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Dear Editor,

Hereby we submit our paper 'School engagement: the construct validity of a multidimensional concept using different informants and varying age groups', hoping it will qualify for Journal of School Psychology.

There are many tables and figures. We want to give you and the reviewers full information on our research but of course you could choose to skip a table and to include in the text that information can be provided on request by the authors.

In case you have any questions please let me know. We hope to hear from you soon. Thank you very much.

Yours sincerely,

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School engagement: the construct validity of a multidimensional concept using different informants and varying age groups

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Abstract

This paper aims to validate a multidimensional model (affective, cognitive and behavioural) on students' school engagement as grounded in mainstream engagement literature from the past two decades. It does so, by using data from four different age groups ranging from 7 to 18 years, and two sources of information (65 teachers and 1290 students). The findings show that school engagement can best be described by a model that includes multiple dimensions (affective, cognitive and behavioural). Moreover, it appeared that the concept of school engagement cannot be adequately represented by a single model without taking the differences between age groups (7-10 years old versus 13-18 years old) and informants (teachers versus students) into account. The dimensions of this model and their relations are discussed, as well as the implications for future research.

During the past decades, a decrease in motivation and involvement in school activities for far too many students has become a well-known phenomenon in many countries (Appleton, Christenson, & Furlong, 2008; Peetsma, Hascher, van der Veen, & Roede, 2005; Hornstra, 2013). The strongest declines are observed in early adolescence and among low-achieving students (Archambault, Eccles, & Vida, 2010; Durik, Vida, & Eccles, 2006; Eccles, Wigfield, & Schiefele, 1998; Harter, Whitesell, & Kowalski, 1992; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002). In order to understand and capture the gradual process by which students disconnect from school (Finn, 1989), there has been increased attention from scholars and practitioners to the concept of student engagement with school (Fredricks, Blumenfeld, & Paris, 2004; Skinner, Kinderman, & Furrer, 2009). Student engagement with school is considered by educators, policy-makers and researchers as an important and critical predictor of learning, achievement and academic career. As a consequence, a growing number of empirical studies into the role school engagement can play in fostering student achievement and promoting school completion has been conducted. Findings from these studies have provided some empirical support for the relationships between school engagement, student achievement and behaviour for different kinds of students. Moreover, the available evidence from intervention studies targeting

school engagement suggests that school engagement can play a critical role in fostering achievement and promoting school completion (Appleton et al., 2008).

Despite the popularity of the concept of student engagement with school, the development and use of the concept in theory and practice is constrained by several conceptual and methodological challenges (Appleton et al., 2008; Fredricks et al., 2004; Skinner & Furrer, 2009). Researchers differ considerably on the dimensions used to conceptualize school engagement and employ a variety of indicators to describe student engagement in classrooms and with different school and classroom activities (see Appleton et al., 2008 for an overview). Few studies have measured all three dimensions of school engagement (behavioural, affective, and cognitive), however. In addition, researchers have used either self-reports of students or teacher reports to measure the nature and degree of school engagement students have with school (e.g., Appleton et al., 2008; Archambault et al., 2009). This may have biased the results found. Empirical studies in which different sources have been used (e.g., students, teachers) are scarce. Furthermore, researchers have used relatively homogeneous age groups within a specific type of education, ranging from students from elementary schools (Guthrie, Coddington, & Wigfield, 2009; Skinner & Furrer, 2009) to main high schools (Appleton et al., 2008) to measure school engagement. As a consequence, we know little about the extent to which school engagement differs for different age groups and how these differences affect the relations between the dimensions of school engagement. More research with more heterogeneous samples is needed to enable comparisons across age groups. Due to this variation, there is limited conceptual clarity and focus. In response to these gaps in the literature, different scholars have emphasized the need for more research that addresses the conceptual and methodological challenges the concept of school engagement is faced with.

This study aimed to provide an increased and nuanced understanding of the concept of school engagement by testing a multidimensional model, including all three dimensions of school engagement as discussed in the literature. In order to validate this model, we used a heterogeneous age sample, ranging from students from elementary schools to secondary vocational education (from 7 to 18 years) and two sources (students and teachers) of information.

Theoretical Background

Although there is no universal definition of school engagement, there appears to be broad international consensus that in general school engagement refers to the quality of “a student’s connection or involvement with the endeavour of schooling and hence with the people, activities, goals, values, and place that compose it” (Skinner & Fuller, 2009, p. 494). In contrast to motivational theories that focus on underlying psychological processes, engagement researchers have stressed the ‘action-oriented’ nature of the engagement concept (Russell, Ainly, & Frydenberg, 2005; Ream & Rumberger, 2008). Based on the description of engagement as “energy in action, the connection between person and activity” (Russell et al., 2005, p. 1), engagement is often considered to be the outward manifestation of motivation (Skinner, Wellborn, & Connell, 1990).

Engagement with school is typically viewed as an overarching (meta-)construct (Fredricks et al., 2004), bringing together several lines of research (i.e., motivation, school and classroom climate, involvement, identity) and providing a more coherent picture of how children participate in classrooms and school activities. Contemporary definitions emphasize that school engagement is a multidimensional construct, including affective engagement, cognitive engagement and behavioural engagement (Appleton et al., 2008; Fredricks et al., 2004; Guthrie et al., 2012; Linnenbrink & Pintrich, 2003).

Affective engagement refers to students’ feelings and emotional attachment to a task, persons (peers and teachers) or school in general and their subjective values about the importance and interest of a task at hand. It thus comprises both students’ attachment or social bonding to the social context of the school and their valuing of the goals of schooling (Audas & Willms, 2001, Archambault, Janosz, Morizot, & Pagani, 2009; Skinner et al., 1990).

Cognitive engagement refers to students’ beliefs about their level of competence that students expect they will display in a given situation (e.g., self-efficacy) and their perceptions of and beliefs about school, teachers, and peers (Jimerson, Campos, & Greif, 2003; Martin, 2007). Other researchers emphasize students’ willingness to exert mental effort needed to perform challenging academic tasks (investment) as well as the use of self-regulatory strategies to guide one’s cognitive efforts as central aspects of cognitive engagement (Appleton, Christenson, Kim, and Reschly, 2006; Fredricks et al., 2004). For example, with regard to reading, cognitive engagement refers to the use of cognitive strategies during reading to foster deeper understanding of the text. As engaged readers are strategic readers using such strategies as rereading, predicting,

questioning, summarizing, and clarifying (Guthrie et al., 2004; Wigfield, Eccles, Schiefele, Roeser, & Davis-Kean, 2008), the application of these strategies for executing and coordinating the reading process are referred to as self-regulation (Duke & Pearson, 2002; Pressley, 2000; Zimmerman & Risemberg, 1997).

Behavioural engagement refers to the active participation of students in academic activities in the classroom. This component comprises the extent to which students are actually performing academic tasks, including attending to and completing tasks responsibly and following rules and instructions as offered by the teacher in the classroom (Cameron Ponitz, Rimm-Kaufman, Grimm, & Curby, 2009). Recently, Appleton et al. (2006) have included an additional component, namely academic engagement referring to variables such as time on task or homework completion.

Following this multidimensional definition, school engagement is thus considered to be determined by motivational processes, cognitive strategies and active behaviour. Affective engagement is what energizes students' behaviour, whereas behavioural engagement indicates whether students are actually engaged (Appleton et al., 2006; Furrer and Skinner, 2003). Cognitive engagement indicates the depth and the direction of students' engagement with task and classroom activities.

Although there appears to be a broad consensus about the tenor of the concept of school engagement, the use of the concept in empirical research faces several conceptual and empirical challenges (Appleton et al., 2008; Skinner et al., 2009). One of the main challenges facing the concept of school engagement is its multidimensional nature. Results of engagement research have been obscured by substantial variation in how engagement is operationalized and measured. The measurement of this construct is focused on one dimension or has included several (usually two) dimensions, pending the definition of engagement used. Most researchers of school engagement have included participatory behaviours as a component of engagement, whereas affective and cognitive engagement are far less studied (Appleton et al., 2006; Appleton et al., 2008). In addition, researchers employed a variety of indicators to measure the dimensions (e.g., behavioural engagement in general or related to a specific school subject or activity). The studies that measured the affective dimension of engagement have focused on the social bonding part (e.g., Jimerson et al., 2003; Ream & Rumberger, 2008), on the emotional states related to learning activities (e.g., Skinner & Belmont, 1993), or both. The cognitive dimension, however,

is less often measured, partly because it is not readily observable, and partly because using students' self-reports is less reliable. Self-reports seem developmentally inappropriate for young students. Studies that have measured all three dimensions of school engagement (behavioural, affective, and cognitive) are limited.

In their attempts to measure school engagement, researchers also differ in the sources from which information is generated (e.g., students, teachers, parents or school records). Most studies either use self-reports of students or teacher-reported levels of school engagement (e.g., Appleton et al., 2008; Archambault et al., 2009). Empirical studies in which both teachers and students are used as sources for information to measure school engagement are scarce. The study of Skinner and colleagues (2009) is an exception and clearly shows that the correlations among the dimensions of school engagement based on student data differed from the correlations found in teacher data.

Finally, researchers have focused on relatively homogeneous age groups within a specific type of education, usually adolescents in middle of high schools. As the meaning of the indicators and the relationships between dimensions may differ for different age groups due to differences in the development of children, studies using a broad range of age groups, including elementary, middle and high school students are needed to further validate the construct of school engagement. Empirical studies with such a heterogeneous sample enabling comparisons across age groups are missing, however.

The present study

The present study aims to make a unique contribution to the existing knowledge base in three ways. *First*, we used the three-dimensional model of school engagement depicted by Fredricks and colleagues (2004) as starting point for measuring school engagement. Following the advice of Fredricks and her colleagues to use more specific measures, we chose to restrict affective engagement to relational variables, including social relations and pedagogical climate. As indicators for cognitive engagement we focused on students' beliefs of self-efficacy in general (e.g., academic self-efficacy) and related to reading (e.g., reading self-efficacy). In addition, students perceived difficulty with regard to reading was used as the third indicator. To measure behavioural engagement we focused on students' work attitude and behaviour in the classroom.

The different indicators of affective, cognitive and behavioural engagement and their interdependencies are visualized in figures 1, 2 and 3.

[Insert figure 1,2,3 here]

Second, we used two sources of information (students' perceptions and teacher reports) to measure the three dimensions. We assessed the different indicators of affective engagement by using both students' self-reports (e.g., satisfaction with school, the social bonding to peers and the social bonding to the teacher) and teacher reports (e.g., teacher-student relationship, the social relationships with classmates of each specific student). As teachers cannot observe the indicators of cognitive engagement reliably, we used student self-reports. To measure students' work attitude and behaviour in the classroom (behavioural engagement), we used teacher reports as teachers are more capable to distinguish behavioural engagement among students than students themselves.

Third, we used four different age groups of students (from age 7 to 18, including elementary school, middle school, and high school students). By doing this, we aimed to examine to what extent the structure of the three-dimensional construct can be validated for different age groups.

Method

Sample

This study is part of an on-going longitudinal research project, called 'Preventie in de Keten' ('Prevention in the education chain') focusing on socio-cultural and individual conditions fostering students' school career in the Netherlands. The data collection for this study was conducted in the academic year 2011/2012. Students in four different grades situated in primary and secondary education (Grade 2, Grade 5, Grade 8, and first year of vocational education) and their teachers were contacted via participating schools and school boards, situated in the eastern part of Netherlands. The following criteria were used to select the participants: 1. at least one class per age group in school had to participate, 2. at least 15 students of each class had to fill out the questionnaires and 3. the school was not involved in any other research project during the time of data collection. To increase the response, research assistants visited each classroom to

administer the questionnaires to the students and to deliver teacher questionnaires which were collected some weeks later. Every teacher completed one questionnaire for each individual participating student in their classroom. A total of 1290 students and 65 teachers from schools in both primary (Grade 2 and 5) and secondary (Grade 8 and first year vocational) education completed the questionnaires. Of the 1290 students and 65 teachers, 354 students and 19 teachers from Grade 2, 340 students and 20 teachers from Grade 5, 439 students and 21 teachers from Grade 8 and 157 students and 5 teachers from the first year of secondary vocational education participated in the study. The descriptives of the sample are summarized in Table 1. Students and teachers from mainly Technology departments situated in Dutch schools for secondary vocational education participated in the study. These departments are mostly dominated by male students and teachers. This explains the small number of girls from the first year of secondary vocational education that were included in our sample.

[Insert Table 1 here]

Instruments

As mentioned earlier, we measured three different dimensions of school engagement, namely affective engagement, cognitive engagement and behavioural engagement.

Affective engagement. Affective engagement refers to the students' wellbeing in terms of their interpersonal relations at school and their perception of the school and classroom climate. Students' perceptions of their interpersonal relations and school climate were measured using the items from the subscales social relations and pedagogical climate from the Flemish Wellbeing Questionnaire (De Volder & De Lee, 2009). In previous research, these scales have been validated using a sample of 4519 Flemish children between eight and 13 years old (social relations $\alpha = 0.70$; pedagogical climate $\alpha = .90$; De Volder & De Lee, 2009). We carefully adapted Dutch items for their appropriateness to the two youngest groups (7 to 10 years) by using age-specific formulations.

A sample item from the scale social relations is: 'I have many friends in school'. An example of an item assessing pedagogical climate is: 'At our school the teachers ask for students' opinions'. Students could indicate the extent to which the items applied to them on a 4-point scale

(ranging from 1= *never*; to 4=*always*). High scores on these scales indicate good social relations and good pedagogical climate, respectively.

In addition, we measured teachers' perception of student's unpopularity and the relationship between the student and the teacher. Unpopularity was measured using the items of the subscale unpopularity from a validated questionnaire used for a longitudinal Dutch cohort study (Driessen, Mulder, Ledoux, Roeleveld & van der Veen, 2009). Teacher student relationship was assessed using the items of the subscales proximity and conflict from the Teacher Student Relation Questionnaire (Leerkracht Leerling Relatie Vragenlijst; Koomen, Verschueren, & Pianta, 2007). All three subscales have been validated for a sample of 37541 children between five and 12 years old using a reference sample (unpopularity $\alpha = .86$; proximity $\alpha = .87$; conflict $\alpha = .93$; Driessen et al., 2009). Examples of items are respectively: 'The student has few friends in the classroom' (unpopularity); 'The student seems to feel safe with me' (proximity); 'The student has the feeling I treat him/her unfair' (conflict). Teachers indicated the extent to which they agree with the items on a 5-point scale (1=*definitely untrue* to 5=*definitely true*). High scores on unpopularity and conflict indicate that teachers perceive that a student is unpopular among peers and that the teacher experiences much conflict with the student. A high score on proximity indicates a high level of closeness and support as perceived by the teacher.

Cognitive engagement. Cognitive engagement refers to students' academic self-efficacy, students' belief in their capacity to read well and their perceived difficulty with reading. Students' more general sense of self-efficacy was measured using the items of the subscale Academic Efficacy as used in previous Dutch research on student motivation in a lower educational track. These Dutch items were translated and adapted from the original English items of the subscale Academic Efficacy from the Patterns of Adaptive Learning Survey (PALS) (Midgley et al., 2000). The Dutch subscale was validated with a sample of 37541 children between five and 12 years old using a reference sample. The Cronbach's Alpha for the reference sample was 0.78 (Driessen et al., 2009; Jungbluth, Roede, & Roeleveld, 2001). A sample item measuring academic self-efficacy is: 'I can do even the hardest work in this class as long as I try'. Students could indicate the extent to which the items applied to them on a 5-point scale (1 =*definitely untrue* to 5= *definitely true*). A high score on the scale indicates that a student has a strong belief in his or her capacity to perform well at school in general. Students' self-efficacy for reading and their perceived difficulty with reading was measured using items of related

subscales from a questionnaire used in a study into profiles of reading motivation as conducted as conducted by Guthrie and his colleagues (Guthrie et al., 2009) These subscales have been validated with a sample of 156 Grade 5 children. (Cronbach's Alpha of 0.71 and 0.76, respectively). We carefully translated and adapted English items for their appropriateness in the Dutch educational context. Sample items are 'Are you able to read long words out loud' (self-efficacy reading) and 'Do you need extra help or resources when reading' (perceived difficulty reading). Students could indicate the extent to which the items applied to them on a 4-point scale, ranging from 1 (*never*) to 4 (*always*). High scores on the self-efficacy scales related to reading indicate a high degree of experienced competence during reading by students. A high score on perceived difficulty indicates a high level of difficulty during a reading task as perceived by students.

Behavioural (dis)engagement. Behavioural engagement refers to teachers' perceptions of students' work attitude and behaviour in the classroom. Students' behavioural engagement was measured using items from two subscales used in previous Dutch research on students' school functioning, including students' bad work attitude and disruptive behaviour (Jungbluth, Roede, & Roeleveld, 2001). The subscales have been validated with a reference sample of 37541 children between five and 12 years old (work attitude $\alpha = 0.82$; disruptive behaviour $\alpha = 0.81$; Driessen et al., 2009). Examples of items are respectively: 'The student is easily distracted' (work attitude) and 'The student does not follow the rules' (disruptive behaviour). Teachers could indicate the extent to which the items applied to the students in their classroom on 5-point scales, ranging from 1 (= *definitely untrue*) to 5 (= *definitely true*). High scores indicate that teachers report that a student has a bad work attitude and shows much disruptive behaviour. As high scores on both subscales refer to negative indicators, the items measure behavioural disengagement.

Analytic Strategy

We used Mplus 6.12 (Muthèn & Muthèn, 2004) to analyse the measurement and structural models. Maximum likelihood estimation was used and missing data were imputed with full information maximum likelihood estimation (value -99). First, we constructed measurement models for the items that were used to assess the ten subscales as depicted in Figure 1, 2, and 3 (i.e., social relations, pedagogical climate, proximity, conflict, unpopularity, self-efficacy, self-efficacy of reading, experienced difficulty reading, bad work attitude and disruptive behaviour).

We first linked the items to their a priori indicators (subscales) and tested these measurement models by conducting confirmatory factor analyses. We then conducted confirmatory factor analysis in which the subscales linked to their a priori engagement dimensions (i.e., affective engagement, cognitive engagement, behavioural engagement) to determine whether the ten subscales indeed underlay the three engagement dimensions and if a similar structure could be found for different age groups and different sources (students and teachers). The following criteria for model fit were used: Comparative Fit Index (CFI) and Tucker-Lewis fit index (TLI) > .95, Root Mean Square Error of Approximation (RMSEA) and Standardized Root Mean Residual < 0.05 and $\chi^2 > .05$. (Hu & Bentler, 1999; Yuan & Bentler, 2000). However, chi-square is not considered to be a useful fit index since it is affected by sample size, model size and the distribution of variables (larger samples and larger models are less likely to result in significant *p*-values and highly skewed and kurtosis variables increase chi-square values).

Results

As mentioned above, the goal of this study was to develop and validate an age group specific multidimensional model of school engagement with two complementing sources of information (i.e., students and teachers). To examine the proposed model, we started by linking all the items to their a priori indicators for the four age groups separately by conducting confirmative factor analyses. These analyses encountered a number of problems. Results indicated that the model did not fit the data well for all age groups. Lack of fit might have been due to the use of both information sources included in one model. To measure affective engagement both teacher and student data had been used, resulting in insufficient fit indicators. This means that it was necessary to differentiate between self- and teacher-reported data and therefore we proceeded by conducting two separate factor analyses for each of the two information sources for all four age groups separately. This resulted in two models. The first model contained student data consisting of affective engagement (subscales: social relations and pedagogical climate) and cognitive engagement (subscales: academic self-efficacy, self-efficacy reading and perceived difficulty reading). The second model contained teacher data and these also consisted of two engagement dimensions: affective engagement (subscales conflict, proximity and unpopularity) and behavioural engagement (subscales bad work attitude and disruptive behaviour).

These analyses encountered convergence problems. Therefore we proceeded by conducting four separate confirmatory factor analyses for each of the two engagement dimensions with student and teacher data for all age groups together. Due to unacceptable fit indicators the decision was made to proceed with just two age groups. The first group was formed by combining Grade 2 and Grade 5 together resulting in a primary school group with age ranging between 7 and 11 years, as of now called *group one*. The second group was formed by taking Grade 8 and the first year of secondary vocational education together resulting in a secondary education group (i.e., *group two*) with age ranging between 13 and 18 years. As such, both the student data model and the teacher data model were fit to the data twice. Once with (younger) respondents belonging to group one and once with (older) respondents from group two. For all engagement dimensions in both groups, adequate model fit was achieved in single-level models in which the items were linked to their a priori indicators (subscales). The internal consistencies indicated that most subscales had reasonable to good reliability. The parameter estimates (i.e., the factor loadings and residual variances), Cronbach's Alpha, means, and standard deviations are presented in Table 2, Table 3, Table 4 and Table 5.

[Insert table 2 here]

[Insert table 3 here]

[Insert table 4 here]

[Insert table 5 here]

Affective engagement with student data. For affective engagement with student data, model fit indicators for the subscales social relations and pedagogical climate were adequate for both group one ($\chi^2 (89) = 249.60, p < .01, CFI = .82, TLI = .79, RMSEA = .05$ (90% Confidence Interval [CI] = .05 – .06; SRMR = .05) and group two ($\chi^2 (151) = 570.946, p < .01, CFI = .85, TLI = .83, RMSEA = .07$ (90% Confidence Interval [CI] = .07 – .08; SRMR = .06). The model for group one explained between 7% and 42% of the variance in the items, and standardized factor loadings were between .26 and .65. The model for group two explained between 10% and 51% of the variance in the items, and standardized factor loadings were between .31 and .74. For both groups, the correlation between the two subscales appeared to be low, with standardized correlation coefficients at respectively .23 and .24. As such, the two subscales of social relations

and pedagogical climate could be replicated by the items that were a priori assigned to them for both distinguished age groups.

Affective engagement with teacher data. For affective engagement using teacher data, model fit indicators for the subscales proximity, conflict and unpopularity were adequate for both group one ($\chi^2 (62) = 407.51, p < .01, CFI = .93, TLI = .91, RMSEA = .09$ (90% Confidence Interval [CI] = .09 – .10; SRMR = .05) and group two ($\chi^2 (62) = 394.44, p < .01, CFI = .91, TLI = .89, RMSEA = .10$ (90% Confidence Interval [CI] = .09 – .11; SRMR = .06). The model for group one explained between 45% and 79% of the variance in the items, and standardized factor loadings were between .67 and .89. The model for group two explained between 41% and 73% of the variance in the items, and standardized factor loadings were between .64 and .86. For both groups, low to moderate correlations were found between proximity and conflict (-.47 and -.40, respectively), unpopularity and conflict (.47 and .30, respectively), and unpopularity and proximity (-.38 and -.25, respectively). Accordingly, the three subscales of proximity, conflict and unpopularity could be replicated by the items that were a priori assigned to them for both distinguished age groups.

Cognitive engagement. For cognitive engagement, model fit indicators for the subscales academic self-efficacy, self-efficacy reading and difficulty reading were adequate for both group one ($\chi^2 (62) = 145.50, p < .01, CFI = .94, TLI = .92, RMSEA = .05$ (90% Confidence Interval [CI] = .04 – .06; SRMR = .05) and group two ($\chi^2 (62) = 127.57, p < .01, CFI = .95, TLI = .93, RMSEA = .05$ (90% Confidence Interval [CI] = .03 – .06; SRMR = .04). The model for group one explained between 14% and 50% of the variance in the items, and standardized factor loadings were between .37 and .69. The model for group two explained between 9% and 61% of the variance in the items, and standardized factor loadings were between .31 and .79. For both groups, low to moderate correlations were found between academic self-efficacy and self-efficacy reading (.52 and .35, respectively), academic self-efficacy and difficulty reading (-.38 and -.22, respectively), and self-efficacy reading and difficulty reading (-.48 and -.69, respectively). Accordingly, the three subscales of academic self-efficacy, self-efficacy reading, and difficulty reading could be replicated by the items that were a priori assigned to them for both age groups.

Behavioural engagement. For behavioural engagement, model fit indicators for the subscales work attitude and behaviour were adequate for both group one ($\chi^2 (19) = 120.92, p <$

.01, CFI = .96, TLI = .94, RMSEA = .09 (90% Confidence Interval [CI] = .07 – .10; SRMR = .04) and group two (χ^2 (19) = 103.64, $p < .01$, CFI = .96, TLI = .94, RMSEA = .09 (90% Confidence Interval [CI] = .07 – .11; SRMR = .05). The model for group one explained between 37% and 77% of the variance in the items, and standardized factor loadings were between .61 and .88. The model for group two explained between 29% and 77% of the variance in the items, and standardized factor loadings were between .54 and .88. For both groups, the correlation between the two subscales appeared to be moderate to high, with standardized correlation coefficients at .72 and .67 respectively. As such, the two subscales bad work attitude and disruptive behaviour could be replicated by the items that were a priori assigned to them for both distinguished age groups.

We subsequently conducted confirmatory factor analyses to determine whether the two engagement dimensions (i.e., affective and cognitive engagement) measured with student data could be represented by their five underlying subscales (i.e., social relations and pedagogical climate; academic self-efficacy, self-efficacy reading, and perceived difficulty reading) and if the two engagement dimensions (i.e., affective and behavioural engagement) measured with teacher data could be represented by their five underlying subscales (i.e., unpopularity, proximity, conflict, bad work attitude and disruptive behaviour). Intraclass correlations (ICCs) for the dimensions suggested that students' and teachers' perceptions were only idiosyncratic in nature, suggesting that differences between schools did not explain the variation in perceptions. The ICCs ranged between 0.001 to 0.091, thus indicating that there is no need for a multilevel analysis of the data.

Due to convergence problems we decided to proceed by calculating average scores for each subscale, thus reducing the number of parameters. After this adjustment, the proposed models had an adequate fit on the data for both groups. For group one, the student data model fit indicators were adequate (χ^2 (4) = 12.86, $p = .01$, CFI = .96, TLI = .90, RMSEA = .06 (90% Confidence Interval [CI] = .02 – .10; SRMR = .03). The model explained between 6% and 41% of the variance of the subscales, and standardized factor loadings were between -.34 and .64. For group two, the student data model fit indicators were adequate as well (χ^2 (4) = 24.73, $p < .01$, CFI = 0.91, TLI = .76, RMSEA = .10 (90% Confidence Interval [CI] = .06 – .14, SRMR = .04). The model explained between 11% and 58% of the variance of the subscales, and standardized factor loadings were between -.60 and .76. The model fit indicators for the teacher data model for

group one were satisfactory ($\chi^2(4) = 32.63, p < .01, CFI = 0.98, TLI = .94, RMSEA = .10$ (90% Confidence Interval [CI] = .07 – .14, SRMR = .03). The model explained between 22% and 72% of the variance of the subscales, and standardized factor loadings were between -.47 and .85. Lastly, the teacher data model fit indicators for group two were adequate ($\chi^2(4) = 43.13, p < .01, CFI = 0.96, TLI = .89, RMSEA = .13$ (90% Confidence Interval [CI] = .10 – .17, SRMR = .04). The model explained between 13% and 97% of the variance of the subscales, and standardized factor loadings were between -.35 and .98.

The final measurement models are displayed in Figures 4 (student data model group one), 5 (student data model group two), 6 (teacher data model group one), and 7 (teacher data model group two). From these figures, a number of observations can be made.

Student data model. In both group one and two, the findings indicate that pedagogical climate contributes the strongest to affective engagement. Self-efficacy reading seems to contribute the most to cognitive engagement for group two. For group one, academic self-efficacy is the largest contributor, followed by self-efficacy reading. The findings thus show that the model fitted similarly for both groups for the affective engagement dimension, but differently for the cognitive engagement dimension.

Teacher data model. With regard to the teacher data, the findings show that for both age groups, conflict seems to be the strongest contributor to the affective engagement dimension. For the behavioural engagement dimension, in comparison to bad work attitude, disruptive behaviour appeared to be the largest contributor for both age groups. This suggests that the model based on teacher data acted similarly for both groups on both engagement dimensions.

Discussion

Our study aims to make a contribution to the existing knowledge base on school engagement by testing a conceptual model, using data from both students and teachers from Dutch elementary and secondary schools. Based on the model of Fredricks and her colleagues (2004), a three-dimensional structure of school engagement, including affective, cognitive and behavioral engagement, for different age groups (range 7-18 years), using different sources (students versus teachers) was empirically validated. Our data offer support for the multidimensional nature of the concept of school engagement. The three engagement dimensions (affective, cognitive and behavioural) were well represented by their underlying subscales. Moreover, the informants

(teachers versus students) contribute in a unique way to the concept of school engagement. Until now, systematic research that tested the assumed interdependency of different dimensions of school engagement using different age-groups has been limited. We therefore also tested whether the sets of key dimensions of school engagement and related subscales were equivalent for different age groups. Our findings showed that, using student data, the multidimensional model fitted similarly for both age groups (between 7 and 11 years versus between 13 and 18 years) for the affective engagement dimension, but differently for the cognitive engagement dimension. In addition, based on teacher data, it appeared that model acted similarly for both age groups on both affective and behavioural engagement.

Our findings suggest that the concept of school engagement is a complex construct that cannot be adequately represented by a single model without taking the differences between age groups, particularly between students from elementary and secondary education, into account. These age related differences may be explained by differences in the experiences and the cognitive development between students in primary and secondary education. Students in elementary schools are mostly involved with one teacher who teaches them every day (one academic year) and as a consequence is often experienced by students as an attachment figure. Secondary school students are confronted with different teachers teaching them different subjects during one day and academic year. Due to this and to their own identity development, they may experience their teachers more as an authority figure. Moreover, research has shown that in adolescence, the value of peer relations increases for older students while the value of maintaining good relationships with adults decreases (Santrock, 2001). In addition, children develop knowledge and skills throughout the years enabling them for instance to better compare themselves with others. These differences in experiences and cognitive development between children in primary and secondary education seem to be reflected in our data. For example, the standardized factor loadings are higher for social relations and lower for pedagogical climate for age group one (between 7 and 11 years), compared with the second age group (between 13 and 18 years). This shows that the relevance and contribution of subscales to the engagement dimensions may differ between different age groups.

In measuring *affective engagement*, we focused on social relationships within classrooms with peers and teachers, using both students and teachers reports. The results from students in both age groups as well as from teachers confirm the importance and relevance of these

relationships in the context of school engagement. For students, the pedagogical climate, a rating of the teacher's social behavior in class, was the most important indicator of affective engagement. For both age groups, teachers' most important indicator of affective (dis)engagement was conflict. These findings concur with findings from previous studies (Appleton et al., 2006) while extending it for a younger group of students, those in elementary school. Moreover, our findings based on data from two different sources suggest that both the academic and social context of the school matters. For students, feelings of belonging seem to be related to the way teachers encounter them.

Of the two relationship characteristics rated by teachers, conflict seems to be a more distinctive characteristic than proximity. Conflict decreases the social bonding to school and possibly creates a negative atmosphere for students' willingness to exert higher levels of effort and performance. Classrooms are constrained environments in which students have to perform activities for external reasons, and therefore it is not easy for teachers to avoid conflicts, especially with disengaged students. However, for teachers to realize that a positive classroom climate, characterized by interest in students and constructive interactions, can support the willingness of students to cooperate and invest in school work, may help to get involved with these students.

In our study, *cognitive engagement* was measured using three subscales: academic self-efficacy, self-efficacy in reading, and difficulty in reading. Although the youngest students that participated in our study may have found it difficult to assess their self-efficacy and difficulty in reading, the reliabilities of the self-efficacy subscales in age group one were comparable to the reliabilities of the subscales in the older age group. This suggests that even at a younger age children are able to report reliably on self-efficacy. Differences in standard loadings between the age groups do indicate differences in relevance of self-efficacy and perceived difficulty reading. It appeared that for older students self-efficacy seems to be less relevant whereas perceived difficulty with reading seems to be more relevant contributor to cognitive engagement. This again emphasizes the need to examine age related differences in research on student engagement.

Behavioural engagement as reported by teachers was measured using scales that refer to negative manifestations of behavioural engagement (or more precisely: behavioural disengagement): bad working attitude and disruptive behaviour. Based on our analysis, we found that these two subscales represent separate aspects of behavioural engagement as perceived by

the teachers that participated in our study. Moreover, both subscales appeared to be moderately to highly correlated. These findings do concur with results from previous research. In their effort to examine whether behavioural engagement could be considered as a single bipolar construct, Skinner and Furrer (2009) also found two separate constructs that were highly correlated. Based on their findings, they suggest that the construct of behavioural engagement is bipolar in nature. More research is needed to validate their and our findings. This will help us to deepening our understanding of the nature of this dimension of student engagement.

Limitations and implications for further studies

The present study focused on the validation of a three-dimensional concept of school engagement for different age groups using two sources of informant. By using two types of informants (students and teachers) and a heterogeneous age sample, we were able to validate the construct of school engagement for different age groups and from different perspectives. Moreover, by using both teacher- and student-reported data, our findings may be less biased than findings from previous studies using only one source of information. Studies that do not consider the effect of informants are prone to underestimating the effect of school engagement and might falsely conclude that school engagement does not have an impact on student learning.

While we believe in the strengths of our study, we also acknowledge its limitations. We, therefore, discuss some important issues that need to be addressed in future research. One important issue is related to the measurement of school engagement. The conclusions of the present study are based on ten different subscales and highlight the central problem of measuring school engagement comprehensively. Despite our ten subscales, there are more possible scales that could complement the models in this study. For example, we restricted the affective dimension to peer and teacher-student relations. In future studies, researchers could focus on indicators measuring other aspects of affective engagement, such as emotional states during learning activities or the valuing of school goals. Moreover, not all items had high factor loadings for both age groups (elementary school pupils and adolescents), suggesting that items were less age-appropriate or just less relevant.

Another important issue is related to the use of questionnaires to measure the construct of school engagement defined as motivation 'in action'. While we believe that questionnaires can be used to measure different subscales of school engagement in a valid and reliable way, especially

when the focus is on student perceptions and beliefs towards school tasks reliable, alternative methods that can facilitate the development of comprehensive and sophisticated models may also be used. This is especially true for cognitive engagement, which is generally difficult to measure reliably with questionnaires and has been scarcely investigated so far. An example for an alternative method of measuring cognitive engagement could be a so-called work sample analysis, in which evidence of mental effort or metacognitive strategies is assessed (Chapman, 2003). Researchers could also conduct direct observations for measuring indicators of the behavioural dimensions of school engagement, including effort and disruptive behaviour. Future studies using multiple methods are needed to validate our findings.

Several models (e.g., the Reduced Self-system Process model of Klem and Connell, 2004) distinguish context, action and outcomes. In these models, the teacher-student relationships typically are part of the context, thereby depicting this relationship quality as preceding school engagement. One lingering issue as often discussed in the literature, pertains to how school engagement and student-teacher relationship are linked. To what extent do school engagement and student-teacher relationships have a causal (engagement precedes the quality of the relationship) or reciprocal relationship. Skinner and Belmont (1993), in an effort to disentangle the reciprocal links between teacher involvement and school engagement, reported that teacher involvement was positively related to school engagement which in turn lead to greater teacher involvement. Other studies point to involvement and support of the teacher as essential, a prerequisite, to meet the students' need for relatedness (Furrer and Skinner, 2003). The present study was cross-sectional and therefore not equipped to unravel this important issue and therefore future research is thus needed. Nevertheless, the multidimensional structure of the concept that has been validated in this study, leaves room for alternatives, in which other forms of engagement can compensate for the lack of affective engagement (or for the presence of disaffection). To which extent affective engagement of older and/or less engaged students is malleable in school settings remains uncertain, although programs like Check and Connect (McPartland, 1994) can help to prevent students from dropping out.

Although the literature and the findings of our study indicate that being engaged in the classroom is influenced by motivation (interest and related: self-efficacy: the cognitive dimension), the social setting in which students are embedded (affective dimension) and their self-regulative behaviour (behaviour dimension), we didn't focus on types or profiles of students

based on specific combinations of the separate dimensions of engagement. One of the advantages and added-value of using the multidimensional construct of engagement above motivation is the possibility to create student profiles and examine the impact these profiles have on students' performance. For example, students who feel less engaged with peers and teachers, and have low levels of self-efficacy, and high levels of bad working habits and disruptive behaviour may have serious problems to perform well and not to drop out from school. In contrast to this type of students, students who believe that they are less competent to perform school-related tasks successfully, but have moderate working habits, may remain engaged with school when they have good relations with their peers and teachers. It thus seems worthwhile to pay more attention to different student profiles and examine how these profiles affect student future school careers. Future studies should therefore focus on how configurations of the engagement dimensions are related to achievement, as well as how engagement changes over time. Findings from these studies can help us to increase our insights into the differentiated nature of (lack of) "person–environment" fit, that is, how the personal world of different students are integrated into the school environment.

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Highlights

1. School engagement can best be described by a model that includes multiple dimensions (affective, cognitive and behavioural).
2. The concept of school engagement cannot be adequately represented by a single model without taking the differences between age groups (7-10 years old versus 13-18 years old) and informants (teachers versus students) into account.

Table 1
Descriptive Statistics of Participants

Group	Students				Teachers
	N	Mean age (SD in months)	Gender		N
			Boys	Girls	
1	354	7.8 (6)	175 (49.2%)	179 (50.6%)	19
2	340	10.8 (5)	175 (50.3%)	165 (48.2%)	20
3	439	13.11 (10)	237 (54%)	202 (46%)	21
4	157	18.0 (30)	150 (95.5%)	7 (4.5%)	5
Total	1290				65

Table 2. Scales, Items, and Standardized Factor Loadings for the School Engagement Model from a Student Perspective in Group 1

	Factor Loading	Residual
Affective Engagement		
Social Relations ($M = 3.26$, $SD = .49$, $\alpha = .61$)		
At our school...		
1. In my class, I don't feel alone	.40	0.84
2. I don't get bullied	.63	0.61
3. I have many friends	.27	.93
4. The students don't argue at the playground	.50	.76
5. Students don't get bullied or laughed at	.65	.57
Pedagogical Climate ($M = 3.07$, $SD = .39$, $\alpha = .63$)		
At our school...		
1. It is calm in the classroom	.31	.91
2. The teachers tell me when I do my best	.33	.89
3. The teachers are careful that the students follow the rules	.33	.89
4. The teachers teach in a good and nice way	.60	.64
5. The teachers are friendly to the students	.53	.72
6. The teachers listen to the students when something happens	.42	.83
7. The teachers ask for students' opinions	.26	.93
8. Students listen to the teachers and do what they are told	.41	.83
9. The teachers take into account students' ideas.	.35	.88
10. Students are allowed to express their opinion	.31	.90
Cognitive Engagement		
Self-efficacy ($M = 3.83$, $SD = .68$, $\alpha = .76$)		
1. I am sure I will make it this year	.61	.63
2. I can do almost all the work in class if I don't give up	.66	.57
3. I can do my work as long as I have enough time	.41	.84
4. I can do even the hardest work in this class if I try	.53	.72
5. Even if the work is hard, I can learn it	.59	.65
6. I am certain I will be able to finish even difficult tasks	.68	.53
Self-efficacy reading ($M = 3.07$, $SD = .69$, $\alpha = .66$)		
1. Can you decipher difficult words?	.51	.74
2. Can you sound out long words?	.69	.52
3. Can you read long words easily?	.71	.50
Reading difficulty ($M = 1.7$, $SD = .60$, $\alpha = .51$)		
1. Do you need extra help or resources while reading?	.37	.87
2. Are you not a good reader?	.60	.64
3. Do you make lots of mistakes in reading?	.53	.72

Table 3. Scales, Items, and Standardized Factor Loadings for the School Engagement Model from a Student Perspective in Group 2

	Factor Loading	Residual
Affective Engagement		
Social Relations ($M = 4.28$, $SD = .64$, $\alpha = .76$)		
At our school...		
1. In my class, I don't stand alone	.57	.67
2. I have a lot of contact with my peers	.59	.66
3. I would rather not be in another class	.61	.63
4. We have a nice class	.71	.50
5. I get along well with my classmates	.68	.54
Pedagogical Climate ($M = 3.60$, $SD = .53$, $\alpha = .85$)		
At our school...		
1. The teachers tell me when I do my best	.53	.72
2. The teachers are careful the students follow the rules	.34	.89
3. The teachers teach in a good and nice way	.71	.50
4. The teachers are friendly to the students	.74	.45
5. The teachers listen to the students when something happens	.72	.49
6. The teachers ask for students' opinions	.65	.58
7. Students work on the tasks they get	.39	.85
8. The teachers take into account students' ideas.	.64	.59
9. Students are allowed to express their opinion	.57	.68
10. My teachers are generally concerned for me	.51	.74
11. The teachers are interested in me	.52	.73
12. I can talk to my teacher about personal problems	.46	.79
13. When necessary the teacher will not leave me in the lurch	.60	.65
14. Most teachers are no strangers for me	.31	.90
Cognitive Engagement		
Self-efficacy ($M = 3.66$, $SD = .51$, $\alpha = .72$)		
At school...		
1. I'm certain I can master the skills taught in class this year	.44	.81
2. I can do almost all the work in class if I don't give up	.64	.59
3. I can do my work as long as I have enough time	.31	.91
4. I can do even the hardest work in this class if I try	.58	.66
5. Even if the work is hard, I can learn it	.56	.69
6. I'm certain I can figure out how to do the most difficult class work	.79	.38
Self-efficacy reading ($M = 3.01$, $SD = .57$, $\alpha = .64$)		
1. Can you decipher difficult words?	.55	.70
2. Can you sound out long words?	.72	.49
3. Can you read long words easily?	.59	.66
Reading difficulty ($M = 1.93$, $SD = .62$, $\alpha = .64$)		
1. Do you need extra help or resources while reading?	.60	.64
2. Are you not a good reader?	.59	.66

3. Do you make lots of mistakes in reading?

.67

.55

Table 4. Scales, Items, and Standardized Factor Loadings for the School Engagement Model from a Teacher Perspective in Group 1

	Factor Loading	Residual
Affective Engagement		
Proximity ($M = 3.76$, $SD = .51$, $\alpha = .85$)		
1. The student talks candidly with me about his/her feelings and experiences	.67	.55
2. If the student is sad, he/she will find solace with me	.72	.49
3. I have a cordial, warm relationship with the student	.89	.21
4. The student seems to feel safe with me	.76	.42
5. Dealing with the student gives me a sense of effectiveness	.70	.51
Conflict ($M = 1.63$, $SD = .63$, $\alpha = .91$)		
1. The student and I constantly seem to battle with each other	.86	.26
2. The student has the feeling that I treat him/her unfair	.75	.44
3. If the student is moody, I know it will be a long tiring day	.86	.26
4. The feelings of the student may be completely unpredictable and change abruptly	.81	.35
5. Dealing with this student requires a lot of energy from me	.82	.32
Unpopularity ($M = 2.31$, $SD = .65$, $\alpha = .82$)		
1. The student cannot get along with classmates well	.78	.40
2. The student is not popular with classmates	.82	.32
3. The student has few friends in the classroom	.75	.44
Behavioural Engagement		
Bad Work Attitude ($M = .259$, $SD = .85$, $\alpha = .86$)		
1. The student does not work accurate	.79	.63
2. The student quickly thinks the work is done	.88	.77
3. The student quickly stops when something does not work	.74	.55
4. The student is easily distracted	.73	.53
Disruptive Behaviour ($M = 2.07$, $SD = .71$, $\alpha = .81$)		
1. The student is often impertinent	.78	.40
2. The student does not follow the rules	.78	.40
3. The student always tries to impose his or her wishes	.74	.45
4. The student always quarrels	.61	.63

Table 5. Scales, Items, and Standardized Factor Loadings for the School Engagement Model from a Teacher Perspective in Group 2

	Factor Loading	Residual
Affective Engagement		
Proximity ($M = 3.48$, $SD = .53$, $\alpha = .86$)		
1. The student talks candidly with me about his/her feelings and experiences	.75	.44
2. If the student is sad, he/she will find solace with me	.82	.32
3. I have a cordial, warm relationship with the student	.81	.35
4. The student seems to feel safe with me	.70	.51
5. Dealing with the student gives me a sense of effectiveness	.64	.59
Conflict ($M = 1.90$, $SD = .64$, $\alpha = .89$)		
1. The student and I constantly seem to battle with each other	.86	.27
2. The student has the feeling that I treat him/her unfair	.75	.45
3. If the student is moody, I know it will be a long tiring day	.73	.46
4. The feelings of the student may be completely unpredictable and change abruptly	.80	.37
5. Dealing with the student requires a lot of energy from me	.79	.35
Unpopularity ($M = 2.50$, $SD = .57$, $\alpha = .79$)		
1. The student cannot get along with classmates well	.80	.35
2. The student is not popular with classmates	.74	.45
3. The student has few friends in the classroom	.70	.51
Behavioural Engagement		
Bad Work Attitude ($M = 2.72$, $SD = .78$, $\alpha = .87$)		
1. The student does not work accurate	.71	.49
2. The student quickly thinks the work is done	.88	.23
3. The student quickly stops when something does not work	.79	.37
4. The student is easily distracted	.78	.39
Disruptive Behaviour ($M = 2.18$, $SD = .69$, $\alpha = .81$)		
1. The student is often impertinent	.79	.34
2. The student does not follow the rules	.76	.42
3. The student always tries to impose his or her wishes	.79	.38
4. The student always quarrels	.54	.71

Figure(s)

Figure captions:

Title figure 1 (Affective engagement): Indicators of affective engagement

Title Figure 2 (Cognitive engagement): Indicators of cognitive engagement

Title Figure 3 (Behavioural engagement): Indicators of behavioural engagement

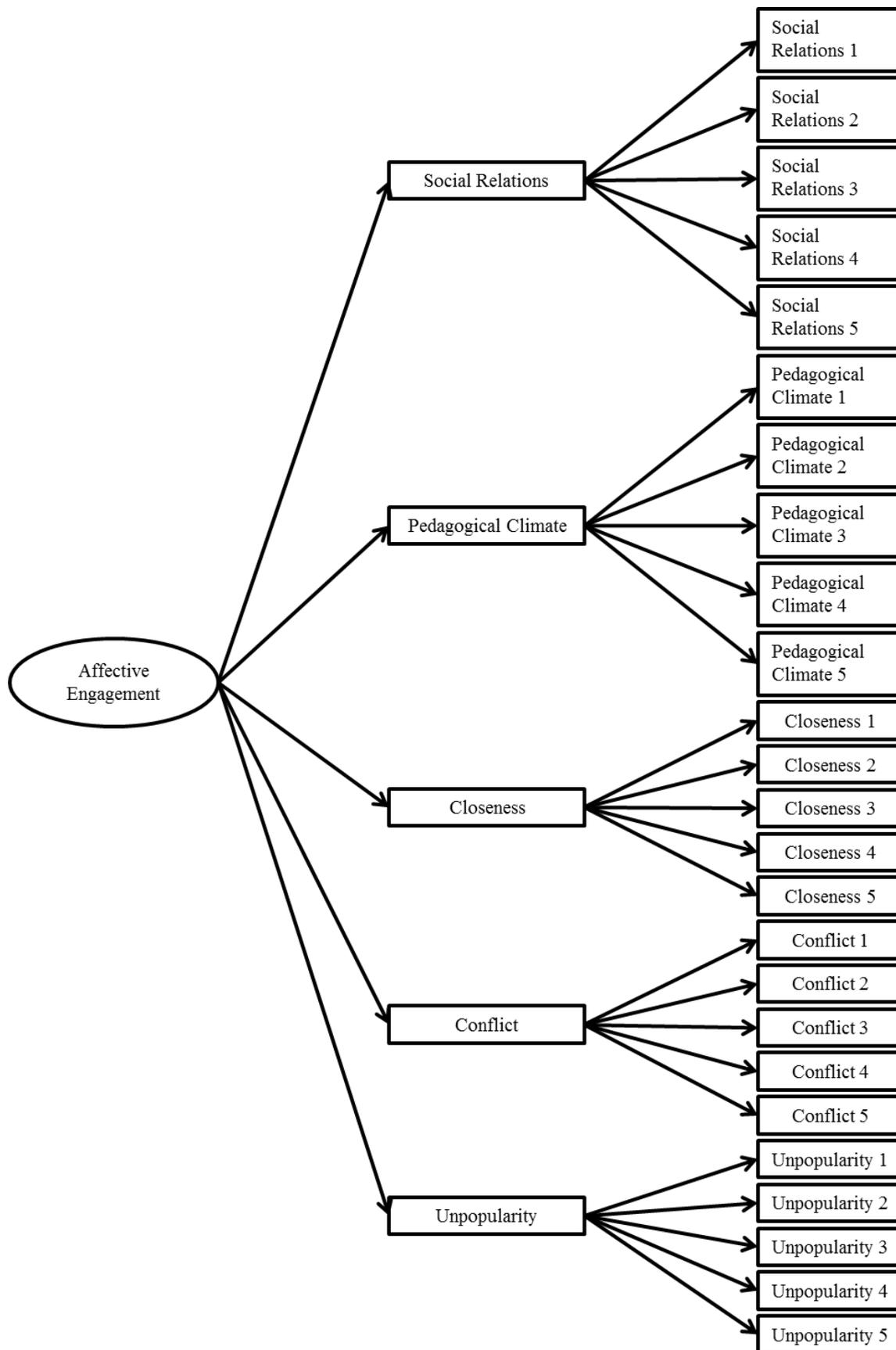
Title Figure 4: Structural model based on student data group one

Title Figure 5: Structural model based on student data group two

Title Figure 6: Structural model based on teacher data group one

Title Figure 7: Structural model based on teacher data group two

Figure(s)



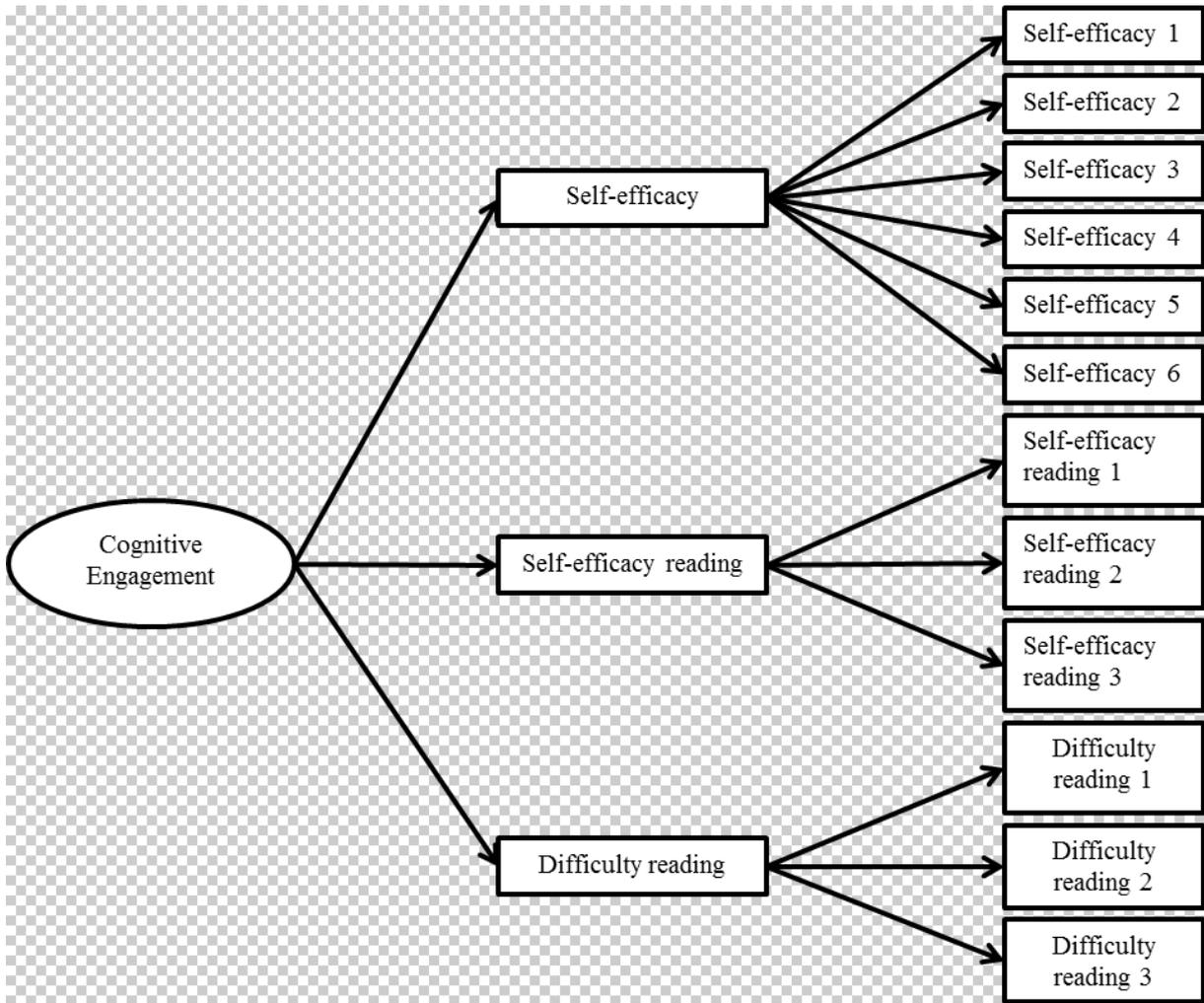


Figure 2: Cognitive engagement

□

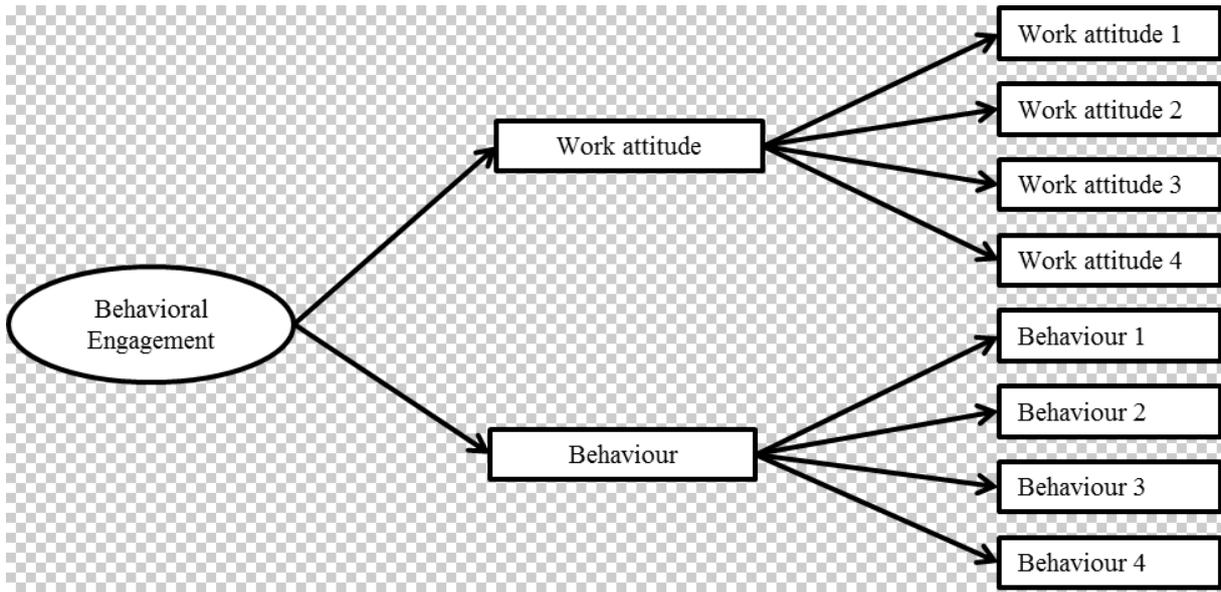


Figure 3 Behavioural engagement

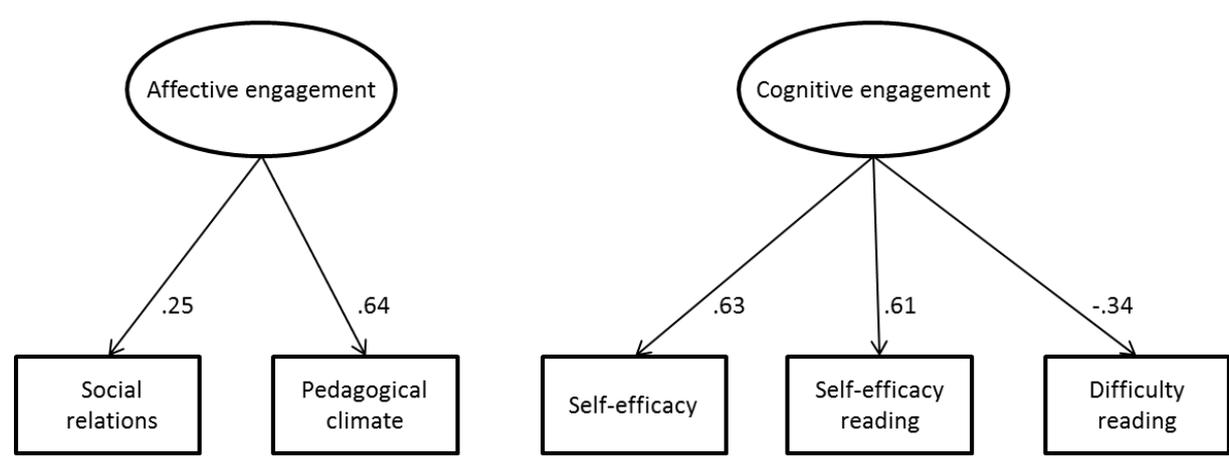


Figure 4. Structural model students' school engagement group 1 (student data).

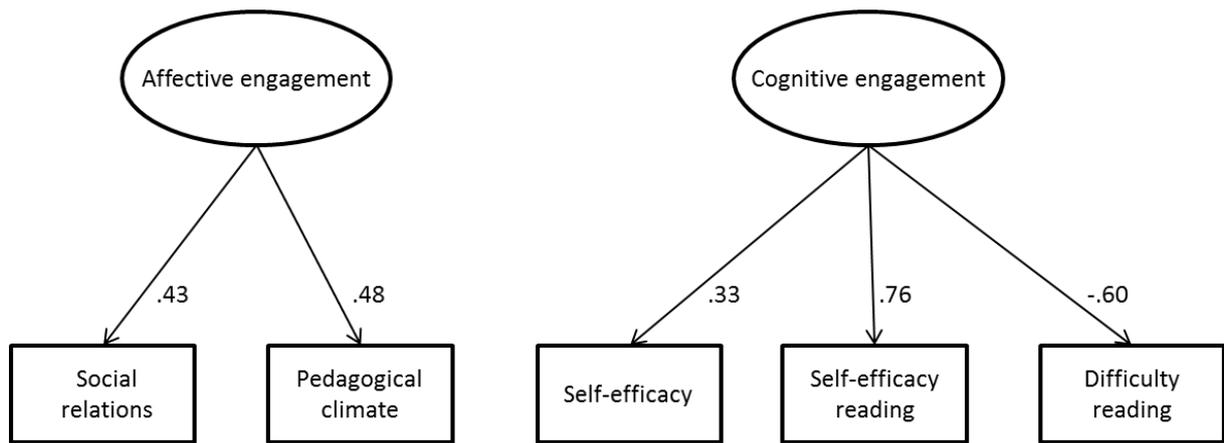
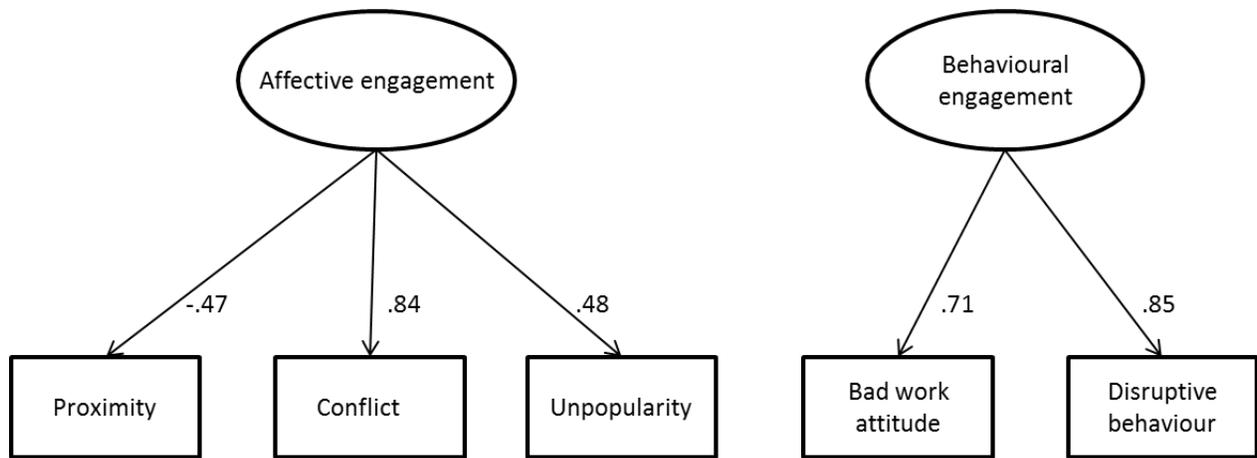


Figure 5. Structural model students' school engagement group 2 (student data).

Figure(s) 6



Figure(s) 7

