

Adolescent Behavioral, Emotional, and Cognitive Engagement Trajectories in School and Their Differential Relations to Educational Success

Ming-Te Wang and Jacquelynne S. Eccles
University of Michigan

The current study used a multidimensional approach to examine developmental trajectories of three dimension of school engagement (school participation, sense of school belonging, and self-regulated learning) from grades 7 to 11 and their relationships to changes in adolescents' academic outcomes over time. The sample includes 1,148 African American and European American adolescents (52% females, 56% black, 34% white, and 10% others). As expected, the downward trajectories of change in school participation, sense of belonging to school, and self-regulated learning differed as did their predictive relationships with academic performance and educational aspiration, with school belonging declining most markedly, but being least predictive of changes in grade point average.

There is much interest in school engagement—interest both in its developmental trajectories and its relations with other educational outcomes and processes (Marks, 2000; McDermott, Mordell, & Stolfus, 2001). However, to fully understand the role of engagement in school success, we need greater consensus on what engagement is. Fredricks, Blumenfeld, and Paris (2004) proposed that school engagement is a multidimensional construct composed of behavioral, emotional, and cognitive components. Drawing on work by Connell (1990), Furrer and Skinner (2003), Voelkl (1997) and Zimmerman (2000), they defined each of these components as follows: *Behavioral engagement* refers to participation in learning activities, including attentiveness, positive conduct, and school attendance. *Emotional engagement* refers to affective attitudes toward and identification with school and a sense of school belonging. *Cognitive engagement* refers to self-regulated approach to learning and use of meta cognitive strategies. These engagement indicators are considered particularly important for adolescents during the secondary school years because they correspond to the developmental needs of early adolescents for competency, autonomy, and relatedness in school (Fredricks et al., 2004).

Fredricks et al. (2004) posited that the patterns of engagement across these three dimensions have long-term effects on students' academic success

and stressed the need to assess the differentiated role of these three dimensions of school engagement. Researchers have identified positive correlations between school engagement and school success (Appleton, Christenson, Kim, & Reschly, 2006; Wang & Eccles, in press). For instance, students who adhere to the school rules, avoid disruptive behaviors, and feel personally accepted and respected by others get better grades and aspire for higher education (Akey, 2006; Wang, Selman, Dishion, & Stormshak, 2010; Wentzel, Battle, Russell, & Looney, 2010). Much of this research, however, has used a unidimensional measure of school engagement (Perry, Liu, & Pabian, 2010; Wang, Willett, & Eccles, 2011) and rarely considered the nature and course of its development (Skinner, Kinderman, & Furrer, 2010). To address these research gaps, we have two specific research goals: (1) to determine whether these three dimensions of school engagement display different developmental trajectories from 7th through 11th grades and (2) to investigate whether changes in the three dimensions of school engagement are related differentially to changes in academic achievement and educational aspirations.

We predict declines in the three dimensions of school engagement, but we expect the extent of these declines to vary. According to Stage-Environment Fit Theory (Eccles et al., 1993), students are most motivated, and experience the highest levels of well-being when school contexts meet their socio-emotional needs appropriately. On the contrary, the misfit between students' socio-emotional

This project was supported by a Pathway to Adulthood Fellowship to Ming-Te Wang. The authors thank John Willett, Margaret Rundle, and Amy Folwer for their feedback on the earlier version of this manuscript.

Requests for reprints should be sent to Ming-Te Wang, ISR 5110, 426 Thompson St., Ann Arbor, MI 48106. E-mail: wangmi@umich.edu

needs and their school environment could contribute to declines in interest, participation, and performance in learning as students transition into secondary school. Although secondary school students are characterized as a period in tremendous need of a sense of competence, autonomy, and social interaction, researchers suggest that current secondary school environments are not congruent with students' developmental needs (Wigfield, Eccles, Schiefele, Roeser, & Davis-Kean, 2006). The possible sources of misfit include limited opportunities for student autonomy and decision-making, less caring and supportive teacher-student relationships, and increases in teacher control, social comparison, and competition (Roeser, Eccles, & Sameroff, 1998; Wang, 2009). If this is true, then we should find evidence of average levels of declines in both behavioral and emotional engagement across the secondary school years, because these aspects of school engagement are directly linked to the processes and outcomes specified in Stage-Environment Fit Theory.

Although not directly addressed in Stage-Environment Fit Theory, we also investigate the nature of the declines in these three aspects of school engagement primarily because documenting differences in these developmental trajectories would provide evidence for the validity of the three distinct dimensions. We do not make strong predictions, but it seems likely that the declines in emotional engagement will be strongest because misfit is likely to be experienced first as an emotional reaction to changes in one's school context (Wang & Dishion, in press). In this perspective, behavioral disengagement should then follow in response to emotional discomfort (Wentzel, Battle, Russell, & Looney 2010). Predicting the course of change for cognitive engagement is less straightforward. Given that students' general ability to use meta-cognitive strategies should increase with cognitive maturation (Zimmerman, 2000), it is not clear whether students' reports of self-regulated learning will decline over the secondary school years. On the one hand, behavioral and emotional disengagement could lead to a decline in the students' motivation to be cognitively engaged in their academic work, particularly if they are doing very well in their classes (Wang & Holcombe, 2010). On the other hand, students' reports of meta-cognitive strategies to learning may increase because they are becoming increasingly able to use such strategies (Zimmerman, 2000).

In addition, we expect to find average level declines in academic performance and educational aspirations across these years given results from

other studies documenting such changes in the United States (Wigfield et al., 2006). However, most importantly, given the research on school disengagement, and on the Eccles' Expectancy-Value Model of Achievement-Related Behaviors, we predict that these declines will be directly related to declines in the three indicators of school engagement. If students become emotionally disengaged from school, they should come to value school less and have increased school absences and decreased effort on their academic subjects, both of which should lead to declines in academic performance and decreased interest in attending college (Eccles, 2009; Hughes, Luo, Kwok, & Loyd, 2009). Finally, decreased use of metacognitive strategies such as regulating their attention and effort and connecting new information to existing knowledge is likely to reduce the students' academic performance and educational aspiration (Eccles & Roeser, 2009). Exactly the opposite should occur for those students who have high behavioral, emotional, and cognitive engagement. These students should maintain high academic achievement and high educational aspirations for tertiary education.

METHOD

Sample

This study used data from the Maryland Adolescent Development in Context Study (MADICS) and the Study of Adolescents in Multiple Contexts (SAMC, see Cook, Herman, Phillips, & Setterson, 2002), which were designed to examine the influence of social contexts on adolescent development. Participants were recruited from 23 public middle schools in a single large county near Washington D.C. MADICS participants were originally part of SAMC and some of the data used in this study were drawn from SAMC. This study focused on three of the six waves of data: Wave 1 ($n = 1,148$), collected in 7th grade; Wave 3 ($n = 1,052$), collected in 9th grade; and Wave 4 ($n = 997$), collected in 11th grade. We did not use Wave 2 because it was a qualitative study of parental management strategies. Approximately 56% of the respondents were African American, 34% were European American, 10% were either biracial or other ethnic minorities; 52% were females. The sample of both African American and European American families is broadly representative of the full socioeconomic range with the mean pre-tax, family annual income between \$45,000 and \$49,999 (range: \$5,000 to >\$75,000); 86% of the primary caregivers were

employed, 54% were high school graduates, and 40% were college graduates. All students attended 2-year middle school for grades 7 and 8 and then 4 years of high school. Unlike many school districts, the middle schools and the high schools were approximately the same size at each grade level. The range in the racial composition of the middle and high schools were approximately the same. Waves 3 and 4 retained 89% and 82%, respectively, of the wave 1 sample. To ascertain whether the students who dropped out of the study in wave 3 ($n = 95$) and wave 4 ($n = 156$) differed from the students who participated in all three waves, we conducted a series of contingency table analyses and t -tests with all study variables at wave 1 and found no significant difference on any of the measures used in this study.

Measures

Academic achievement. Adolescents' grade point average (GPA) was our indicator of academic achievement. GPA is the average of grades in the English language, math, science, and social studies taken from school records for 7th and 9th grades and from student self-report for 11th grade. Letter grades were converted into a 5-point scale (A = 5, B = 4, C = 3, D = 2, Failing = 1).

Educational aspiration. Adolescents' self-reported educational aspiration was measured by one item commonly used in national surveys at 7th, 9th, and 11th grades: "If you could do exactly what you wanted, how far would you like to go in school?" This question was rated along a 9-point scale, ranging from 9th to 11th grade, graduate from high school, post-high school vocational or technical training, some college, graduate from a 2-year college with associates degree, graduate from a 4-year college, get a master's degree or a teaching credential, and get a law degree, a Ph.D., or a medical doctor's degree. Higher scores indicate higher level of educational aspiration.

School engagement. We developed measures for assessing adolescents' school engagement in 7th, 9th, and 11th grades from the existing scales in MADICS and SAMC. Prior research (Wang & Holcombe, 2010; Wang et al., 2011) has indicated that these scales have strong psychometric properties, including internal consistency, criterion-related validity, and measurement invariance across gender and race or ethnicity. All three assessments were scaled appropriately, so that the higher scores

indicate higher school engagement (see Table 1 for the internal consistencies for each scale).

School participation was our indicator of behavioral engagement at each wave. This construct was measured with six items based on the work of Elliott, Huizinga, and Menard (1989) in SAMC, including "Have you been sent to office?", "Have you had trouble getting homework done?", "Have you had trouble paying attention in classes?", "Have you been involved in a fight in school?", "Have you done risky things in school for kicks?", and "Have you disrupted the class?" Responses to each question on this scale were rated along a five-point scale, ranging from 1 (*almost never*) to 5 (*almost always*). Scores were then averaged across items to yield a total score at each wave.

School belonging was our indicator of emotional engagement at each wave. This construct measured adolescents' mean perceived sense of connectedness to school with five items developed for MADICS. Sample items were "In general, I like school a lot", "I feel like a real part in this school", "I feel happy and safe in this school", "I would recommend to other kids that they go to my current school", and "I feel close to people in this school." The item responses ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). A mean score was created by averaging across the items at each wave.

Self-regulated learning was our indicator of cognitive engagement at each wave. It is derived from four items measuring adolescents' use of meta cognitive strategies and self-regulated approach to learning developed for use in MADICS and SAMC (Eccles et al., 1993). Sample items were "How often do you try to relate what you are studying to other things you know about?", "How often do you try to plan what you have to do for homework before you get started?", "How often do you try to decide what you are supposed to learn, rather than just read the material when you are doing school work?", and "How often do you check your homework to make sure it's done correctly when you finish it?" Item responses for the scale ranged from 1 (*almost never*) to 5 (*almost always*). A mean score was created by averaging across the items at each wave.

Socio-demographic controls. Individual-level characteristics included adolescents' gender, ethnicity, socioeconomic status (SES), and prior academic ability (standardized test scores on the California Achievement Test). We standardized and added the parent's education, employment, and annual family income to create our SES score, ranging from 1 (*low*) to 10 (*high*) (Mean = 5.23, $SD = 0.72$,

TABLE 1
Means, Standard Deviations, Internal Consistency, and Zero-Order Correlations for School Engagement
and Academic Outcomes ($N = 1,148$)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
GPA (7)	1.00														
GPA (9)	0.78	1.00													
GPA (11)	0.48	0.39	1.00												
Educational aspiration (7)	0.24	0.24	0.17	1.00											
Educational aspiration (9)	0.32	0.33	0.22	0.56	1.00										
Educational aspiration (11)	0.30	0.24	0.33	0.41	0.41	1.00									
School participation (7)	0.32	0.31	0.20	0.18	0.19	0.15	1.00								
School participation (9)	0.35	0.39	0.19	0.19	0.20	0.18	0.40	1.00							
School participation (11)	0.22	0.25	0.28	0.16	0.16	0.15	0.28	0.26	1.00						
School belonging (7)	0.08	0.14	0.06	0.15	0.14	0.14	0.10	0.09	0.10	1.00					
School belonging (9)	0.13	0.12	0.08	0.12	0.16	0.20	0.09	0.17	0.09	0.26	1.00				
School belonging (11)	0.09	0.09	0.12	0.19	0.13	0.18	0.09	0.10	0.18	0.13	0.27	1.00			
Self-regulated learning (7)	0.22	0.20	0.12	0.26	0.23	0.16	0.09	0.08	0.08	0.18	0.15	0.09	1.00		
Self-regulated learning (9)	0.20	0.23	0.15	0.24	0.25	0.10	0.08	0.09	0.07	0.12	0.20	0.11	0.37	1.00	
Self-regulated learning (11)	0.18	0.15	0.19	0.20	0.18	0.23	0.14	0.07	0.08	0.11	0.16	0.22	0.25	0.38	1.00
Mean	3.72	3.64	3.13	7.42	7.22	6.56	3.84	3.32	3.03	3.70	3.25	3.02	3.54	3.36	3.27
Standard deviation	0.90	0.86	0.96	1.48	1.35	1.59	0.84	0.95	1.16	0.70	0.81	0.87	0.78	0.75	0.81
Internal consistency	0.89	0.87	0.87	–	–	–	0.77	0.75	0.76	0.76	0.74	0.77	0.87	0.85	0.88

Note. 7 = 7th grade, 9 = 9th grade, and 11 = 11th grade; all coefficients were $p < .01$; GPA = grade point average.

$\alpha = .79$). Four school-level covariates drawn from school records were included: school size, racial composition, teacher-student ratio (calculated by dividing the total number of students by the number of teachers at the school), and school SES (percentage of students receiving free or reduced-price meals). The school racial compositions were calculated with Simpson's (1949) index of diversity that accounts for both the relative proportion of each racial group in the school and the number of racial groups represented within the school. The value ranges from 0 to 1, with higher scores reflecting greater racial diversity. Scores in our study range from 0.35 to 0.56 (Mean = 0.47, $SD = 0.18$).

Data Analysis

We used multilevel modeling to estimate both changes in school engagement from grades 7–11 and the associations of these changes with changes in academic outcomes. All analyses were conducted using HLM (Bryk & Raudenbush, 1992), full information maximum likelihood estimation. As adolescents were observed on multiple occasions and nested in schools, a three-level model (time, individual, and school) was used. Adolescents' school engagement can be expressed as a linear function of adolescents' grade. The level 1 (within-person) models described individual change over time in the three dimensions of school engagement (Raudenbush & Bryk, 2002). The level

2 (between-person) models described how these individual changes differed by individual demographic characteristics (e.g., gender and ethnicity). To account for students nested in 23 schools, the level 3 (between-school) was included to take into account the school-level covariates (e.g., school size and racial composition) and produce correctly adjusted standard error in the model estimations.

RESULTS

Trajectories of Adolescent School Engagement

Table 1 provides the means, standard deviations, and correlations for all measures. As predicted, the means for each of the dimensions of school engagement declined from 7th through 11th grades, and the three dimensions of school engagement were positively related to adolescents' GPA and educational aspirations.

The results of the unconditional growth model in Table 2 suggest that, on average, adolescents' school participation, school belonging, and self-regulated learning declined between 7th and 11th grades, and that the rate of decline varied across the three dimensions of engagement (Figure 1). Finally, although not a focus of this study, both the associations of the initial levels and linear slopes of these three engagement constructs with our demographic covariates differed in magnitude and significance. These last two findings provide further support for

TABLE 2
Fixed Effects, Variance Components, and Fit Statistics for the Growth Models of School Participation, School Belonging, and Self-Regulated Learning (N = 1,148)

	School Participation		School Belonging		Self-Regulated Learning	
	Model 1a	Model 2a	Model 1b	Model 2b	Model 1c	Model 2c
<i>Fixed effects</i>						
For initial status						
Intercept	4.031*** (0.022)	4.019*** (0.102)	3.594*** (0.018)	3.520*** (0.093)	3.453*** (0.019)	3.361*** (0.118)
Male	–	–0.325*** (0.044)	–	–0.197* (0.039)	–	–0.203*** (0.034)
White	–	0.243*** (0.047)	–	–0.213*** (0.045)	–	0.184*** (0.050)
SES	–	0.129** (0.045)	–	0.119** (0.040)	–	0.085 (0.050)
Prior achievement	–	0.111*** (0.025)	–	–0.023 (0.025)	–	0.116*** (0.020)
For linear slope						
Intercept	–0.265** (0.009)	–0.266*** (0.012)	–0.397*** (0.008)	–0.378* (0.040)	–0.155*** (0.009)	–0.166*** (0.034)
Male	–	–0.004 (0.024)	–	–0.009 (0.017)	–	–0.002 (0.015)
White	–	0.037 (0.020)	–	0.061** (0.020)	–	0.046** (0.016)
SES	–	–0.001 (0.023)	–	–0.020 (0.018)	–	–0.017 (0.016)
Prior achievement	–	–0.029* (0.015)	–	0.019 (0.011)	–	0.019* (0.025)
For school effect						
Intercept	0.012 (0.015)	0.013 (0.012)	0.019 (0.025)	0.017 (0.023)	0.014 (0.017)	0.010 (0.013)
School size	–	–0.054 (0.103)	–	–0.072 (0.121)	–	0.039 (0.107)
Racial composition	–	0.073 (0.056)	–	0.078 (0.062)	–	0.027 (0.045)
Teacher–student ratio	–	–0.019 (0.016)	–	–0.024 (0.025)	–	–0.015 (0.021)
School SES	–	0.055 (0.034)	–	0.022 (0.028)	–	0.014 (0.040)
<i>Random effects</i>						
Initial status	0.015***	0.012***	0.075**	0.067**	0.376***	0.314***
Linear slope	0.017**	0.015***	0.013*	0.010**	0.017***	0.018***
Level 1 residual	0.574***	0.523***	0.471***	0.465***	0.312***	0.310***
<i>Goodness of fit</i>						
–2LL	7792.5	4506.5	8006.4	5277.4	7570.9	4690.9
AIC	7748.5	4516.5	8032.4	5291.4	7517.9	4702.9

Note: –2LL = –2 log-likelihood; AIC = Akaike information criterion; SES = socioeconomic status.
p* < .05, *p* < .01, ****p* < .001; standard errors in parentheses.

the importance of treating these three constructs as different dimensions of school engagement.

The Associations Between School Engagement and Academic Outcomes

GPA. As predicted, GPA decreased from 7 to 11 grades for the average adolescent (Table 3,

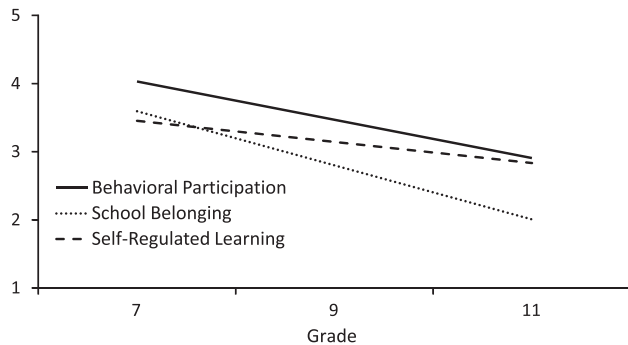


FIGURE 1 The growth trajectories of the three dimensions of school engagement.

model 1a). Two statistically significant positive level 1 coefficients indicated that declines in school participation and self-regulated learning were associated with within-person declines in GPA (Table 3, model 2a). In essence, these coefficients indicate that the decline in GPA is most marked for those students who are experiencing declines in their school participation and self-regulated learning. Contrary to our hypothesis, changes in school belonging were not associated with changes in GPA within person at level 1. Finally, according to the pseudo-*R*², 38% of the within-person variation in GPA was explained by within-person variation in school engagement.

Educational aspiration. On average, educational aspiration decreased from 7 to 11 grades (Table 3, model 2a). In Table 3, model 2b, the statistically significant positive level 1 coefficients indicated that decreases in school participation, school belonging, and self-regulated learning were associated with within-person decreases in

TABLE 3
Fixed Effects, Variance Components, and Fit Statistics for the Growth Models in Which School Engagement Predicts the Adolescent School Grade Point Average (GPA; $N = 1,148$)

	GPA		Educational Aspirations	
	Model 1a	Model 1b	Model 2a	Model 2b
<i>Fixed effects</i>				
For initial status				
Intercept	3.658*** (0.023)	3.434*** (0.165)	7.453*** (0.039)	7.231*** (0.291)
Male	–	–0.764*** (0.172)	–	–0.217* (0.090)
White	–	0.175** (0.052)	–	–0.123 (0.101)
SES	–	0.028 (0.055)	–	0.092 (0.107)
Prior achievement	–	0.377*** (0.027)	–	0.334*** (0.051)
For linear slope				
Intercept	–0.118*** (0.010)	–0.142** (0.051)	–0.153*** (0.016)	–0.178* (0.085)
Male	–	–0.020 (0.019)	–	–0.065 (0.035)
White	–	0.015 (0.023)	–	–0.072 (0.043)
SES	–	0.012 (0.020)	–	0.046 (0.039)
Prior achievement	–	0.014 (0.012)	–	0.043* (0.020)
School participation slope				
Intercept	–	0.114*** (0.021)	–	0.078** (0.032)
School belonging slope				
Intercept	–	0.012 (0.020)	–	0.104** (0.035)
Self-regulated learning slope				
Intercept	–	0.065* (0.031)	–	0.186*** (0.042)
For school effect				
Intercept	0.009 (0.014)	0.012 (0.015)	0.017 (0.020)	0.015 (0.018)
School size	–	–0.046 (0.124)	–	0.032 (0.117)
Racial composition	–	0.053 (0.044)	–	0.061 (0.047)
Teacher–student ratio	–	0.008 (0.021)	–	0.023 (0.024)
School SES	–	0.062 (0.028)	–	0.055 (0.024)
<i>Random effects</i>				
Initial status	0.643***	0.582***	1.154***	0.874***
Linear slope	0.045***	0.039***	0.075**	0.050***
Level residual	0.239***	0.232***	0.908***	0.680***
<i>Goodness of fit</i>				
–2LL	7852.3	3514.5	8913.5	5793.4
AIC	7912.3	3670.5	8978.5	5814.4

Note. –2LL = –2 log-likelihood; AIC = Akaike information criterion; SES = socioeconomic status.

* $p < .05$, ** $p < .01$, *** $p < .001$; standard errors in parentheses.

educational aspiration. The pseudo- R^2 indicates that 32% of the within-person variation in educational aspiration was explained by school engagement.

Additional analyses. As both school engagement and academic outcomes are time-varying variables, another way to show strong evidence of longitudinal relationships is to parallel the change process of school engagement variables and the academic outcomes and examine the within-person relationships between them over time. Thus, we also used multivariate latent growth models in Mplus (Muthén & Muthén, 2006) to test whether the slopes of behavioral, emotional, and cognitive engagement were associated with the slopes of academic outcomes from 7th through 11th grades (Table 4).

Support for the hypothesized developmental patterns of behavioral and cognitive engagement and GPA was provided by the positively associated slopes factors. As students experienced sharper declines in school participation and self-regulated learning, there were corresponding declines in GPA over time. Similarly, the declines in school participation, school belonging, and use of self-regulatory strategies predict corresponding declines in educational aspiration.

DISCUSSION

Trajectories of Adolescent School Engagement

As predicted, the average growth trajectories of school participation, sense of belonging to school,

and self-regulated learning decreased from 7th through 11th grades, and the rates of decline varied across these three types of engagement. In many school districts, school environmental characteristics change between elementary school and secondary school in ways that are at odds with adolescents’ developmental needs. The declines in the three dimensions of school engagement could reflect an increasing misfit between the youth’s stage of development and the opportunities provided in their school environments as suggested by Stage-Environment Fit Theory (Eccles et al., 1993). Future study should investigate how various aspects of school environment in this sample explain the changes we have documented in these three types of school engagement.

The Associations Between School Engagement and Academic Outcomes

Using a multidimensional perspective of school engagement enabled us to disentangle the unique roles played by each type of engagement in different school outcomes. The three school engagement dimensions contributed differently to academic performance and educational aspiration, after controlling for individual and school characteristics. Specifically, changes in both school participation and self-regulated learning were positively linked to both GPA and future educational plans. This finding confirmed the basic notion that students are more likely to succeed academically when they attend classes regularly, participate in class, and use self-regulated learning strategies to help understand the class materials and vice versa (Finn, 1989).

The emotional belonging to school dimension serves a more integral role in terms of motivating students to pursue a higher degree (Eccles, 2009).

Contrary to our hypothesis, however, adolescents’ sense of school belonging—whether they emotionally identify with school or not—did not significantly contribute to academic performance when it was considered along with the other two components. This finding suggests that although students may feel emotionally connected to school if they are not actively participating in school or do not use self-regulation learning strategies, they are less likely to get very good grades. This finding also contradicts a number of studies which demonstrate that students’ identification with school is related to academic performance (Voelkl, 1997). Two hypotheses can help to explain this inconsistency. First, it is plausible that school belonging has no direct association with academic achievement, and that its association operates indirectly through the effects of behavioral or cognitive engagement (Archambault, Janosz, Morizot, & Pagani, 2009). Future research examining the mediating effects of school engagement would extend our understanding of the underlying processes. Second, this discrepancy may reflect the different aspects of emotional engagement that were measured and conceptualized across different studies. For instance, Voelkl (1997) operationalized emotional engagement as school belonging and the valuing of school combined into one composite. In the present study, emotional engagement focused only on school belonging and assessed whether students “feel attached to” and “feel part of” their school as well as the extent to which they feel “happy” and “safe” in their school. In this case, students may have positive feelings of belonging to school, because they enjoy interacting with their peers or like their teachers. However, if students do not feel that school or education has any purpose or meaning for them, then a sense of school belonging may not motivate them to study hard and enhance their

TABLE 4
Associations Between Growth Factors From Multivariate Models

<i>Estimated Path</i>	<i>Associations with Change in GPA</i>		<i>Associations with Change in Educational Aspirations</i>	
	<i>B (SE)</i>	<i>β (SE)</i>	<i>B (SE)</i>	<i>β (SE)</i>
Change in school participation	0.05** (0.01)	0.36* (0.07)	0.05* (0.02)	-0.25* (0.10)
Change in school belonging	0.02 (0.01)	0.22 (0.12)	0.06** (0.02)	0.30** (0.09)
Change in self-regulated learning	0.07*** (0.02)	0.43*** (0.08)	0.12*** (0.04)	0.47*** (0.12)

Note. Fit statistics indicated adequate model fit for the final model—GPA: $\chi^2(46) = 645.34, p < .001$; CFI = 0.97; TLI = 0.96; RMSEA = 0.04; educational aspiration: $\chi^2(46) = 585.25, p < .001$; CFI = 0.96; TLI = 0.95; RMSEA = 0.05. GPA = grade point average.
* $p < .05$; ** $p < .01$; *** $p < .001$.

academic performance. Future research should distinguish the two aspects of emotional engagement (i.e., school belonging and valuing of school) to identify their individual effects on academic performance.

Limitations and Strengths

It is worth noting that the measure of behavioral engagement in this study taps into a minimal level of participation in school. It is best thought of as the absence of disengagement, where disengagement involves truancy, not paying attention in class, and not completing homework. Although it clearly separates the disengaged from the engaged, it does not differentiate students at higher levels of engagement from lower levels. Future research will benefit from examining a range of engagement behaviors from the minimal non-disruptive behaviors to the greater psychological investment of engaged students (Smerdon, 1999). Moreover, the present data relies mainly upon self-report information from students to assess school engagement. Future studies should use multiple sources of information and multiple methodologies to gain a more diverse perspective on school engagement. Third, this study did not examine or differentiate school subject areas. Incorporating domain-specific measures would help determine to what extent engagement is content specific and reduce any confound aspects of the school context with subject area. It would also be helpful to compare the impact of school engagement on students' academic performance in different subject areas. Finally, the study only assessed three indicators of school engagement. It is likely that different indicators of school engagement may operate differently during adolescence.

In conclusion, our study contributes to the literature on school engagement in several ways. First, the validity of the three-factor engagement model supports the multifaceted nature of school engagement. We do not intend to suggest that this conceptualization of school engagement represents a comprehensive overview of all indicators of engagement. However, approaching student engagement as a process characterized by multiple dimensions would greatly advance our understanding of why some youth perform well academically and others do not. Furthermore, the use of individual growth modeling enabled us to identify distinct trajectories of behavioral, affective, and cognitive engagement during adolescence and to examine the relationships between these pathways

and the change in academic outcomes over time. Our findings clearly indicate that these types of school engagement are not static and do change over time. Thus, any analysis assessing their mutual influence should take into account the dynamic nature of these processes. Finally, this study has demonstrated the importance of school engagement for academic performance and educational aspiration. We note, however, that the effects of school engagement varied with respect to the type of engagement. These results underscore the importance for school personnel to focus on interventions aimed at specific dimensions of school engagement to effectively promote students' academic success. This knowledge will support the development of tools and programs for at-risk students in school.

REFERENCES

- Akey, T. M. (2006). *School context, student attitudes and behavior, and academic achievement: An exploratory analysis*. Washington, D.C.: MDCR.
- Appleton, J. J., Christenson, S. L., Kim, D., & Reschly, A. L. (2006). Measuring cognitive and psychological engagement: Validation of the student engagement instrument. *Journal of School Psychology, 44*, 427–445.
- Archambault, I., Janosz, M., Morizot, J., & Pagani, L. (2009). Adolescent behavioral, affective, and cognitive engagement in school: Relationship to dropout. *Journal of School Health, 79*, 408–415.
- Bryk, A. S., & Raudenbush, S. W. (1992). *Hierarchical linear modeling applications and data analysis methods*. Newbury Park, CA: Sage.
- Connell, J. P. (1990). Context, self, and action: A motivational analysis of self-system processes across the lifespan. In D. Cicchetti (Ed.), *The self in transition: From infancy to childhood* (pp. 61–97). Chicago, IL: University of Chicago Press.
- Cook, T. D., Herman, M. R., Phillips, M., & Setterson, R. A. (2002). Some ways in which neighborhoods, nuclear families, friendship groups, and schools jointly affect changes in early adolescent development. *Child Development, 73*, 1283–1309.
- Eccles, J. S. (2009). Who am I and what am I going to do with my life? Personal and collective identities as motivators of action. *Educational Psychologist, 44*, 78–89.
- Eccles, J. S., Midgley, C., Wigfield, A., Buchanan, C. M., Reuman, D., Flanagan, C., et al. (1993). Development during adolescence: The impact of Stage-Environment Fit on young adolescents' experiences in schools and in families. *American Psychologist, 48*, 90–101.
- Eccles, J. S., & Roeser, R. W. (2009). Schools, academic motivation, and Stage-Environment Fit. In R. M. Lerner, & L. Steinberg (Eds.), *Handbook of adolescent psychology* (3rd ed., pp. 404–434). Hoboken, NJ: John Wiley & Sons.

- Elliott, D. S., Huizinga, D., & Menard, S. (1989). *Multiple problem youth: Delinquency, substance, and mental health problems*. New York, NY: Springer-Verlag.
- Finn, J. D. (1989). Withdrawing from school. *Review of Educational Research*, 59, 117–142.
- Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, 74, 59–109.
- Furrer, C., & Skinner, E. (2003). Sense of relatedness as a factor in children's academic engagement and performance. *Journal of Educational Psychology*, 95, 148–161.
- Hughes, J. N., Luo, W., Kwok, O., & Loyd, L. K. (2009). Teacher-student support, effortful engagement, and achievement: A 3-year longitudinal study. *Journal of Educational Psychology*, 100, 1–14.
- Marks, H. M. (2000). Student engagement in instructional activity: Patterns in elementary, middle and high school years. *American Educational Research Journal*, 37, 153–184.
- McDermott, P. A., Mordell, M., & Stolfus, J. C. (2001). The organization of student performance in American schools: Discipline, motivation, verbal learning, and nonverbal learning. *Journal of Educational Psychology*, 93, 65–76.
- Muthén, L. K., & Muthén, B. O. (2006). *Mplus user's guide* (4th ed.) [Computer software manual]. Los Angeles, CA: Author.
- Perry, J. C., Liu, X., & Pabian, Y. (2010). School engagement as mediator of academic performance among urban youth: The role of career preparation, parental career support, and teacher support. *The Counseling Psychologist*, 38, 269–295.
- Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods*. Thousand Oaks, CA: Sage.
- Roeser, R. W., Eccles, J. S., & Sameroff, A. J. (1998). Academic and emotional functioning in early adolescence: Longitudinal relations, patterns, and prediction by experience in middle school. *Development and Psychopathology*, 10, 321–352.
- Simpson, E. H. (1949). Measurement of diversity. *Nature*, 163, 688.
- Skinner, E. A., Kinderman, T. A., & Furrer, C. J. (2010). A motivational perspective on engagement and disaffection: Conceptualizing and assessment of children's behavioral and emotional participation in academic activities in the classroom. *Educational and Psychological Measurement*, 69, 493–525.
- Smerdon, B. A. (1999). Engagement and achievement: Differences between African-American and white high school students. *Research in Sociology of Education and Socialization*, 12, 103–134.
- Voelkl, K. E. (1997). Identification with school. *American Journal of Education*, 105, 204–319.
- Wang, M. T. (2009). School support for adolescents' behavioral and psychological adjustment: Testing the mediating effect of social competence. *School Psychology Quarterly*, 24, 240–251.
- Wang, M. T., & Dishion, T. J. (in press). The trajectories of adolescents' perceptions of school climate, deviant peer affiliation, and behavioral problems during the middle school years. *Journal of Research on Adolescence*.
- Wang, M. T., & Eccles, J. S. (in press). Social support matters: Longitudinal effects of social support on three dimensions of school engagement from middle to high school. *Child Development*.
- Wang, M. T., & Holcombe, R. (2010). Adolescents' perceptions of school environment, engagement, and academic achievement in middle school. *American Educational Research Journal*, 47, 633–662.
- Wang, M. T., Selman, R. L., Dishion, T. J., & Stormshak, E. A. (2010). A tobit regression analysis of the covariation between middle school students' perceived school climate and behavioral problems. *Journal of Research on Adolescence*, 20, 274–286.
- Wang, M. T., Willett, J. B., & Eccles, J. S. (2011). The assessment of school engagement: Examining dimensionality and measurement invariance across gender and race/ethnicity. *Journal of School Psychology*, 49, 465–480.
- Wentzel, K. R., Battle, A., Russell, S. L., & Looney, L. B. (2010). Social supports from teachers and peers as predictors of academic and social motivation. *Contemporary Educational Psychology*, 35, 193–202.
- Wigfield, A., Eccles, J. S., Schiefele, U., Roeser, R., & Davis-Kean, P. (2006). Development of achievement motivation. In W. Damon (Series Ed.) & N. Eisenberg (Vol. Ed.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (6th ed., pp. 933–1002). New York, NY: Wiley.
- Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 13–39). San Diego, CA: Academic Press.