang & Holcombe, 2010), this would allow educators to plan tailored interventions at an early stage of low engagement before school-related problems escalate.

The SEI provides practitioners and researchers information of the affective and cognitive subtypes of engagement which are not easily observable for educators. However, its psychometric properties are not widely studied outside the US school contexts (for an exception, see Moreira et al., 2009). The nature of student engagement and the strength of its relationship to achievement may vary somewhat depending on the cultural context and the specific features of the educational system (e.g., the age of transitioning to subject teacher instruction, the extent to which the group composition varies from one subject to another, the extent to which extra-curricular activities take place in stable groups, and the availability of support for wellbeing and group processes). In this study, the factors composing student engagement and psychometric properties of the SEI were examined for the first time among Finnish students and in Northern Europe. The engagement of Finnish students is of specific interest because of their high achievement in the 15-year-old students' Programme for International Student Assessment (PISA; OECD, 2013) of scholastic performance in mathematics, science, and reading. Virtually, all schools in Finland are public schools with very homogeneous curricula and teacher qualifications. Comparing the structure of student engagement across cultures may have important implications for cross-cultural comparison studies and understanding the manifestation of school engagement in different populations (Moreira et al., 2009).

The present study examined whether using the SEI (Appleton et al., 2006) in the Finnish junior high school context (Grades 7–9, 13–15-year-old students) produces a similar structure of engagement as in the US context, and whether it is related in the expected way to student-reported self-esteem, burnout, and academic achievement, as well as behavioral engagement. Specifically, we examined (a) whether the SEI captures the subtypes of affective and cognitive engagement (construct validity), (b) whether the SEI factorial structure holds when cross-validated with an independent Finnish junior high school student sample, (c) whether the SEI affective and cognitive engagement relates in a meaningful way to factors known to be associated with student engagement (concurrent validity), and (d) whether the SEI proves reliable when assessing Finnish junior high school students (item and scale reliability). The associations between behavioral engagement and affective and cognitive engagement were analyzed to test the three-component model of engagement (Fredricks et al., 2004) with conceptually distinct but positively correlating affective, cognitive, and behavioral subtypes of engagement. Student gender, grade level, academic achievement, self-esteem, and school burnout were chosen as criterion variables for concurrent validity analyses, based on the consistent reports in the engagement literature showing that girls (e.g., Covell, 2010), younger students (e.g., Wang & Eccles, 2012), and academically high-

performing students (e.g., Haapasalo, Välimaa, & Kannas, 2010) are more engaged than boys, older students, and students with lower academic achievement. Furthermore, higher levels of self-esteem (e.g., Ma, 2003) have been found to relate to higher levels of student engagement, while school burnout relates negatively with engagement (see Salmela-Aro, Kiuru, Leskinen, & Nurmi, 2009).

## **2. Method**

### **2.1 Participants and procedure**

#### **2.1.1 Sample 1**

Before collection of the data between December 2012 and January 2013, the principals of eight Finnish-speaking junior high schools in four towns were briefed about the purpose of the study. The schools were typical public schools – five were located in Northern Finland and three in Western Finland. Students were from relatively similar ethnic and economic backgrounds. Following the guidelines of the Finnish National Advisory Board on Research Ethics (2009), the schools distributed a letter to the children's parents or guardians in which the nature of the study was explained, along with the procedure for withdrawing their child from participation. Teachers were advised about how to collect the data from the students, and the students responded anonymously and voluntarily to the questionnaire. Two schools favored the Internet-based questionnaire ( $N = 650$ ), and in the remaining six schools, the students filled in the paper version ( $N = 1,835$ ). The response rate was 86.3 %. Sample 1 comprised 2,485 students (females 52.2 %), of whom 35.9 % were ninth graders, 32.2 % were eighth graders, and 31.9 % were seventh graders. The students' mean age was 14.7 years ( $SD = .92$ ). The percentage of missing values on SEI variables varied between 0.90 and 4.70 ( $M = 2.59$  %,  $SD = 0.92$  %).

#### **2.1.2 Sample 2**

In November and December 2010, another independent data collection was carried out in seven junior high schools from Western Finland. The principals randomly selected half of the classes in their schools to participate in the study. Teachers informed the students' parents about the purpose of the study, and parents were asked for written consent allowing their children to participate. In all, 85.0 % of the students responded to the questionnaire. The sample comprised 821 students (females 49.0 %). By grade level, the sample composition was 32.0 % ninth graders, 31.3 % eighth graders, and 36.7 % seventh graders. The students' mean age was 14.4 years ( $SD = .92$ ). All the students responded by means of the Internet-based questionnaire. The percentage of missing values on SEI variables varied between 0.50 and 2.70 ( $M = 1.19$  %,  $SD = 0.48$  %).

## 2.2 Measures

### 2.2.1 The Student Engagement Instrument

First, the SEI (Appleton et al., 2006) was translated into Finnish by a certified translator. Second, the questionnaire was piloted in an urban junior high school in order to gain user feedback. Third, taking into account the students' feedback from the pilot, minor language revisions were made. Finally, the Finnish SEI was back-translated into English, and this translation was compared with the original English version by Appleton et al. (2006). The items were rated on a 4-point scale (1 = *strongly agree*; 4 = *strongly disagree*). Before the analyses the items were reverse-coded so that higher scores indicated a higher level of engagement. In the present study, the SEI structure with five interrelated factors was examined whereby Teacher-Student Relationships, Peer Support at School, and Family Support for Learning were assumed to capture different aspects of affective engagement, while Control and Relevance of the School Work and Future Aspirations and Goals were assumed to capture cognitive engagement. The values of Cronbach's alpha ( $\alpha$ ) for the original SEI validation study varied between .72 (Family Support for Learning) and .88 (Teacher-Student Relationships) (Appleton et al., 2006). The SEI items are given in Appendix A.

### 2.2.2 Student characteristics

*Gender* was entered as a dummy-coded variable (0 = female) and *grade level* as an ordinal variable (0 = seventh; 1 = eighth; 2 = ninth).

### 2.2.3 Self-esteem

Students' self-esteem was assessed using the Rosenberg Self-Esteem Scale (Rosenberg, 1965). The scale consisted of five items with positively-worded statements (e.g., "On the whole, I am satisfied with myself"), and five items with negatively worded statements (e.g., "At times, I think I am no good at all"). Items were answered on a 4-point scale (1 = *strongly agree*; 4 = *strongly disagree*). Before the analyses the items were reverse-coded so that higher scores indicated higher self-esteem. A total score of self-esteem was used in the analyses. The Cronbach's  $\alpha$  for the scale was .83.

#### **2.2.4 School burnout**

Students' level of school burnout was measured using the Adolescents' Burnout Inventory (Salmela-Aro & Näätänen, 2005), which assesses students' school-related exhaustion (four items, e.g., "I feel overwhelmed by my school work"), cynicism (three items, e.g., "I feel a lack of motivation in my school work and often think of giving up"), and inadequacy (three items, e.g., "I often have feelings of inadequacy in my school work"), using a 6-point Likert scale (1 = *completely agree*; 6 = *completely disagree*). The items were reverse-coded so that higher scores indicated a higher level of school burnout. A total score of burnout was used in the analyses. The Cronbach's  $\alpha$  for the scale was .91.

#### **2.2.5 Academic achievement**

Academic achievement was assessed using the grade point average which was calculated based on students' self-reported grades for three subjects – Literacy, Mathematics, and English. The Cronbach's  $\alpha$  for academic achievement was .81.

#### **2.2.6 Behavioral engagement**

Behavioral engagement was measured using the middle school student version of the Research Assessment Package for Schools (RAPS-SM; Wellborn & Connell, 1987). In the present study, four items (two positively and two negatively worded) measuring behavioral engagement (e.g., "I work very hard on my school work," "I don't try very hard in school") rated on a 4-point scale (1 = *strongly agree*; 4 = *strongly disagree*) were used. The items were reverse-coded so that higher scores indicated higher engagement. A total score was used in the analyses. The Cronbach's  $\alpha$  for the scale was .71.

### **2.3 Analysis strategy**

The analyses were conducted with Mplus Version 7.11 (Muthén & Muthén, 1998–2015), using a mean- and variance-adjusted weighted least squares approach (WLSMV), which, according to Brown (2006), is the best choice for categorical data modeling in confirmatory factor analysis. Little's Missing Completely at Random (MCAR) was tested, which showed that missingness was not completely random:  $\chi^2(232) = 453.417$ ;  $p < .001$ . Consequently, the missing values were imputed with *Mplus*. The Bayesian multiple-imputation method (Rubin, 1987) averages the parameter estimates over the set of analyses (10 imputed data sets), and computes standard errors using the average of the standard errors over the set of analyses and the between-analysis parameter estimate variation.

The analyses were carried out according to the following four-step procedure. First, the SEI construct validity was tested with Sample 1 using confirmatory factor analysis. Confirmatory factor analysis was chosen because the SEI has an established theoretical basis (Kline, 2013) with three factors consistently representing the affective subtype and two or three factors the cognitive subtype. In order to analyze whether the SEI captures the subtypes of affective and cognitive engagement, five theory-based competing models were specified and tested against each other. The models were: (a) one-factor model where all items formed a global student engagement factor (M1); (b) two-factor model where affective engagement items formed one factor and cognitive engagement items formed a second factor (M2); (c) replication of the SEI five-factor model (Betts et al., 2010; Reschly et al., 2014) with three affective engagement factors (Teacher-Student Relationships, Peer Support at School, and Family Support for Learning) and two cognitive engagement factors (Control and Relevance of the School Work and Future Aspirations and Goals) (M3); (d) an alternative five-factor model with Control and Relevance of the School Work divided into three sub-factors (M4a); and, finally, (e) a model with two second-order factors, five first-order factors, and Control and Relevance of the School Work divided into three sub-factors (M4b).

Second, the results were cross-validated (model M5) with an independent sample (Sample 2) of Finnish junior high school students by means of confirmatory factor analysis. Third, associations between the SEI affective and cognitive engagement subtypes and the other measures were analyzed by means of path analysis in order to examine concurrent validity of the SEI. Fourth, scale and item reliability information (Bollen, 1989) of the SEI was examined.

The goodness-of-fit of the estimated models was evaluated according to the following absolute goodness-of-fit indicators: Chi square ( $\chi^2$ ) and root mean square error of approximation (RMSEA). If  $\chi^2 = ns$  ( $p > .05$ ), the model is a good fit (Byrne, 2012). In turn, if  $RMSEA < .08$ , the error of approximation can be considered reasonable (Browne & Cudeck, 1993), whereas if  $RMSEA < .06$ , there is a relatively good fit between the hypothesized model and the observed data. Because the  $\chi^2$ -test is sensitive to sample size, the use of relative goodness-of-fit indices is also strongly recommended in the case of large sample sizes (Bentler & Bonett, 1980), as in our study ( $n > 2,000$  in the main sample,  $n > 800$  in the validation sample). Consequently, the following relative goodness-of-fit indices were also used to evaluate model fit: (a) comparative fit index (CFI) and (b) Tucker-Lewis index (TLI). Hu and Bentler (1999) have suggested that if the values of CFI and TLI are close to .95, the model fits the data reasonably well. Weighted root mean square residual (WRMR) is not reported, because it has been shown to perform poorly when estimating categorical data (Yu, 2002).

### 3. Results

#### 3.1 Item correlations

The Sample 1 data between-item Spearman's rho raw score correlations were statistically significant at  $p < .001$  with one exception (item CR1 with item PS5  $\rho = .058, p = .004$ ). Within-factor item correlations were medium to large in magnitude (Cohen, 1988).

#### 3.2 Construct validity

Examination of the models M1 (one-factor model), M2 (two-factor model), and M3 (replication of the original SEI model) indicated that two of the 33 SEI items (item TS9, "I feel safe at school," and item CR9, "I feel like I have a say about what happens to me at school") discriminated the factors poorly. These items had cross-loadings (i.e., they had high factor loadings on more than one factor). Modification indices (MI; Muthén & Muthén, 1998–2015) indicated that the goodness-of-fit of the M2 model would significantly improve if item CR9 hypothesized to load on the cognitive engagement factor would also be allowed to load on affective engagement (MI = 528.52). Furthermore, modification indices indicated that the goodness-of-fit for the M3 model would significantly improve if item TS9 was allowed to load not only on Teacher-Student Relationships, but also on Peer Support at School (MI = 1,134.89) and Family Support for Learning (MI = 454.11). Furthermore, modification indices suggested that the M3 model would be improved, if item CR9 hypothesized to measure Control and Relevance of School Work would also be allowed to load on Teacher-Student Relationships (MI = 352.97). Because the items TS9 and CR9 loaded strongly not only on the hypothesized factors but also cross-loaded on some other factors (standardized loadings  $\geq .43$ ), they contributed substantively to the models' misfit and, thus, were excluded from subsequent analyses. These two excluded items also showed poor psychometric properties in the Portuguese study (Moreira et al., 2009).

After omitting the two items (TS9 and CR9), M1 (one-factor model) yielded poor fit (see Table 1 for model fit indices). Even though the chi-square difference test showed that M2 (two-factor model) fit the data better than the M1 model ( $\chi^2(1) = 1,309.70; p < .001$ ), the M2 model did not fit the data well. The M3 model (replication of the original five-factor SEI) yielded a better fit than the two-factor model M2 ( $\chi^2(9) = 3,041.25; p < .001$ ), and the fit indices were acceptable. However, four (Teacher-Student Relationships, Peer Support at School, Family Support for Learning, and Future Aspirations and Goals) out of the five engagement factors formed theoretically cohesive scales, but in line with some earlier studies, the Control and Relevance of the School Work factor had problems in its psychometric properties (Carter et al., 2012; Grier-Reed et al., 2012). Specifically,

Table 1: Fit indices for the estimated models

Model	Sample	N	Number of factors	Number of items	$\chi^2$	df	p	RMSEA	CFI	TLI
M1: One-factor model	Sample 1	2,485	1	31	22,665.54	434	< .001	.14	.63	.60
M2: Two-factor model	Sample 1	2,485	2	31	17,638.78	433	< .001	.13	.71	.69
M3: Replication of the original SEI five-factor structure	Sample 1	2,485	5	31	5,135.94	424	< .001	.07	.92	.91
M4a: Five-factor model, Control and Relevance of the School Work divided into three sub-factors	Sample 1	2,485	5 + 3	31	3,830.29	421	< .001	.06	.94	.94
M4b: Two second-order factors, five first-order factors, and Control and Relevance of the School Work divided into three sub-factors	Sample 1	2,485	2 + 5 + 3	31	4,199.95	425	< .001	.06	.94	.93
M5: Cross-validation of the M4a model with an independent sample	Sample 2	821	5 + 3	31	1,421.07	421	< .001	.05	.96	.95

Note. RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index.

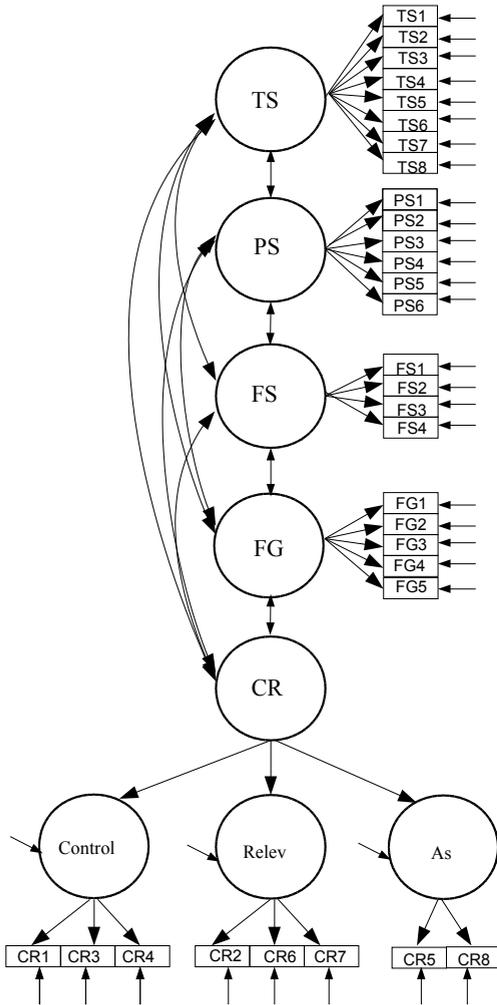
two items measuring the Control and Relevance of the School Work factor (CR5: “The tests in my classes do a good job of measuring what I’m able to do,” CR8: “The grades in my classes do a good job of measuring what I’m able to do”) had a large item residual correlation (.25), implying that they share unique variance not accounted for by the Control and Relevance of the School Work factor. Consequently, the Control and Relevance of the School Work factor was omitted from the model, and the remaining four-factor model was estimated. The fit of the four-factor model was relatively good:  $\chi^2(224) = 2693,53$ ;  $p < .001$ ; RMSEA = .07; CFI = .95; TLI = .94 (see also Carter et al., 2012; Grier-Reed et al., 2012). As implicated by the original title student-perceived control and relevance of school work may partly capture different aspects within the Control and Relevance of the School Work factor. Omitting the Control and Relevance of the School Work factor may not, however, be an optimal solution because it would leave out an important component of cognitive engagement.

In the subsequent, model M4a, three factors (Teacher-Student Relationships, Peer Support at School, and Family Support for Learning) represented the affective subtype of engagement. Cognitive engagement was represented by Future Aspirations and Goals and Control and Relevance of the School Work, but the latter was specified as a higher-order factor measured by Control of the School Work (three items), Relevance of the School Work (three items), and Validity of Student Assessment sub-factors (two items). This model fit the data relatively well. The chi-square difference test showed that the M4a model fit was better than the fit of the M3 model (replication of the original five-factor SEI structure):  $\chi^2(3) = 730,42$ ;  $p < .001$ .

Finally, we estimated model M4b with two second-order factors, namely affective (Teacher-Student Relationships, Peer Support at School, and Family Support for Learning) and cognitive engagement (Control and Relevance of the School Work and Future Aspirations and Goals). The model with two highly correlated second-order factors (latent correlation .95) showed a relatively good fit to the data. The chi-square difference test indicated that the M4a model (five-factor model, Control and Relevance of the School Work divided into three sub-factors) fit the data better than the M4b model with two second-order factors, five first-order factors, and Control and Relevance of the School Work divided into three sub-factors:  $\chi^2(4) = 171,91$ ;  $p < .001$ .

These results suggest that two models describe well the structure of the SEI in the Finnish high school student sample. The first is a five-factor model (M4a) which includes three affective engagement factors (Teacher-Student Relationships, Peer Support at School, and Family Support for Learning), and two cognitive engagement factors (Control and Relevance of the School Work and Future Aspirations and Goals). The second is the M4b model with two second-order factors where affective and cognitive engagement form second-order factors and the five factors are first-order factors. In both models, Control and Relevance of the School Work factor is measured by Control of the School Work, Relevance of the

Figure 1: Model M4a (five-factor model) of Student Engagement Instrument



Notes: All estimates are statistically significant at  $p < .001$  (see Table 3 for estimates). TS = Teacher-Student Relationships; PS = Peer Support at School; FS = Family Support for Learning; FG = Future Aspirations and Goals; CR = Control and Relevance of the School Work; Control = Control of the School Work; Relev = Relevance of the School Work; As = Validity of Student Assessment.

School Work, and Validity of Student Assessment sub-factors. A graphical presentation of the best fitting five-factor model M4a is presented in Figure 1.

The M4a model's factor correlations ranged between .37 (Teacher-Student Relationships with Peer Support at School) and .81 (Control and Relevance of the School Work with Future aspirations and Goals) (see Table 2).

### 3.3 Cross-validation

Model M4a was cross-validated with the independent Validation Sample 2. The cross-validation showed that the five-factor model with Control and Relevance of the School Work divided into three sub-factors fit the Sample 2 data well. The fit indices of the cross-validation model M5 were as follows:  $\chi^2(421) = 1,421.07$ ;  $p < .001$ ; RMSEA = .05; CFI = .96; TLI = .95 (see Table 1).

Table 2: Model M4a factor correlations

Factor	TS	PS	FS	CR
PS	.37***			
FS	.58***	.46***		
CR	.77***	.38***	.66***	
FG	.57***	.43***	.68***	.81***

Note. TS = Teacher-Student Relationships; PS = Peer Support at School; FS = Family Support for Learning; CR = Control and Relevance of the School Work; FG = Future Aspirations and Goals.

\*\*\* $p < .001$ .

Table 3 reports the factor loadings and reliability coefficients across the two independent samples. A similar pattern of coefficients was found across the samples. Out of 31 items, 27 reached the standardized loading of at least .70 in both samples. The loadings of items representing Control of the School Work sub-factors were satisfactory (ranging between .50 and .72). The standard errors of the factor loadings were small (.01–.02), suggesting stable estimates.

Factor-score scale reliabilities and Cronbach’s  $\alpha$  coefficients were computed separately for each factor across the two independent samples. For computing factor-score scale reliabilities, the regression method was applied. Table 3 reveals similar reliability and validity patterns across the samples. Factor-score reliabilities and Cronbach’s  $\alpha$  coefficients were typically greater than .80 (see Table 3). Control and Relevance of the School Work sub-factors were the least reliable. This is partly caused by the small number of items (two or three) measuring the sub-factors. The majority of the item reliabilities exceeded the level of .50, indicating that more than half of the indicator variance was explained by the factor (Kline, 2013). In general, Cronbach’s  $\alpha$  coefficients were slightly better than in the original SEI validation study (Appleton et al., 2006). Except for the Control of the School Work, squared standardized loadings showed acceptable or good item reliability.

Table 3: Five-factor model M4a scale and item reliability information and standardized factor loadings in two independent samples (Sample 1/Sample 2)

	RelFS	$\alpha$	$R^2$	$\lambda$
Teacher-Student Relationships	.90/.88	.88/.86		
TS1			.53/.56	.73/.75
TS2			.58/.58	.76/.76
TS3			.56/.50	.75/.71
TS4			.45/.41	.67/.64
TS5			.66/.71	.81/.84
TS6			.67/.62	.82/.79
TS7			.49/.41	.70/.64
TS8			.71/.67	.84/.82
Peer Support at School	.87/.88	.84/.86		
PS1			.64/.69	.80/.83
PS2			.79/.79	.89/.89
PS3			.71/.79	.84/.89
PS4			.62/.62	.79/.79
PS5			.49/.53	.70/.73
PS6			.49/.52	.70/.72
Family Support for Learning	.80/.80	.78/.80		
FS1			.59/.61	.77/.78
FS2			.55/.66	.74/.81
FS3			.66/.67	.81/.82
FS4			.64/.62	.80/.79
Control and Relevance of the School Work				
Control of the School Work	.67/.64	.64/.58		
CR1			.44/.46	.66/.68
CR3			.52/.52	.72/.72
CR4			.36/.25	.60/.50
Relevance of the School Work	.76/.77	.73/.70		
CR2			.50/.49	.71/.70
CR6			.58/.50	.76/.71
CR7			.61/.62	.78/.79

Table 3 continues

Table 3 continued

	RelFS	$\alpha$	$R^2$	$\lambda$
Validity of Student Assessment	.78/.76	.78/.75		
CR5			.69/.59	.83/.77
CR8			.81/.83	.90/.91
Future Aspirations and Goals	.83/.82	.81/.81		
FG1			.64/.69	.80/.83
FG2			.62/.58	.79/.76
FG3			.67/.66	.82/.81
FG4			.61/.61	.78/.78
FG5			.64/.66	.80/.81

Note. The first figure represents the values of Sample 1, and the second, the values of Sample 2. RelFS = Factor-score reliabilities;  $\alpha$  = Cronbach's alpha coefficient;  $R^2$  = Item reliability;  $\lambda$  = Standardized factor loading. All standardized factor loadings are significant at  $p < .001$ .

### 3.4 Concurrent validity

Finally, the associations between the affective and cognitive engagement subtypes and students' self-esteem, burnout, academic achievement, behavioral engagement, grade level, and gender were examined in Sample 1. The results are presented in Table 4.

Table 4: Associations between the affective and cognitive engagement subtypes and the criterion variables in Sample 1

Sub-type	Self-esteem	School Burnout	Academic achievement	Behav. engmt	Grade	Gender
Affective	.39***	-.23***	.09***	.23***	-.12***	-.12***
Cognitive	.24***	-.20***	.23***	.20***	-.04 <sup>ns</sup>	-.14***

Note. Estimates are standardized path coefficients. Behav.engmt = Behavioral engagement. Female = 0. Seventh grade = 0.

\*\*\* $p < .001$ . ns = non-significant.

Students' self-esteem, experiences of school burnout, academic achievement, behavioral engagement, grade level, and gender showed the expected relationships with affective and cognitive subtypes of engagement. In sum, better self-esteem and higher academic achievement were associated with students experiencing more affective and cognitive engagement. A high level of school burnout was negatively associated with affective and cognitive engagement. Girls were more affectively and cognitively engaged in comparison to boys. Younger students were affectively and cognitively engaged in comparison to boys. Younger students were affectively and cognitively engaged in comparison to boys. Younger students were affectively and cognitively engaged in comparison to boys.

tively but not cognitively more engaged than older students. Importantly, affective and cognitive engagement had statistically significant positive relationships with behavioral engagement.

## 4. Discussion

Using two independent samples of Finnish junior high school students, this study investigated the applicability of the SEI (Appleton et al., 2006) for capturing the subtypes of affective and cognitive engagement. Additionally, associations were examined between affective and cognitive engagement and measures with prior evidence of associations to engagement (self-esteem, burnout, and academic achievement), as well as a measure of behavioral engagement. The present study is among the first to investigate psychometric properties of SEI in an educational system outside the US (for another example, see Moreira et al., 2009). The results of confirmatory factor analyses provided support for the studies conducted among the US middle and high school students (Betts et al., 2010; Carter et al., 2012; Reschly et al., 2014) in indicating that five factors represent the SEI affective and cognitive subtypes of engagement. Furthermore, the SEI showed acceptable item and scale reliability properties, as evidenced by generally high factor score reliabilities, Cronbach's  $\alpha$  coefficients, and squared standardized loadings. The results supporting the five-factor structure in an educational system other than that of the US suggest that affective and cognitive engagement can be assessed across different cultures and educational systems.

The results showed that the factor structure of SEI can be construed along two theoretically meaningful alternative models: (a) a five-factor model comprising three intercorrelated affective engagement factors (Teacher-Student Relationships, Family Support for Learning, and Peer Support at School) and two cognitive engagement factors (Future Aspirations and Goals, and Control and Relevance of the School Work); and (b) a model including two correlated second order factors: affective engagement (consisting of three lower-order affective engagement factors) and cognitive engagement (consisting of two lower-order cognitive engagement factors). The findings, thus, suggest that the SEI can be viewed as an instrument of affective and cognitive engagement construed along five intercorrelated factors or consisting of a higher order structure with two intercorrelated affective and cognitive engagement subtypes.

The results indicated that Control and Relevance of the School Work factor needed to be divided into three sub-factors. These were labeled as Control of the School Work, Relevance of the School Work, and Validity of Student Assessment. Some previous studies on the SEI (Carter et al., 2012; Grier-Reed et al., 2012) have completely omitted the psychometrically poorest factor, Control and Relevance of the School Work. The four-factor model showed a relatively good fit in the Finnish data; however, in this model an important component of cognitive engagement had

to be left out. Consequently, we specified this factor as a higher-order factor with three sub-factors. Control of the School Work sub-factor, however, showed relatively low reliability, suggesting that further testing and modification of the item contents or increasing the number of items of this sub-factor would be needed.

Positive concurrent associations were found between the independently assessed behavioral engagement scale and the SEI affective and cognitive engagement scales. These associations provide support for the relationship between students' affective and cognitive experiences at school and their behavior. Systematic monitoring of changes in students' affective and cognitive engagement has the potential for predicting changes in their behavior (Li et al., 2010; Walker & Greene, 2009; Wang & Holcombe, 2010). Expected associations emerged between the SEI factors and other constructs and background variables, attesting to concurrent validity of SEI. Statistically significant positive associations were found between the SEI affective and cognitive engagement subtypes and self-esteem (e.g., Ma, 2003), and negative associations between the affective and cognitive engagement and school burnout (see Salmela-Aro et al., 2009). Our findings were also in line with previous studies in that girls (e.g., Covell, 2010) and academically high-performing students (e.g., Haapasalo et al., 2010) were found to be more affectively and cognitively engaged than boys and students with lower academic achievement. However, younger students (e.g., Wang & Eccles, 2012) were not cognitively more engaged than older students. This may be due to the operationalization of the Future Aspirations and Goals factor, where upper-grade students closer to completion of high school have most likely given higher scores to items measuring this factor than lower-grade students.

Affective engagement was less strongly related to students' academic achievement than cognitive engagement. Warm supportive relationships among teachers, students, and families may relate indirectly to students' academic achievement by way of increased behavioral engagement (e.g., Voelkl, 2012) and decreased school burnout (Salmela-Aro, Kiuru, Pietikäinen, & Jokela, 2008). It was interesting that the highest correlations were between students' self-esteem and affective and cognitive engagement. This result implies that the way students see themselves is transferable to the way they see their school-related relationships and relevance of school (see Ma, 2003).

Our analyses of using the SEI in a Finnish junior high school sample showed that out of the original 33 items, two items ("I feel safe at school" and "I feel like I have a say about what happens to me at school") did not discriminate well between the engagement factors; these items had high factor loadings on more than one factor. Consequently, these poorly working items were omitted from subsequent analyses. The observed cross-loadings of the two items in our sample may be due to the differences between the original SEI validation sample (Appleton et al., 2006) and the Finnish samples. The original validation sample comprised an ethnically and economically diverse sample of ninth graders in the US, while the Finnish samples included seventh, eighth and ninth graders from relatively similar ethnic and economic backgrounds. It is noteworthy that the two deleted items

were also omitted from the Portuguese version of the SEI (Moreira et al., 2009), suggesting that items addressing safety and control may not be perceived as equally salient in the European school context as in the US.

The present study also has limitations. First, this study relied solely on students' self-reports, which may be biased due to socially desirable responses (Paulhus, 1991). Reports from teachers and parents on students' engagement would have strengthened the SEI concurrent validity examination. Nevertheless, as far as the highly inferential student affective and cognitive aspects of engagement are concerned, self-reports are likely to be the most feasible method available (Appleton et al., 2006). Second, the majority of the data was administered using Likert scales. Likert scales are vulnerable to systematic differences in the data resulting from students' response styles or construct-conform response behavior. Some students may, for example, have a tendency to endorse middle options and to avoid extreme responses. This, along with using self-reports as a sole method of collecting data, may inflate the relationships between the student engagement construct and the other variables applied in concurrent validity analysis. Future studies involving cross-validation of student reports with teacher and parent reports might provide more accurate estimates of the relationships between student engagement and related constructs, thus offering additional insights into student engagement.

The present study supports the utilization of the SEI as a reliable and valid screening instrument for student affective and cognitive engagement in cultural contexts outside the US where the instrument was originally developed. Given that changes in students' behavior is expected to be preceded by changes in affective and cognitive engagement (see Li et al., 2010; Walker & Greene, 2009; Wang & Holcombe, 2010), systematic monitoring of students' affective and cognitive engagement contributes to early identification of individuals with low affective and/or cognitive engagement, or of classrooms with collective low engagement. This early identification may prevent a cumulative process of low engagement leading to poor academic achievement, disaffected behavior (such as truancy from school), and, ultimately, school dropout. The analyses showed that the SEI consists of five factors which can be construed along a five-factor model or two second-order factors model. For practitioners, the SEI may be most useful as a five-factor instrument. Affective engagement factors are particularly useful in providing teachers with information concerning the targets of interventions. Cognitive engagement factors help to identify students with low future goals, low perceived relevance of schooling, and low experiences of control over one's own school work (see Reschly, 2010). Researchers may find the SEI higher-order factor structure beneficial in deepening the understanding of student affective and cognitive engagement and their relationships with students' behavior and multiple other educationally relevant variables.

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## Appendix A

Table A1: Items and factors of the original Student Engagement Instrument (SEI; Appleton, Christenson, Kim, & Reschly, 2006)

TS1	My teachers are there for me when I need them.
TS2	Adults at my school listen to the students.
TS3	The school rules are fair.
TS4	Most teachers at my school are interested in me as a person, not just as a student.
TS5	Overall, my teachers are open and honest with me.
TS6	Overall, adults at my school treat students fairly.
TS7	I enjoy talking to the teachers here.
TS8	At my school, teachers care about students.
TS9	I feel safe at school.
PS1	Other students here like me the way I am.
PS2	Other students at school care about me.
PS3	Students at my school are there for me when I need them.
PS4	Students here respect what I have to say.
PS5	I enjoy talking to the students here.
PS6	I have some friends at school.
FS1	My family/guardian(s) are there for me when I need them.
FS2	When something good happens at school, my family/guardian(s) want to know about it.
FS3	When I have problems at school, my family/guardian(s) are willing to help me.
FS4	My family/guardian(s) want me to keep trying when things are tough at school.
CR1	After finishing my school work, I check it over to see if it's correct.
CR2	Most of what is important to know you learn in school.
CR3	When I do school work, I check to see whether I understand what I'm doing.
CR4	When I do well in school, it's because I work hard.
CR5	The tests in my classes do a good job of measuring what I'm able to do.
CR6	Learning is fun because I get better at something.
CR7	What I'm learning in my classes will be important in my future.
CR8	The grades in my classes do a good job of measuring what I'm able to do.
CR9	I feel like I have a say about what happens to me at school.
FG1	Going to school after high school is important.
FG2	I plan to continue my education following high school.
FG3	School is important for achieving my future goals.
FG4	I am hopeful about my future.
FG5	My education will create many future opportunities for me.

Note. TS = Teacher-Student Relationships; PS = Peer Support at School; FS = Family Support for Learning; CR = Control and Relevance of the School Work; FG = Future Aspirations and Goals; A 4-point rating scale: 1 = *strongly agree*; 4 = *strongly disagree*.