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Student engagement and its relationship with early high school dropout

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Abstract

Although the concept of school engagement figures prominently in most school dropout theories, there has been little empirical research conducted on its nature and course and, more importantly, the association with dropout. Information on the natural development of school engagement would greatly benefit those interested in preventing student alienation during adolescence. Using a longitudinal sample of 11,827 French-Canadian high school students, we tested behavioral, affective, cognitive indices of engagement both separately and as a global construct. We then assessed their contribution as prospective predictors of school dropout using factor analysis and structural equation modeling. Global engagement reliably predicted school dropout. Among its three specific dimensions, only behavioral engagement made a significant contribution in the prediction equation. Our findings confirm the robustness of the overall multidimensional construct of school engagement, which reflects both cognitive and psychosocial characteristics, and underscore the importance attributed to basic participation and compliance issues in reliably estimating risk of not completing basic schooling during adolescence.

Keywords: School engagement; Achievement motivation; Involvement; Commitment; Participation; School dropout

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Limited achievement and academic attainment represent two important consequences of growing up poor (Entwisle, Alexander, & Olson, 2005; Pagani, Boulerice, Vitaro, & Tremblay, 1999). More than ever, younger generations need a basic education in order to successfully participate in the demanding labour force that awaits them (Heckman, 2006). Those not earning a high school diploma face a life-course of underemployment and its correlates, which, for many perpetuates their economically disadvantaged origins (Rumberger & Lamb, 2003). Aiming to circumvent student dropout and ultimately reduce the intergenerational cycle of poverty, researchers and clinicians have increasingly become interested in studying the nature and course of its putative mechanisms.

The construct of engagement is central to most theories of school dropout (Finn, 1989; Tinto, 1975). The present study aims to develop and examine the predictive value and multidimensional nature of student engagement. We test the contribution of its specific components in predicting student dropout. Our hope is to generate knowledge that will help orient the development of educational practices which promote success in high school (Christenson & Thurlow, 2004).

Engagement in theories of school dropout

The construct of student engagement originates in part from Social Control Theory (Hirshi, 1969) which places a great deal of emphasis on individual feelings of attachment and belongingness to social institutions. Youthful antisocial behavior is viewed as a breakdown of the bonds between the individual and society. Likewise, disengagement could result from a weakened relationship between the individual and educational institutions. The bonds in Social Control Theory are characterized by commitment, beliefs, attachment, and engagement. These theoretical elements have greatly influenced conceptualizations of student engagement in recent theories of dropout.

In Tinto's (1975) mediation model, school dropout represents an ongoing and unfolding process. From the time students enter school, they interact within its academic and social system. Individual and family background characteristics contribute to their commitment toward this institution and its academic goals. Individual commitments to specific academic goals directly influence involvement in school-related tasks and activities. In turn, commitment to school influences the time invested toward this institution. Taken together, goals and institutional commitments set the course of student engagement from school entry onward. These two characteristics and their evolution are believed to influence a youngster's academic and social experience at school and, in unfavourable conditions, can eventually play a role in the decision to leave the system altogether.

Finn's (1989) participation-identification model of school withdrawal also considers the construct of student engagement. In this model, engagement is defined by identification and participation at school. Identification refers to a sense of belongingness and the perceived worth of schooling. Participation comprises four distinct components that range from minimum to maximum engagement. These are responsiveness to requirements, participation in class-related initiatives and extracurricular activities, and decision-making. We expect students to identify more with school as they increase their participation. Conversely, low or absent participation, predicts gradual disengagement and eventual school withdrawal.

In their dropout prevention model, Wehlage, Rutter, Smith, Lesko, and Fernandez (1989) introduce concepts of educational engagement and school membership as intermediate steps that contribute to individual and social development in school. Educational engagement favors student effort and promotes personal academic success. Membership is successfully reached when students generate social bonds with peers or adult authorities in the school context. From this perspective, students who fail to achieve these two goals present higher risks of dropping out.

Finally, in Rumberger and Larson's (1998) model, engagement is distinguished by two components, social and academic, which contribute to academic adjustment. Social engagement is defined by behaviors such as class attendance, rule compliance, and active participation in school-related activities and venues. Academic engagement includes student attitudes toward school and the ability to meet performance expectations. For this model, both types of engagement are essential for understanding the process that underlies school dropout.

Two major similarities emerge between the aforementioned conceptualizations. First, they conceive engagement as a process that evolves over the course of the school experience. Second, they underscore the importance of behavioral and motivational aspects of engagement. Behavioral and motivational dimensions of engagement seem more obvious in three of the models. As an exception, these aspects are less clearly established in Tinto's model, given that goal and institutional commitment are both considered to be motivational processes. Institutional commitment, as it is defined, could also represent what the other models view as behavioral engagement. Through concepts of participation-identification, educational engagement, membership, and social and academic engagement, we can conclude that both behaviors and attitudes are equally important in the hypothetical process that leads to school dropout.

Toward a framework of school engagement

Even if similarities exist in the theoretical understanding of student engagement, conceptualizations remain fragmented and untested. As highlighted in literature reviews (Fredricks, Blumenfeld, & Paris, 2004; Libbey, 2004), authors refer to it in various ways as school bonding and connectedness (Eggert, Thompson, Herting, Nicholas, & Dickers, 1994; Jenkins, 1997), attachment (Gottfredson, Fink, & Graham, 1994), belongingness (OECD, 2003), involvement (Caspi, Entner, Moffitt, & Silva, 1998; Finn, 1989), and commitment (Janosz, LeBlanc, Boulerice, & Tremblay, 1997).

Some authors have recently proposed a more integrated definition of student using multiple dimensions student engagement (Appleton, Christenson, Kim, & Reschly, 2006; Fredricks et al., 2004; Jimerson, Campos, & Greif, 2003). A primary advantage of such multidimensionality is that the concept addresses central and related facets of human development (i.e., behaviors, affect, and cognition). Another advantage clearly concerns prescriptions for prevention and intervention strategies (Christenson & Thurlow, 2004). In this paper, we adopt the comprehensive definition advanced by Fredricks et al. (2004). According to their perspective, student engagement encompasses behavioral, affective, and cognitive dimensions.

Behavioral engagement refers to student conduct that is beneficial to psychosocial adjustment and achievement at school. This dimension can be divided into three main axes: positive

behaviors, involvement in school-related tasks, and participation in extracurricular activities (Fredricks et al., 2004). Behaviors defining all three axes range on a continuum and may be positive and negative. For the positive behavior axis, school attendance vs. skipping class and compliance with rules vs. oppositional behavior and represent good examples along the engagement/disengagement continuum (Costenbader & Markson, 1998). When it comes to involvement in school-related tasks, behaviors could be addressed as to whether and to what extent students do their homework and participate in classroom-related work and discussions (Posner & Vandell, 1999; Tymms & Fitz-Gibbon, 1992). Finally, studies that focus on participation in extracurricular activities generally address their frequency of participation (Mahoney & Cairns, 1997).

The affective dimension of engagement refers to feelings, interests, perceptions, and attitudes toward school. Researchers have operationalized this variable using perceptions of belongingness (Goodenow, 1993), the perceived benefits and value of education (Eccles, Wigfield, Harold, & Blumenfeld, 1993), and specific importance of school in helping students reach specific goals (Bouffard & Couture, 2003; Watt, 2004). Most of these concepts can be treated more generally or specifically (i.e., according to different subject matter), depending upon the research question.

Cognitive engagement addresses two variables that might affect achievement and psychosocial adjustment. These are student psychological investment in learning and the use of self-regulation strategies by students. Cognitive investment in learning covers perceptions of competency, willingness to engage in learning activities and engage in effortful learning, and establishing task-oriented goals (i.e., performance, mastery, and performance-avoidance goals; DeBacker & Nelson, 2000). Self-regulation strategies focus on specific learning tools such as memorization, task planning, and self-monitoring (Ablard & Lipschultz, 1998).

Important considerations in the study of school engagement

As underscored by Appleton et al. (2006), despite the recent efforts consolidate the concept of student engagement, the theoretical and practical overlap between this multidimensional construct and the motivational literature remains obvious. Nevertheless, when conceptualized as having multiple dimensions beyond goal-directed issues, school engagement derives its relevance in its own right, especially given the complexity of school dropout. For example, Janosz, LeBlanc, Boulerice, and Tremblay (2000) prospectively tested a typology of school dropout with 1582 Montreal high school students from an urban disadvantaged setting. They were followed from early adolescence onward. A third ($n = 507$) did not complete high school by age 22. Surprisingly, they found that 40% of high school dropouts had previously reported high levels of school motivation. These were referred to as *quiet* dropouts. Surprisingly, individuals following this life-course also showed similar, and sometimes even better, behavioral and psychological profiles than the average graduate. Another 40% (*maladjusted* dropouts) experienced severe levels of school and psychosocial difficulties. Two other interesting life-course patterns also emerged with the remainder of the dropouts: The *disengaged* dropout (10%), a strongly unmotivated student with few socio-emotional difficulties and average grades; and the *low-achiever* dropout (10%), who is typically unmotivated with a school experience of failure yet not showing any externalizing problem behaviors.

The multiconceptual approach we favor in this study integrates several motivational concepts (e.g., value and interest attributed to school and its academic goals) while also considering behavior as an important indicator of student engagement/disengagement and dropping out. Since behavior is more easily measurable than motivation, it remains very useful for identifying at-risk students. Furthermore, given that students are expected to disengage first psychologically and then behaviorally (Eccles, 2004), the multidimensional construct of engagement could represent an effective way to tap different but related levels of student risk. We favor a multidimensional approach that covers both motivational and psychosocial characteristics. As such, the evolution of the school experience of the individual can be addressed as a whole. We can also potentially address whether there are distinct affective, cognitive, and behavioral needs that influence whether students stay in school or not. The natural evolution and course of student engagement and its relationship with school dropout has yet to be viewed from a process standpoint. A better developmental understanding of its complexity will not only help advance theory but also help clinicians, teachers, and parents keep students from prematurely withdrawing from basic schooling.

Objective

Theoretical and empirical findings indicate that dropout represents a complex and gradual process of diminishing school engagement (Ensminger, Lamkin, & Jacobson, 1996; Finn, 1989). This requires an integrative approach to capture the nature and course of its complexity (Elder, 1995). School transitions are often challenging (Eccles, Barber, Stone, & Hunt, 2003) and dropout often occurs before 10th grade. As such, the developmental period leading up to this life-course turning point might be helpful in the study of engagement.

Using the conceptualization offered by Fredricks et al. (2004), this study aims to examine behavioral, affective, cognitive indices of engagement both separately and as a global construct. Next, we test the contribution of global engagement and its components as prospective predictors of school dropout. We expect that student low engagement will predict school dropout. Because students disengage first psychologically and then behaviorally (Eccles, 2004), we expect that the behavioral component will more reliably predict dropping out because of its proximity to the outcome.

Method

Participants and procedure

Consent forms were sent to parents and obtained for 77.4% of candidates for this study. Participants were 11,827 seventh to ninth graders (corresponding to 12 to 16-year-olds, 44.6% boys) from 69 high schools in the French-Canadian province of Quebec, Canada. The average participant age was 13.1 years (SD = 0.97). Assessments took place in the spring of 2003 when teachers distributed questionnaires to students in their classes with the assistance of trained graduate students.

Our sample is mostly homogeneous in terms of ethnicity but remains representative of the province. Most participants were born in Quebec (89.2%), with the remainder born in another Canadian province (4.9%) or in another country (5.9%). About two-thirds of participants (69.3%)

lived with two parents, 20.3% lived with their mother or their father (4.5%), and the remainder lived in shared custody (4.6%) or in various other family arrangements (1.2%).

Measures

School engagement

As reported in Table 1, 18 self-report items were used to measure overall student engagement from the beginning of the school year. These items were hypothesized to reflect six first-order latent concepts that represent three dimensions of engagement that would further converge into one global engagement construct. Behavioral engagement, which assesses school attendance and compliance with rules (e.g., "Have you disrupted the class on purpose?"), was assessed using four negatively recoded items on a four-point Likert scale (never to quite often). Affective and cognitive engagement were both measured using a seven-point Likert scale (which ranged from strongly agree to strongly disagree). The seven-item affective dimension assessed student enjoyment and their level of interest in school-related challenges and tasks (e.g., "Do you like school?"). The seven-item cognitive dimension assessed student willingness to learn language arts (French) and mathematics (e.g., "How much effort are you ready to spend in mathematics?"). All original items comprising the behavioral engagement dimension were transformed into

Table 1
Items measuring the first-order latent concepts related to student engagement.

Items	
Behavioral engagement	
School attendance	1. Missed school without a valid reason.
	2. Skipped a class while you were at school.
Discipline	3. Disrupted the class on purpose.
	4. Been rude to your teacher.
Affective engagement	
Liking school	5. I like school.
	6. I have fun at school.
	7. What we learn in class is interesting.
	8. I enjoy what we do at school.
Interest in school work	9. I am happy when the work is quite challenging.
	10. Often, I do not want to stop working at the end of a class.
	11. I am very happy when I learn something new that makes sense.
Cognitive engagement	
Willingness to learn French languages arts	12. How much time are you ready to spend in French?
	13. How much effort are you ready to put into French?
	14. How much energy are you willing to put into French?
Willingness to learn mathematics	15. How much effort are you willing to spend in mathematics?
	16. How much time are you ready to spend in mathematics?
	17. I would like to do/learn more than what we are actually doing/learning in mathematics class?
	18. I can easily spend a lot of time on mathematics problem.

z-scores before conducting the analysis to minimize any potential variance and distribution problems caused by the limited item-response constraints (Gorsuch, 1983).

School dropout

Information on school registration status was obtained through official records on an annual basis. Students who never obtained a high school diploma and who were no longer enrolled at school in the province of Quebec by the end of September 2005 (i.e., 2 years after data collection) were identified as school dropouts. Out of the 11,827 students, 404 students (3.4%) were identified as dropouts.

Maternal education

Students were asked to indicate their mother's highest level of schooling (1 = primary school, 2 = seventh grade, 3 = eighth grade, …, 8 = university).

Course retention

Information on class retention in secondary school was reported by students (e.g., "Have you ever failed a secondary school course, but not had to repeat your entire year?").

Data analytic strategy

We first generated descriptive statistics and correlations for all studied variables. Next, Explanatory Factor Analyses (EFAs) with Promax rotation were conducted in Mplus using the 18 engagement items (Muthén & Muthén, 2005). Based on theory, Scree plots, and eigenvalues, we identified several candidate psychometric models. These models were then subjected to first-order Confirmatory Factor Analysis (CFA). We subsequently compared the fit for each model. Factor loadings were fixed arbitrarily at one unit for each first variable. The other factor loadings and the variance of all latent constructs were left to vary. Given the non-normal distribution of most of the scales in our data, maximum likelihood mean-adjusted estimators for non-normal distributions were used (Muthén & Muthén, 2005).

Once the first-order model was established, we then tested second and third-order models that were hypothesized to represent the specific dimensions and the global construct of engagement. Multiple group invariance of the final model was also tested for boys and girls. Using five hierarchically nested steps, we determined: (1) a baseline model for each group, (2) configural invariance, (3) invariance of first-order factor loadings, (4) invariance of first and second-order factor loadings, and (5) invariance of first and second-order factor loadings, measured variables, and first-order intercepts (for technical details, see Byrne & Stewart, 2006; Chen, Sousa, & West, 2005). For model identification, we constrained the mean of the second and third-order factors from the baseline model to zero.

Finally, we conducted two separate Structural Equation Models (SEMs). The first model aims to verify the prospective link between student global engagement and school dropout over 2 year period. To this end, we used the third-order construct of engagement obtained from our final CFA. The second SEM prospectively tested the predictive links between the behavioral, affective, and cognitive second-order components of student engagement and dropout.

As recommended by Hu and Bentler (1999), we compared different parameters in order to evaluate the EFA, CFA, and SEM model fit: Comparative Fit Index (CFI); Tucker–Lewis Index

(TLI); Root Mean Square Error of Approximation (RMSEA); Standardized Root Square Mean Residual (SRMR); and the χ^2/df Ratio. We chose to rely on the indices that are less sensitive to sample size (TLI, RMSEA; Sharma, Mukherjee, Kumar, & Dillon, 2005). Further, because SRMR is not available for SEM categorical outcome testing in Mplus, this model specification index was only used to evaluate the measurement model. Although values of 0.06 or less are considered an adequate fit for SRMR and RMSEA (MacCallum, Browne, & Sugawara, 1996), values of 0.05 or less represent a more conservative choice. A value of 0.95 and above is considered an excellent fit for CFI and TLI. Also, a 3.0 value or less represents the best ratio for χ^2/df (Bentler & Bonett, 1980). To compare CFA models with a different number of factors, we also used Akaike Information Criterion (AIC; Akaike, 1987), Bayesian Information Criterion (BIC: Schwartz, 1978), and Sample-Size Adjusted Bayesian Information Criterion (ABIC; Sclove, 1987). A better fit is indicated when absolute values of these indices become smaller. However, it is preferable to rely on the BIC and ABIC rather than the AIC because they usually select more parsimonious models. Finally, adequacy of factor loadings and Cronbach's alpha coefficients were examined for both models. Although factor loadings exceeding 0.40 are considered acceptable (Hair, Anderson, Tatham, & Black, 1998), we chose to adopt a more conservative standard of 0.50.

Results

The multidimensionality of student engagement

Table 2 reports correlations between the 18 items included in the psychometric model, as well as their means and standard deviations. Inter-item correlations were all positive and significant ($P < 0.001$). According to the criteria of Cohen (1988), they were ranging from small (0.06) to large in size (0.85), with most being of moderate size (mean of 0.29).

The EFA of the 18-item version identified the most plausible models based on the Scree plot. As illustrated in Fig. 1, these models were composed of three, four, and six factors. We also chose to select the five-factor model because of its location prior to the inflexion of the curve on the Scree plot. The three and four-factor models were the only ones with all eigenvalues greater than 1 (for the five and six-factors models, the final eigenvalues were 0.972 and 0.963, respectively). We relied on this test to select our best fitting models because the results of the Scree test are more reliable than eigenvalues with larger sample sizes (Gorsuch, 1983). Item factor loadings in all models were quite high (greater than 0.55); however, three factor loadings did not reach 0.40 (items 11, 17, and 18). These items were thus removed.

With the remaining 15-items, we conducted separate CFAs to force them into three, four, five, and six-factor models.[1] Table 3 reports the fit indices of these four models. None of the χ^2/df ratios reached the value of 3; however, considering that χ^2 is very sensitive to sample size, we decided not to rely on this fit to select our best model. The BIC, ABIC, and AIC consistently

[1] Distribution of items for the three (factor 1: 1, 2, 3, 4; factor 2: 5, 6, 7, 8, 9, 10; factor 3: 12, 13, 14, 15, 16), four (factor 1: 1, 2, 3, 4; factor 2: 5, 6, 7, 8, 9, 10; factor 3: 12, 13, 14; factor 4: 15, 16), five (factor 1: 1, 2, 3, 4; factor 2: 5, 6, 7, 8; factor 3: 9, 10; factor 4: 12, 13, 14; factor 5: 15, 16), and six-factor models (factor 1: 1, 2; factor 2: 3, 4; factor 3: 5, 6, 7, 8; factor 4: 9, 10; factor 5: 12, 13, 14; factor 6: 15, 16).

Table 2
Inter-correlations and descriptive statistics of the different items measuring student engagement.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Missed school without a valid reason.																		
2. Skipped a class while you were at school.	0.40																	
3. Disrupted the class on purpose.	0.21	0.20																
4. Been rude to your teacher.	0.29	0.25	0.48															
5. I like school.	0.18	0.13	0.20	0.21														
6. I have fun at school.	0.15	0.09	0.14	0.17	0.72													
7. What we learn in class is interesting.	0.17	0.12	0.20	0.23	0.61	0.56												
8. I enjoy what we do at school.	0.19	0.15	0.22	0.25	0.62	0.59	0.58											
9. I am happy when the work is quite challenging.	0.10	0.08	0.09	0.12	0.36	0.31	0.38	0.29										
10. Often, I do not want to stop working at the end of a class.	0.11	0.07	0.13	0.13	0.37	0.32	0.38	0.30	0.41									
11. I am very happy when I learn something new that makes sense.	0.12	0.08	0.14	0.16	0.44	0.38	0.45	0.38	0.40	0.37								
12. How much time are you ready to spend in French?	0.15	0.10	0.19	0.15	0.36	0.31	0.42	0.32	0.27	0.26	0.31							
13. How much effort are you ready to put into French?	0.15	0.10	0.19	0.16	0.37	0.33	0.42	0.33	0.27	0.26	0.33	0.79						
14. How much energy are you willing to put into French?	0.16	0.10	0.19	0.16	0.38	0.34	0.45	0.33	0.29	0.27	0.35	0.78	0.85					
15. How much effort are you willing to spend in mathematics?	0.14	0.10	0.16	0.14	0.33	0.29	0.33	0.31	0.27	0.21	0.33	0.43	0.44	0.43				
16. How much time are you ready to spend in mathematics?	0.15	0.10	0.16	0.15	0.36	0.31	0.36	0.32	0.31	0.26	0.37	0.47	0.48	0.47	0.72			
17. I would like to do/learn more than what we are actually doing/ learning in mathematics class?	0.13	0.09	0.12	0.15	0.38	0.34	0.40	0.33	0.42	0.32	0.43	0.28	0.30	0.31	0.46	0.51		
18. I can easily spend a lot of time on mathematics problem.	0.09	0.06	0.12	0.09	0.27	0.22	0.24	0.22	0.20	0.18	0.25	0.23	0.24	0.23	0.34	0.43	0.30	
Mean	2.62	2.74	2.34	2.43	3.88	4.24	3.8	4.01	3.63	2.75	5.05	4.93	5.23	5.00	5.81	5.44	4.51	4.17
S.D.	0.64	0.55	0.81	0.75	1.82	1.67	1.62	1.42	1.83	1.85	1.63	1.55	1.54	1.62	1.33	1.47	1.71	1.64

All correlations are significant at $P < 0.001$.

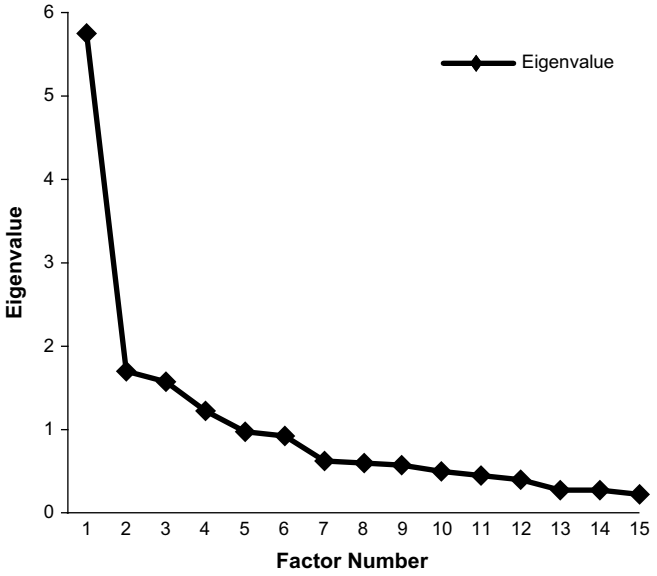

Fig. 1. EFA Scree plot of the 18 items.

decreased as the number of factors increased; whereas, only the five and six-factor models reached the ideal fit level of 0.95 for CFI and TLI and 0.5 for RMSEA and SRMR. Consequently, we next compared factor loadings of these two models. They were all higher in the six-factor structure (Table 4). More specifically, factor loadings of items 1 and 2 were higher in this model (respectively, 0.57 and 0.66) than in the five-factor model (respectively, 0.38 and 0.43). Furthermore, the item distribution in the six-factor model showed adequate internal consistency (Table 5). For all these reasons and considering that this model corresponds to our initial theoretical structure (Table 1), we selected it as the best first-order model.

We subsequently tested a second-order model measuring the behavioral, affective, and cognitive dimensions of engagement. This model was based on the six concepts previously identified. As expected, this model resulted in a good fit solution index (CFI = 0.98; TLI = 0.97; RMSEA = 0.05; SRMR = 0.02; χ^2/df = 13.17) which confirmed the presence of behavioral, affective, and cognitive dimensions of engagement. Factor loadings for this second level structure were salient (reported in second column of Table 4), as they were all above 0.70 and ranged as high as

Table 3
Fit indices for the CFA models.

Model	CFI	TLI	RMSEA	SRMR	BIC	ABIC	AIC	χ^2/df
1. Three-factor	0.870	0.845	0.089	0.066	429207	429045	428835	38.34
2. Four-factor	0.946	0.933	0.058	0.042	423038	422866	422644	87.78
3. Five-factor	0.967	0.957	0.047	0.032	421375	421191	420951	24.88
4. Six-factor	0.979	0.963	0.038	0.025	420406	420205	419945	16.84

CFI, Comparative Fit Index; RMSEA, Root Mean Square Error of Approximation; SRMR, Standardized Root Square Mean Residual; BIC, Bayesian Information Criterion; ABIC, Sample-Size Adjusted Bayesian Information Criterion; AIC, Akaike Information Criterion.

Table 4
Factor loadings of the first and second-order CFA models.

	First-order CFA 15-item model	Second-order CFA
Behavioral engagement		
School attendance – during this school year, how many times have you:		0.86
1. Missed school without a valid reason.	0.57	
2. Skipped a class while you were at school.	0.66	
Discipline – during this school year, how many times have you:		0.85
3. Disrupted the class on purpose.	0.63	
4. Been rude to your teacher.	0.77	
Affective engagement		
Liking school		0.71
5. I like school.	0.82	
6. I have fun at school.	0.79	
7. What we learn in class is interesting.	0.71	
8. I enjoy what we do at school.	0.72	
Interest in school work		0.79
9. I am happy when the work is quite challenging.	0.59	
10. Often, I do not want to stop working at the end of a class.	0.56	
11. I am very happy when I learn something new that makes sense.	–	
Cognitive engagement		
Willingness to learn French languages arts		0.81
12. How much time are you ready to spend in French?	0.80	
13. How much effort are you ready to put into French?	0.88	
14. How much energy are you willing to put into French?	0.88	
Willingness to learn mathematics		0.83
15. How much effort are you willing to spend in mathematics?	0.80	
16. How much time are you ready to spend in mathematics?	0.86	
17. I would like to do/learn more than what we are actually doing/learning in mathematics class?	–	
18. I can easily spend a lot of time on mathematics problem.	–	

$N = 11{,}827$.

0.86. Internal consistency estimates also support the adequacy of this second level structure. The coefficients, reported in Table 5, are satisfactory for all three dimensions: behavioral ($\alpha = 0.65$), affective ($\alpha = 0.83$), and cognitive ($\alpha = 0.88$).

We combined our first and second-order models together and further tested the global construct of engagement. Overall, this last model indicated an excellent fit for all indices (CFI = 0.97; TLI = 0.98; RMSEA = 0.04; SRMR = 0.03; $\chi^2/df = 11.81$). This is illustrated in Fig. 2. Factor loadings assessing relationships between measured variables, first and second sets of the latent concept, and the global measure of engagement were all very adequate. With coefficients varying from 0.62 to 0.84, all factor loadings appear especially high. As expected, the behavioral (0.62), affective (0.92), and cognitive (0.84) dimensions all seem to converge into one major construct. Given its positively skewed distribution, the proportion of variance

Table 5
Number of items and internal consistency of the first and second-order models.

	Items	Internal consistency
Behavioral engagement	4	0.65
School attendance – during this school year, how many times have you: Missed school without a valid reason. Skipped a class while you were at school.	2	0.60
Discipline – during this school year, how many times have you: Disrupted the class on purpose. Been rude to your teacher.	2	0.66
Affective engagement	6	0.83
Liking school I like school. I have fun at school. What we learn in class is interesting. I enjoy what we do at school.	4	0.86
Interest in school work I am happy when the work is quite challenging. Often, I do not want to stop working at the end of a class.	2	0.65
Cognitive engagement	5	0.88
Willingness to learn French languages arts How much time are you ready to spend in French? How much effort are you ready to put into French? How much energy are you willing to put into French?	3	0.93
Willingness to learn mathematics How much effort are you willing to spend in mathematics? How much time are you ready to spend in mathematics?	2	0.84

$N = 11{,}827$.

explained by the behavioral dimension ($R^2 = 0.32$) is significantly smaller than that explained by the affective ($R^2 = 0.84$) and cognitive ($R^2 = 0.70$) dimensions.

Invariance across gender

In terms of the baseline models, results revealed an excellent data fit for both boys (χ^2 (96) = 8239.481; CFI = 0.982; SRMR = 0.024; RMSEA = 0.036, with 90% CI = 0.034 to 0.038) and girls (χ^2 (96) = 1119.371; CFI = 0.981; SRMR = 0.025; RMSEA = 0.037, with 90% CI = 0.035 to 0.039). These parameters were all statistically significant. Table 6 reports the results of factorial invariance testing. Only the final step indicated a small but significant variation of the chi-square as a change of the CFI (0.019).[2] This change indicates that the measured variables and

[2] According to Cheung and Rensvold (2002), invariance is reached when changes on the CFI are no larger than 0.01 and when the χ^2 differences between the models' fit is not significant. However, considering that the χ^2 is very sensitive to sample size, we relied on the CFI change.

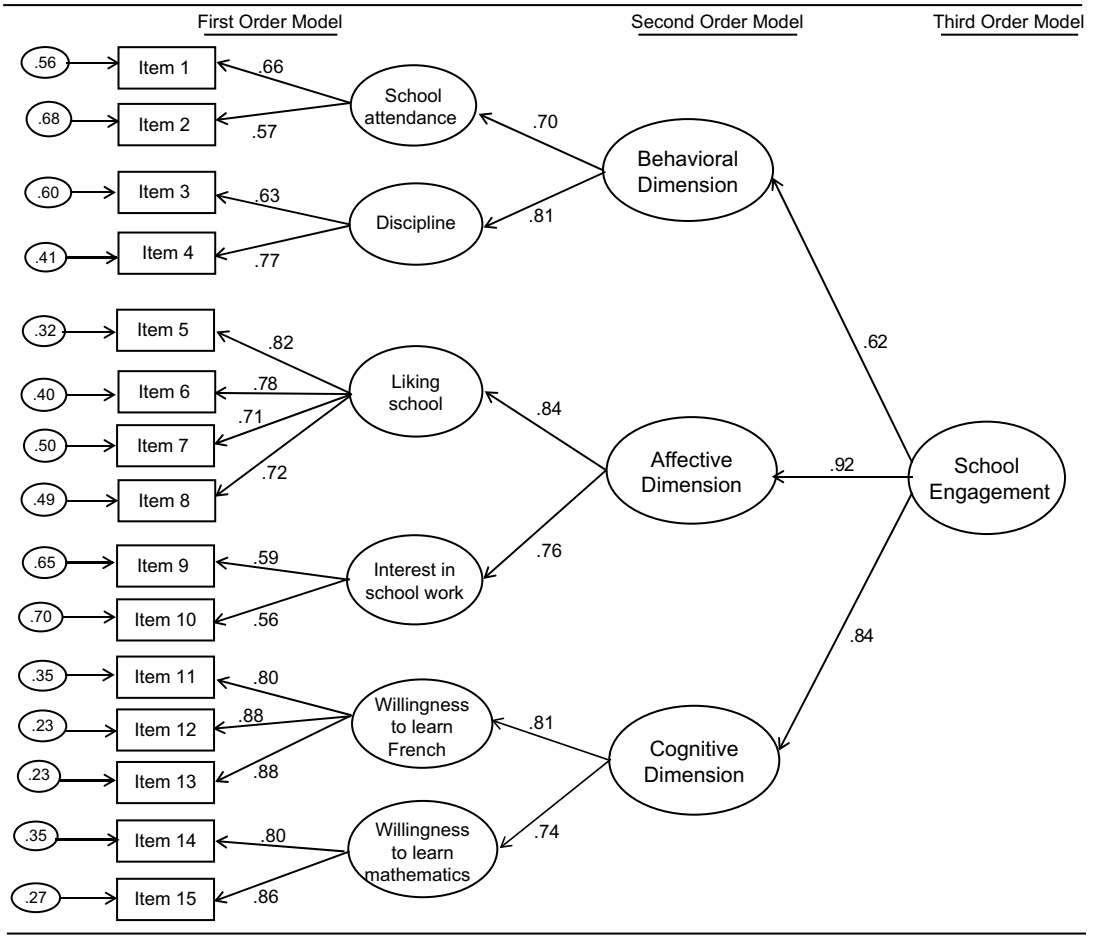

Fig. 2. Final measurement structure of school behavioral, affective, and cognitive engagement.

first-order intercept were not completely invariant for boys and girls. However, considering that all models presented excellent fit indices and that the first three steps provided evidence of invariance, we can conclude that this structure operates equivalently for both genders.

School engagement and dropout

In the second stage of our investigation, we prospectively tested two separate SEM models; one to verify the predictive links between student global engagement and dropout and the other to test the predictive links between the three second-order engagement dimensions and the same outcome. Theoretically significant covariates (i.e., age, course retention, maternal education) were included in both models. As recommended by MacCallum et al. (1996), the first step involved testing a saturated model which includes all possible paths from the covariates and the school engagement latent factor (global or specific) to the measured outcome of school dropout. Next, all non-significant paths were removed and the model was retested. Fig. 3

Table 6
Tests for invariance of the school engagement structure by gender: goodness-of-fit statistics.

Model	χ^2	df	CFI	RMSEA	SRMR	Model comparison	Δ*CFI	$\Delta\chi^2$	Δdf
Model 1: configural invariance	1999.180	162	0.981	0.040	0.026	–	–		
Model 2: invariance of first-order factor loadings	2041.207	171	0.981	0.039	0.027	2 vs. 1	0.000	42.027*	9
Model 3: invariance of first and second-order factor loadings	2176.661	177	0.979	0.040	0.033	3 vs. 2	0.002	135.454*	2
Model 4: invariance of first and second-order loadings, measured variables and first-order intercept	2437.334	192	0.960	0.053	0.052	4 vs. 3	0.021	260.673*	15

CFI, robust CFI; RMSEA, robust root mean squared error of approximation; SRMR, standardized root mean squared residual.
*$P < 0.001$.

illustrates final results of the first model predicting school dropout from the global construct of engagement. Once again, because of the sample size, the $\chi^2/df = 19.89$ was far from the ratio of 3. Furthermore, the CFI was close but did not reach the 0.95 ideal fit (CFI = 0.928). However, considering that overall, the other fit indices were adequate (TLI = 0.963; RMSEA = 0.040), confirming a good fit. As expected, school engagement predicted school dropout ($\beta = -0.15$, $P < 0.001$) beyond the contribution of the covariates. This model explained 12% of the variance in school dropout.

The second SEM structure also presented a good data fit (CFI = 0.934; TLI = 0.972; $\chi^2/df = 17.25$; RMSEA = 0.038). As expected and illustrated in Fig. 4, a decrease in behavioral

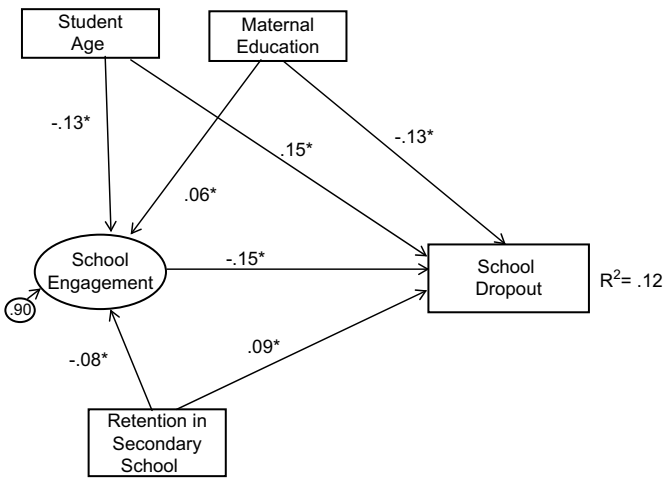

Fig. 3. Structural equation model of global school engagement to predict school dropout. Large circles represent latent factors and small circles with numbers reflect residual variances. *$P < 0.001$.

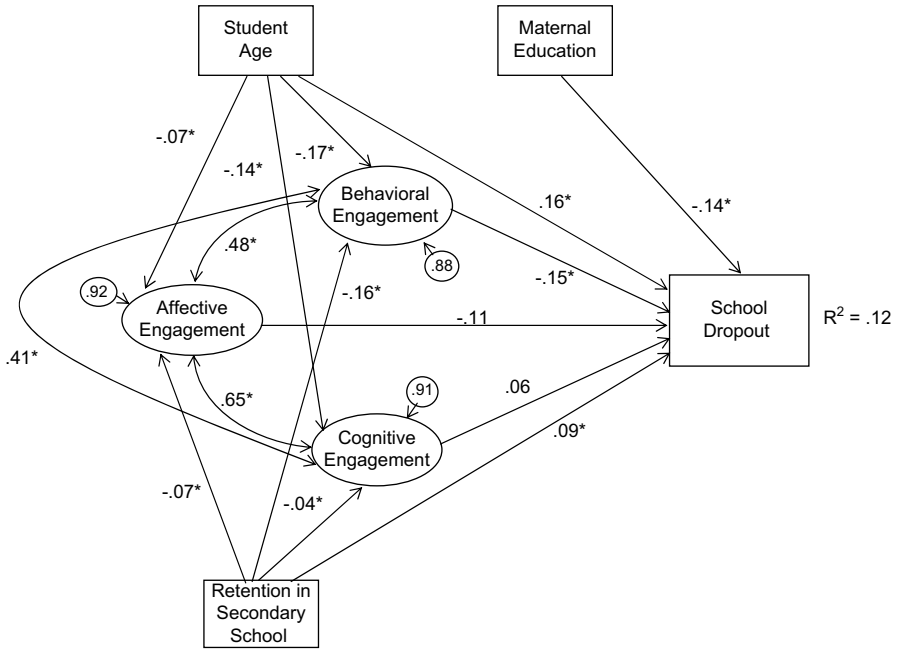

Fig. 4. Structural equation model of behavioral, affective, and cognitive engagement to predict school dropout. Large circles represent latent factors and small circles with numbers reflect residual variances. $^{*}P < 0.001$.

engagement significantly predicted school dropout ($\beta = -0.15$, $P < 0.001$). Affective and cognitive engagement were not directly associated with dropout, and the three dimensions of engagement were highly covariant, especially the affective and cognitive dimensions ($r = 0.65$, $P < 0.001$). This model also explains 12% of the variance in school dropout.

Discussion

The primary purpose of this study was to develop a reliable measure of student engagement. We then tested how this construct and its components related to eventual school dropout. Overall, our results support the use of a multidimensional framework of engagement in predicting student dropout. They also underscore the necessity to better understand how the individual factors comprising the construct of student engagement relate to each other both concurrently and over the long-term.

As expected, our first set of analyses modeled a multidimensional structure, built on six concepts that are closely related to the different facets of engagement: school attendance and discipline; liking school; interest in academic work; and willingness to learn language arts and mathematics. These concepts all represent important indicators of academic success (Alexander, Entwisle, & Kabbani, 2001; Janosz et al., 1997). In subsequent steps, these concepts converged into behavioral, affective, and cognitive components, and finally, into one global construct of engagement. Although invariance of this structure was only partially confirmed for boys and girls,

these variations were to be expected given that boys tend to be comparatively less engaged in many behavioral and emotional aspects of schooling (Wigfield & Eccles, 2002).

In keeping with previous research and theory (Ensminger et al., 1996; Finn, 1989), our results also indicated that, beyond the contribution of important individual and family risk factors, global student disengagement was associated with eventual dropout over the short term. When broken down into components, only the behavioral dimension predicted dropout. That is, student compliance and attendance forecasted dropout better than student willingness and effort to learn the basic curriculum and how much pleasure was associated with school-related issues. This finding is not surprising, as impoliteness, truancy, and absenteeism are all behaviors that express some degree of alienation from school (Battin-Pearson et al., 2000; Janosz et al., 1997; Newcomb, Abbott, & Catalano, 2002; Rumberger, 1995). Students are often sanctioned by school staff in response to these behaviors, and unfortunately, this contributes to further negative perceptions about investing in school. Eventually, school disengagement becomes expressed by dropout (Finn, 1989).

We found it surprising that affective and cognitive engagement did not matter in the prediction of eventual school dropout. Past research has suggested that all three dimensions are important in forecasting school dropout (Janosz et al., 1997). It is plausible that the specific influence of affective and cognitive engagement on student propensity to dropout prematurely might be mediated by behavioral engagement. Entwisle et al. (2005) observed that student disengagement can start as early as the first grade transition or at least a number of years before the actual interruption of schooling (Alexander et al., 2001; Entwisle et al., 2005; Rumberger, 1987; Vitaro, Brendgen, Larose, & Tremblay, 2005). Further longitudinal research is needed to examine any indirect influential role played by behavioral engagement in the hypothesized relationship between psychological engagement and dropout.

The concept of heterotypic continuity, whereby the same underlying latent factor manifests itself differently across development (Cicchetti & Rogosch, 2002), suggests that student disengagement likely has distinct dynamics as students progress across their school experience. In its initial stages, student disengagement might first be expressed by a psychological state; while later, as this negative emotional and cognitive state evolves, the nature of disengagement becomes more observable, and thus easier to reliably assess (Eccles, 2004). Decreases in school interest, motivation, and willingness to learn eventually lead to school alienation and misbehaviors. In other words, student effect and cognitions regarding school and learning-related variables influence behaviors, eventually culminating in the decision to dropout. Within the realm of this interpretation, our results are consistent with the idea that behavioral manifestations of student disengagement process are more proximal to dropout and are likely a consequence of affective and cognitive disengagement. Unfortunately, the concurrent nature of our engagement measures precludes a prospective approach to the differential influence of student affect, cognition, and behavior in the prediction of school dropout. A longer-term approach in data collection is thus needed to establish how these variables unfold and foretell dropout at a later age.

It is likely that the behavioral component accounted for the association between the inclusive engagement variable and dropout. This component is also easier to operationalize compared to the affective and cognitive components. Nevertheless, considering engagement as a composite variable might enable researchers to account for putative influential mechanisms that exist between its components. Even if our findings highlight the unique direct contribution of behavioral engagement in the prediction of student dropout, there remains a need to better understand

the longitudinal mechanisms underlying this outcome. As demonstrated previously (Alexander et al., 2001; Janosz et al., 1997), student effect and cognition act as important indicators of student alienation and this contribution, even if indirect, should not be neglected in our efforts to understand the problem. Yet, in order to do so, it might be more beneficial to treat engagement as a multidimensional experience. Attention to the developmentally specific roles of each dimension and their potential interactions in the school dropout prediction equation merits some attention.

Some limitations of this study bear mentioning. First, some of the children in our sample were not yet of legal age for dropout (age 16) when the dependent variable was measured. As such, the prevalence of this outcome in our sample was small and represents only the early withdrawers. The fact that our model explained a modest effect size with such a particular sample remains interesting. It leads us to believe that with a longer follow-up, the prediction might be stronger. One further limitation of this study relates to the measure of student engagement itself. Considering that various skills, behaviors, and attitudes are shaped at different life stages (Cunha, Heckman, Lochner, & Masterov, 2006), the dimensions of engagement might be dependent upon student age. As recounted by Cicchetti and Rogosch (2002), heterotypic continuity and change across development is expected. As we consider developmental constraints, it is likely that the way behavioral engagement is defined in this study is not representative of engagement during elementary school. Finally, there are compromises made with secondary analysis of existing data. Although our three dimensions of engagement are supported by theory, their operationalization is constrained by the data. For example, our cognitive dimension only reflected student psychological investment in learning, when, in principle, its conceptualization is also defined in terms of metacognition and self-regulation strategies (Fredricks et al., 2004). Consequently, it is possible that these concepts could be more associated with dropout than psychological investment in learning. Independently of these limitations, a definition of engagement based on few items remains advantageous as a cost-effective risk indicator of school dropout.

In summary, this study demonstrated that, beyond its theoretical contribution, the multidimensional construct of student engagement is indeed associated with school dropout. Student engagement can be defined by three specific dimensions: behavioral, affective, and cognitive. Globally, these dimensions somehow stand for the complexity of student experience. However, only the behavioral dimension seems to contribute to the estimation of school dropout. In order to understand the more indirect mechanisms underlying this outcome, future research should address the specific interactions between the dimensions of engagement over a longer follow-up period. Such efforts will contribute to meaningful knowledge that will enable tailored and differentiated prevention strategies that reduce dropout. The identification of students presenting greater behavioral, affective, and cognitive risks will help researchers to develop or improve realistic, cost-effective, and context-based prevention and intervention strategies one step further toward fostering successful development.

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