

*Learning Accelerator Research Paper*

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Joann Moore

Jason Way

Alex Casillas

Jeremy Burrus

Jeff Allen

Mary Ann Hanson

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Joann L. Moore, Jason D. Way, Alex Casillas, Jeremy Burrus, Jeff Allen, Mary Ann Hanson

ACT, Inc., Iowa City, Iowa

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### Abstract

Research has shown that psychosocial factors (PSFs) have a positive impact on high school outcomes, including grades and persistence (e.g., Farrington et al., 2012). However, few longitudinal studies have examined the nature of these relationships. We report on a longitudinal study of middle school students followed through high school completion. We found that high school GPA mediates the effects of prior academic achievement, demographics, and most PSFs on on-time high school graduation. A measure of self-regulation had a significant direct effect on on-time graduation. The results underscore the importance of PSFs in predicting academic outcomes, even after accounting for prior achievement and demographics. Implications of examining PSFs early in students' academic progression are discussed.

## Effects of psychosocial characteristics of middle school students on high school grades and on-time graduation

Although the situation has improved in recent years, on-time high school graduation remains of major concern in the U.S., with over 20% of entering public high school students failing to earn a high school diploma in four years (Aud et al., 2013). In some states and communities, these rates exceed 50% of all entering 9<sup>th</sup> grade students. In the discussion that follows, we use the term “dropout” to refer to the situation where a student’s enrollment in high school is suspended before they earn a diploma. While on-time graduation is not the direct opposite of dropout, the two outcomes are closely related and the dropout literature is relevant for understanding on-time graduation.

Over the past decade, research has shown that measuring critical psychosocial factors (PSFs; e.g., motivation, social engagement, self-regulation) can increase schools’ abilities to identify and intervene with students at risk of dropout or delayed graduation (e.g., Farrington et al., 2012; Zins, Bloodworth, Weissberg, & Walberg, 2004). As the dropout process begins well before students actually decide to leave high school (e.g., Rumberger & Lim, 2008), research into early indicators of dropout or delayed graduation is needed. Further, research should focus not only on academic indicators, but psychosocial indicators as well.

### *Early Warning for Dropout*

Research has demonstrated that high school dropout can be predicted well before students enter high school. For example, in public schools in the Northeastern U.S., an early warning system to identify 6<sup>th</sup> grade students at risk to drop out in high school was created (Balfanz, Herzog, & Mac Iver, 2007; Neild, Balfanz, & Herzog, 2007). Indicators included grades, attendance, and disciplinary records. Together these indicators identified 60% of the students who did not graduate within one year of expected graduation. Further, several large-scale longitudinal studies have found that at ages 2, 6, 12, and 14, future high school dropouts were much more likely than graduates to have: parents who were divorced or separated; lower achievement test scores; and, higher scores on measures of behavioral problems (see Heckman, Humphries, & Kautz, 2014 for a review). This research clearly shows that academic performance and behavioral indicators measured during middle school can be effective predictors of on-time high school graduation. Many of these indicators (e.g., attendance, discipline, behavior problems) are related to PSFs.

### *Psychosocial Factors (PSFs)*

Research has examined the effects of PSFs on academic performance and persistence, highlighting a range of constructs, including self-efficacy, motivation, locus of control, attitude toward learning, and persistence (e.g., Grigorenko et al., 2009; Poropat, 2009; Robbins et al., 2004). Other studies have found that PSFs provide incremental validity over traditional predictors of academic performance such as achievement tests and demographics (e.g., Casillas et al., 2012; Zins et al. 2004). Analogous results have been obtained in the postsecondary realm (e.g., Robbins, Allen, Casillas, Peterson, & Le, 2006), as well as for work outcomes such as job performance and retention (e.g., Barrick & Mount, 1991; Judge & Ilies, 2002).

One assessment of PSFs is ACT Engage, a low-stakes, self-report instrument designed to measure ten PSFs related to academic performance and persistence (Casillas et al., 2011), which can be grouped into three broad behavioral domains: motivation, social engagement, and self-regulation (see Table 1). *Motivation* refers to the mechanism by which individuals act on

prescribed behaviors and implement learning activities and/or pursue goals, *social engagement* refers to an individual's skills in engaging the social environment in ways that support and reinforce his or her learning activities, and *self-regulation* refers to the ability to manage or regulate attitudes, behaviors, and feelings that affect students' receptiveness to, and implementation of, learning activities (Robbins et al., 2009).

Casillas et al. (2012) conducted a longitudinal study to validate the ACT Engage instrument for middle school students, using a large ( $N \sim 5,000$ ), longitudinal dataset of students followed from middle school through the first year of high school. They found that PSFs measured by Engage provided incremental validity above achievement tests and prior grades when predicting early high school grade point average (HSGPA) and that the variance accounted for was comparable to that of prior grades.

#### *Current Study*

This study builds on the Casillas et al. (2012) study, following the same sample after additional years of data collection to examine effects of PSFs on HSGPA and on-time graduation. A path model to examine direct and indirect effects of PSFs on intermediate (grades) and more distal (graduation) outcomes is proposed, with grades serving as a potential mediator of the relationship between PSFs and on-time graduation (see Figure 1). This allows for the examination of differential effects of the PSFs and other predictors on both outcomes. Specifically, the research questions addressed are:

*RQ1:* Is there evidence of effects of PSFs on HSGPA, after controlling for prior academic achievement and student and school demographics?

*RQ2:* Is there evidence of effects of PSFs on on-time high school graduation, after controlling for prior academic achievement, student and school demographics, and HSGPA? This question examines whether PSFs have direct effects on on-time graduation and whether the relationship is mediated by HSGPA.

*RQ3:* How do effects on on-time high school graduation vary by PSF? This question examines which PSFs have the largest effects on on-time graduation.

#### *Method*

A prospective sample of 4,660 middle-school students from 24 schools in 13 districts throughout the U.S. completed PSF and standardized achievement tests during the fall of 2006 when most students were in 8<sup>th</sup> grade. The 24 schools varied with respect to percentage of students eligible for free or reduced lunch (mean=53%, minimum=29%, maximum=97%) and percentage of students in underrepresented minority groups (mean=27%, minimum=1%, maximum=97%). Follow-up data were collected each fall (2007-2011), with districts providing data annually on GPA, absences, and enrollment status. The last wave of data was collected after most students would have graduated from high school on time.

#### *Measures*

Academic achievement in middle school was measured using ACT Explore, a standardized achievement test typically taken in 8<sup>th</sup> or 9<sup>th</sup> grade, which includes measures of English, mathematics, reading, and science (ACT, 2013). Subject area scores range from 1-25 and the Composite score is calculated as the mean of the four subject area scores. Explore is intended for all students in grades 8 and 9 and focuses on the knowledge and skills that are usually attained by grade 8.

PSFs were measured using ACT Engage Grades 6–9. The instrument contains 97 items scored using a 6-point Likert-type scale ranging from *strongly disagree* to *strongly agree* and nine yes/no items; the 106 items form 10 scales corresponding to each PSF (see Table 1 for scale

names, definitions, and example items). The ten scales demonstrate moderate to high internal consistency reliabilities (range  $\alpha=.81-.90$ ; Mdn  $\alpha=.87$ ; Casillas et al., 2011).

School demographic information included percent of students eligible for free or reduced lunches (FRL), percent minority (African American, Hispanic, and American Indian), and size (defined as the average cohort size across grade levels served by the school). School demographics were obtained from the Common Core of Data ([nces.ed.gov/ccd](http://nces.ed.gov/ccd)). Student demographic variables included gender and indicators for race/ethnicity categorized as white, African American, Hispanic, and other (American Indian, Asian, two or more races, and other were combined due to small sample sizes).

*Outcomes.* Mid-point HSGPA was defined as students' end-of-10<sup>th</sup> grade cumulative GPA. If a student's 10<sup>th</sup> grade cumulative GPA was missing, then his/her end-of-9<sup>th</sup> grade cumulative GPA was used instead. Students were classified as having graduated high school on time if they had graduated within four years of starting high school and were classified as unsuccessful if they had dropped out, were expelled, had earned a General Educational Development (GED) high school equivalency certificate, or were still enrolled after four years of starting high school. Only students for whom on-time graduation could be determined were included in the analyses. Two schools were excluded from the analyses ( $n=192$ ) because the final wave of data collection was unavailable. A small number of students (approximately 1%) were in 7<sup>th</sup> grade in fall of 2006, and therefore may have been in 12<sup>th</sup> grade in the fall of 2011 during the last wave of data collection; if such a student was enrolled in fall 2011, they were excluded from the analysis. Students who were classified as deceased ( $n=4$ ), home schooled ( $n=84$ ), not enrolled-unknown ( $n=382$ ), or transferred ( $n=709$ ), were excluded from the analyses because on-time graduation was undefined or unknown. Overall, 87% of students in the analysis sample were classified as graduated on time.

#### *Data Cleaning*

Records were also excluded if a student did not complete any of the Engage scales ( $n=9$ ) or did not take the ACT Explore test ( $n=557$ ), yielding a total sample size of 2,764 from 21 schools. The analysis sample appears similar to the original sample; average demographic characteristics (school percent FRL, school and student percent minority, percent male) were within 5 percentage points of the original sample. In the analysis sample, mean Explore Composite score was .11 SD units higher, and means for each of the Engage scales were higher by .02 to .08 SD units compared to the original sample.

Approximately 30% of the sample completed an early form of the Engage assessment that did not include one of the scales, *Relationships with School Personnel*. All other predictors had a missing rate of 10% or less, and missing values were imputed for all predictors. Because the multiple imputation procedure borrows information from other variables used in the imputation process, a larger set of predictors than those of interest were included in the imputation procedure.

#### *Analyses*

To address the first research question (*RQ1*), a multilevel linear model was used to relate the predictors to HSGPA. To account for variation in grades across schools not explained by the student and school predictors, a random intercept model was used. The effects of each student-level predictor were assumed to be the same across schools, thus random slopes were not used. To address *RQ2*, multilevel logistic regression was used to relate the predictors to on-time graduation. Again, to account for school effects, random intercepts were used, but not random slopes.

The results from the models for HSGPA and on-time graduation can be used to determine the extent that HSGPA mediates effects on on-time graduation, using Baron and Kenny's (1986) approach to testing for mediation. Indirect effects were estimated by the product of the coefficients (e.g.,  $\alpha \times \beta$  in Figure 1B; Wright, 1934) and significance was tested using Sobel's (1982) approach. Total effects of each predictor were estimated by fitting the model for on-time graduation without the mediator (HSGPA) (e.g.,  $\tau$  in Figure 1A). *RQ3* is addressed by examining differences in total effects across the ten PSF measures. To facilitate comparisons of effect size, all predictors except for the student demographics (gender and race/ethnicity indicators) were standardized prior to modeling.

### Results

Table 2 contains descriptive statistics for all variables in the model prior to imputation and standardization. Mean Explore Composite score was 15.2 (standard deviation 3.2), which is similar to the U.S. national fall grade 8 mean (15.5) and standard deviation (3.3) (ACT, 2013). Fifty-one percent of students were female, 67% white, 9% African American, 12% Hispanic, and 89% spoke English as their primary language.

Table 2 also contains correlations between all study variables after imputing missing data. All predictors were significantly correlated with both HSGPA and on-time high school graduation, and HSGPA and on-time high school graduation were correlated with one another ( $r=.53$ ). Explore Composite and the Engage scales were more highly correlated with HSGPA than with on-time graduation. Explore Composite was positively correlated with each of the Engage scales, and the Engage scales were all positively intercorrelated. The largest intercorrelation among predictors was observed for two of the PSF scales within the self-regulation domain (*Orderly Conduct* and *Managing Feelings*,  $r=.64$ ), suggesting that there does not appear to be serious redundancy in the predictors.

Table 3 presents the results of the regression models and the indirect, direct, and total effects of all predictors on on-time graduation. Because all but on-time high school graduation and the student demographic variables were standardized, the beta coefficients can be interpreted as the increase in HSGPA in standard deviation units—or increase in the log-odds of on-time high school graduation—corresponding to an increase of one standard deviation in the predictor, controlling for the other predictors in the model. For the student demographic indicators, the betas correspond to the increase in the outcome corresponding to demographic group membership.

To address *RQ1*, the first set of coefficients corresponds to the model predicting HSGPA. Higher school percent minority and male status predicted lower HSGPA. Higher Explore Composite score, *Academic Discipline*, and *Orderly Conduct* predict higher HSGPA. A small but significant negative relationship was found between *Commitment* and HSGPA. Because the bivariate relationship between *Commitment* and HSGPA was positive ( $r=.28$ ), this is likely an artifact of multicollinearity, also known as suppression.

To address *RQ2*, the direct effects on on-time graduation were examined. The only significant predictors in the full model ( $p < 0.05$ ) were *Orderly Conduct* and HSGPA. HSGPA fully mediated the relationships between school percent minority, male status, Explore Composite, *Academic Discipline*, and *Commitment* on on-time graduation. *Orderly Conduct* remained a significant predictor of on-time graduation, but the coefficient was reduced in magnitude, indicating partial mediation. *Optimism* and *School Climate* were marginally significant ( $p < 0.1$ ), with the coefficient for *School Climate* suggesting a negative effect.

Indirect effects were obtained by multiplying the coefficients from the model predicting HSGPA with the HSGPA-on-time graduation coefficient in the full (direct effects) model. Significant indirect effects were found for school percent minority and male status, Explore Composite score, *Academic Discipline*, *Commitment*, and *Orderly Conduct*. This was expected because the same variables were significant predictors of HSGPA.

The final set of coefficients in Table 3 corresponds to the total effects, or the effects of the predictors on the outcome without the presence of the mediator (GPA) in the model. Because multilevel linear and logistic models were used, the indirect and direct effects do not sum to the total effects. The indirect effects of school percent minority, male status, and *Commitment* were significant, but the total effects were not. The total effects of *Optimism* and *Thinking Before Acting* were significant, but the indirect effects were not. Both the indirect and total effects of *Family Attitude* and *School Climate* were marginally significant ( $p < 0.1$ ). Interestingly, the total effect of *Thinking Before Acting* was negative, despite a positive bivariate relationship with the outcome.

To address *RQ3*, we compared the total effects across the different PSF measures. The largest effects were observed for *Orderly Conduct* (0.372), *Academic Discipline* (0.340), *Optimism* (0.175), and *Thinking Before Acting* (-0.176). For the other six PSFs, there was no evidence of additional effects on on-time graduation. Thus, among the constructs measured by the Engage assessment, there is evidence of effects from the motivation and self-regulation domains, but no additional effects from the social engagement domain. The negative estimate for *Thinking Before Acting* was not expected and, as mentioned earlier, may be the product of multicollinearity. In a model for on-time graduation that excluded all other PSFs but included mid-point GPA, the coefficient for *Thinking Before Acting* was positive and not significant. The predictors with significant effects on on-time graduation are summarized in Figure 2 (*Commitment* and *Thinking Before Acting* are not included because their effects were smaller and negative, contrary to theory).

### Discussion

This study showed that PSFs measured in middle school predict both high school grades and on-time high school graduation. While observational longitudinal studies do not bear evidence of causality, the results suggest that PSFs measured in middle school are related to academic performance and persistence in high school. They also highlight the value of using PSFs to supplement traditional predictors of academic outcomes. Identifying students' strengths and needs in terms of their PSFs allows teachers and administrators to approach student success from a more nuanced perspective, rather than solely focusing on academic performance. Given that student risk factors can be identified at an early age, it may be possible to avert future negative outcomes. Further, schools can connect students to targeted resources and interventions that can help them improve in areas needing development and thus be less likely to drop out or delay graduation.

*RQ1* examined which PSFs predicted mid-point HSGPA, and thus had indirect effects on on-time graduation. *Academic Discipline* and *Orderly Conduct* were important predictors of HSGPA. These results show that, for middle school students, being motivated to complete school work and behaving appropriately are precursors to later success in high school. Male status was negatively related to HSGPA, and as expected, grade 8 academic achievement (Explore Composite) was positively related.

*RQ2* examined which PSFs have direct effects on on-time graduation. Mid-point GPA fully mediated the relationships found between on-time high school graduation and



demographics, prior academic achievement, and most of the prior PSFs, and partially mediated the relationship between high school graduation and *Orderly Conduct*. The impact of demographics, prior academic performance, and most PSFs on high school graduation can be explained by their effects on HSGPA, suggesting that lowering risk for poor academic performance may also lower risk for dropout or delayed graduation. *Orderly Conduct* was the only PSF to retain a direct effect on graduation after accounting for the mediating effect of HSGPA. This is in line with previous research showing that poor grades and poor conduct are two pathways that lead students to drop out of school (e.g., Rumberger & Lim, 2008). The direct effect of *Optimism* was positive and nearly statistically significant, suggesting that a hopeful outlook on the future helps students persist in high school.

*RQ3* examined differences in total effects on on-time graduation, across the ten PSF scales. Five of the ten PSFs had significant direct, indirect, or total effects on at least one of the outcomes. Ordering by the magnitude of their total effect on graduation, the most important PSFs were *Orderly Conduct*, *Academic Discipline*, *Optimism*, and *Family Attitude*.

#### *Limitations*

One limitation of this study is that the participating schools were located mainly in the Midwestern and Southern United States, and were not nationally representative. However, the students included represented a wide range of individual differences. Additionally, some error may have been introduced to the model due to the imputation of missing values. On-time graduation status was unknown for students who transferred out of the study districts or who were no longer enrolled for reasons unknown, and were thus excluded from analysis. Also, the study relied on self-reports of the PSFs. The effects of PSFs on high school outcomes may have been stronger if the self-report measures were supplemented by observer ratings (e.g., teacher behavioral ratings), or if effect estimates were corrected for measurement error.

While the study included a diverse set of predictors of HSGPA and graduation, the results do not prove that the predictors caused the outcomes. This limitation is important because it calls into question whether interventions can affect the outcome (on-time graduation) by improving PSFs (e.g., *Orderly Conduct*).

#### *Future Research*

Additional research would benefit from incorporating other measures not included in this study, such as absenteeism and other academic behaviors (e.g., homework completion, failed classes, disciplinary actions). Future studies also could use alternative measurement methods (e.g., other reports, behavior diaries) to help validate the types of behaviors that are predictive of high school outcomes.

Future research also could incorporate measures of PSFs at later points in time into a similar research design, and examine the extent to which students' PSFs change between middle school and high school and whether the mediating relationship between these factors and HSGPA holds steady throughout high school. In addition, it would be useful to systematically explore how interventions implemented based on prior assessment of PSFs can impact student outcomes.

#### *Conclusion*

In a paper cited in the introduction of this study, Neild, Balfanz, and Herzog (2007) report that they could predict a 6<sup>th</sup> grade student's future chance of dropping out of high school with 75% accuracy using just a few indicators. Consistent with the current study, one of these indicators had to do with behavioral conduct. In their paper, Neil and colleagues state that, "These students are metaphorically waving their hands and asking for help" (p. 28). Measures of

PSFs that predict on-time graduation, such as ACT Engage, can, as such, serve as a mode through which students can “ask for help” and can be used by educators as part of early warning systems designed to identify students who may be at risk. Although we are unsure whether intervening directly on the PSFs measured by ACT Engage will lead to lower dropout (see the limitation about causality discussed above), at minimum such a tool can signal which students might require some kind of additional supports (psychosocial or otherwise) to complete high school successfully. That alone, we believe, makes early assessment of PSFs valuable in applied settings.

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Figure 1. Relationships tested among PSFs, academic achievement, demographics, and high school outcomes.

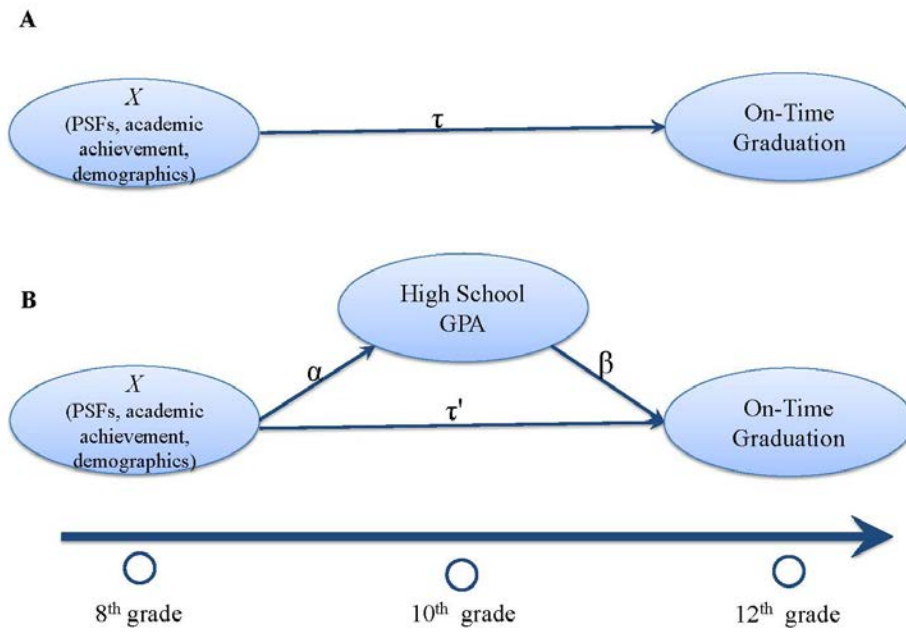


Figure 2. Effects of predictors on on-time graduation.

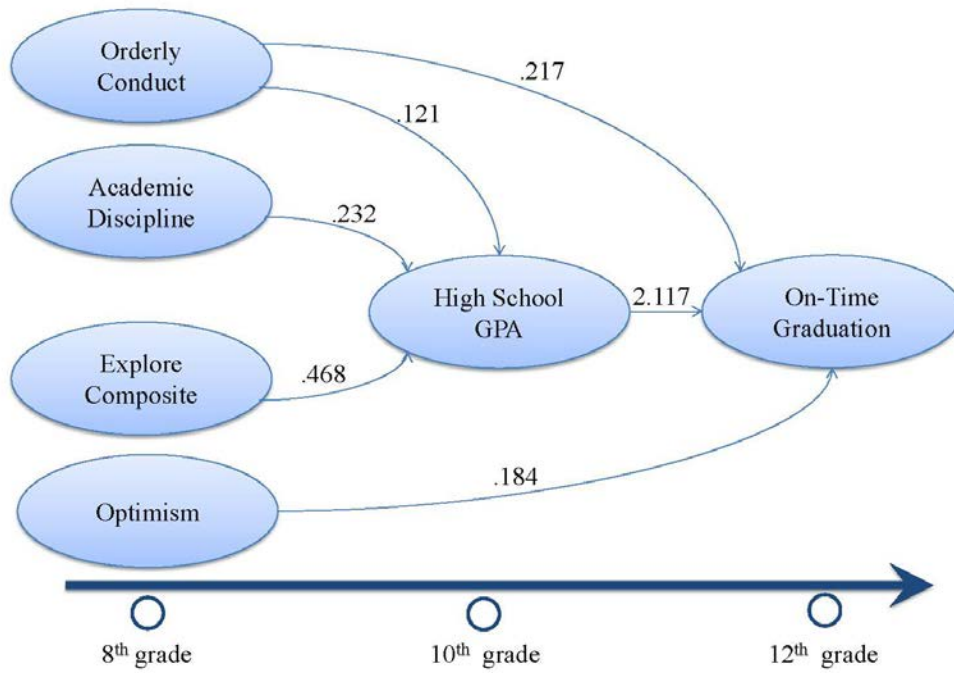


Table 1. *Engage Grades 6-9 Domains, Scale Names, Definitions, and Sample Items*

<b>Domain</b>	<b>Scale Name</b>	<b>Definition</b>	<b>Sample Item</b>
<b>Motivation</b>	Academic Discipline	Degree to which a student is hardworking and conscientious as evidenced by the amount of effort invested into completing schoolwork.	I turn in my assignments on time.
	Commitment to School	Commitment to stay in school and obtain a high school diploma.	I am committed to graduating from high school.
	Optimism	A hopeful outlook about the future in spite of difficulties or challenges.	I am confident that everything will turn out all right.
<b>Social Engagement</b>	Family Attitude toward Education	Positive family attitude regarding the value of education.	My family supports my efforts in school.
	Family Involvement	Family involvement in a student's school life and activities.	I talk to my family about schoolwork.
	Relationships with School Personnel	The extent to which students relate to school personnel as part of their connection to school.	Adults at my school understand my point of view.
	School Safety Climate	School qualities related to students' perception of security at school.	I feel safe at school.
<b>Self-Regulation</b>	Managing Feelings	Tendency to manage duration and intensity of negative feelings (e.g., anger, sadness, embarrassment) and to find appropriate ways to express feelings.	I would walk away if someone wanted to fight me.
	Orderly Conduct	Tendency to behave appropriately in class and avoid disciplinary action.	I have been sent to the principal's office for misbehaving.
	Thinking before Acting	Tendency to think about the consequences of one's actions before acting.	I think about what might happen before I act.

Table 2. *Correlations and Descriptive Statistics.*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1) School % FRL	—																				
2) School % Minority	<b>.44</b>	—																			
3) School Size	<b>-.65</b>	.11	—																		
4) Male	-.01	-.02	.01	—																	
5) White	<b>-.22</b>	<b>-.43</b>	-.04	-.02	—																
6) Black	<b>.27</b>	<b>.31</b>	-.16	.02	<b>-.45</b>	—															
7) Hispanic	.02	<b>.21</b>	.15	-.01	<b>-.54</b>	-.12	—														
8) Other Race/Ethnicity	.05	.11	.03	.03	<b>-.46</b>	-.10	-.12	—													
9) Explore Composite	<b>-.23</b>	-.11	.18	-.06	<b>.24</b>	<b>-.22</b>	-.09	-.05	—												
10) Academic Discipline	-.13	-.11	.07	-.17	.13	-.03	-.10	-.06	<b>.26</b>	.90											
11) Commitment to Sch.	-.12	-.07	.07	-.18	.08	.04	-.09	-.06	<b>.23</b>	<b>.52</b>	.84										
12) Family Attitude	-.09	-.02	.07	-.07	.06	.01	-.06	-.03	<b>.21</b>	<b>.45</b>	<b>.61</b>	.85									
13) Family Involvement	-.12	-.10	.04	-.06	.11	.02	-.10	-.07	.14	<b>.52</b>	<b>.47</b>	<b>.57</b>	.86								
14) Managing Feelings	-.13	-.07	.11	<b>-.23</b>	.15	-.11	-.05	-.07	<b>.20</b>	<b>.52</b>	<b>.28</b>	<b>.23</b>	<b>.39</b>	.90							
15) Optimism	-.08	-.06	.04	-.09	.05	.06	-.06	-.07	.15	<b>.52</b>	<b>.50</b>	<b>.43</b>	<b>.55</b>	<b>.39</b>	.89						
16) Orderly Conduct	-.20	-.15	.13	<b>-.23</b>	.20	-.12	-.10	-.07	<b>.28</b>	<b>.56</b>	<b>.30</b>	<b>.24</b>	<b>.34</b>	<b>.64</b>	<b>.31</b>	.82					
17) Relat. w/ Sch. Pers.	-.19	-.15	.07	-.10	.18	-.06	-.11	-.09	.14	<b>.51</b>	<b>.41</b>	<b>.36</b>	<b>.59</b>	<b>.46</b>	<b>.56</b>	<b>.39</b>	.89				
18) School Climate	-.18	<b>-.22</b>	.02	-.06	.14	-.06	-.07	-.07	.08	<b>.35</b>	<b>.31</b>	<b>.28</b>	<b>.37</b>	<b>.37</b>	<b>.43</b>	<b>.36</b>	<b>.59</b>	.82			
19) Think. Bef. Acting	-.06	.03	.06	-.10	.03	.02	-.01	-.04	.15	<b>.50</b>	<b>.27</b>	<b>.25</b>	<b>.39</b>	<b>.57</b>	<b>.42</b>	<b>.49</b>	<b>.41</b>	<b>.31</b>	.86		
20) 10 <sup>th</sup> Grade GPA	-.14	<b>-.21</b>	.04	-.18	<b>.26</b>	-.15	-.18	-.05	<b>.58</b>	<b>.45</b>	<b>.28</b>	<b>.27</b>	<b>.27</b>	<b>.32</b>	<b>.26</b>	<b>.42</b>	<b>.28</b>	.18	<b>.24</b>	—	
21) On-time HS Grad.	-.15	-.10	.12	-.10	.13	-.10	-.08	-.03	<b>.29</b>	<b>.27</b>	<b>.23</b>	<b>.21</b>	.19	.18	.19	<b>.26</b>	.17	.10	.12	<b>.53</b>	—
N	2764	2764	2764	2758	2761	2761	2761	2761	2751	2762	2763	2761	2762	2761	2762	2463	1940	2759	2759	2725	2764
Min	0.3	0	39	0	0	0	0	0	5.0	10.0	16.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	0	0
Max	1.0	1.0	425	1.0	1.0	1.0	1.0	1.0	25.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	4.3	1.0
Mean	0.5	0.3	246	0.5	0.7	0.1	0.1	0.0	15.2	48.7	56.7	55.8	47.3	39.1	48.5	44.9	40.2	42.2	39.4	2.7	.87
SD	0.1	0.2	96	0.5	0.5	0.3	0.3	0.3	3.2	8.8	5.5	6.3	10.1	11.8	9.1	14.7	10.0	9.3	10.4	0.9	.30

Note. Correlations >.04 are significant at  $p < .05$ . Correlations > .20 are in **bold**. Cronbach's alphas for Engage scales are on the diagonal.



Table 3. *Indirect, Direct, and Total Effects for the Model.*

Effect	10 <sup>th</sup> Grade GPA			On-time High School Graduation								
	Beta	SE	P-value	Indirect Effects			Direct Effects			Total Effects		
	Beta	SE	P-value	Beta	SE	P-value	Beta	SE	P-value	Beta	SE	P-value
Intercept	0.027	0.108	0.805				3.904*	0.574	<.0001	2.784*	0.491	<.0001
School demographics												
School % FRL	0.075	0.064	0.244	0.158	0.136	0.245	-0.222	0.272	0.413	0.154	0.279	0.582
School % Minority	-0.101*	0.045	0.024	-0.214*	0.095	0.025	0.089	0.188	0.634	-0.189	0.191	0.324
School Size	-0.011	0.055	0.836	-0.024	0.117	0.836	0.120	0.241	0.619	0.285	0.246	0.247
Student demographics												
Male	-0.170*	0.029	<.0001	-0.360*	0.064	<.0001	0.052	0.161	0.747	-0.251	0.137	0.066
White	0.110	0.104	0.290	0.232	0.220	0.291	-0.385	0.549	0.484	0.048	0.470	0.919
Black	0.000	0.112	0.998	-0.001	0.238	0.998	-0.407	0.576	0.480	-0.123	0.493	0.803
Hispanic	-0.114	0.108	0.294	-0.241	0.230	0.295	-0.290	0.568	0.610	-0.340	0.486	0.485
Other Race/Ethnicity	0.079	0.110	0.473	0.167	0.233	0.473	-0.106	0.584	0.856	0.046	0.498	0.926
Prior academic achievement												
Explore Composite	0.468*	0.015	<.0001	0.990*	0.067	<.0001	0.130	0.107	0.228	0.764*	0.085	<.0001
Psychosocial factors												
Academic Discipline	0.232*	0.021	<.0001	0.491*	0.052	<.0001	0.034	0.101	0.737	0.340*	0.087	<.0001
Commitment	-0.042*	0.019	0.028	-0.089*	0.041	0.029	0.074	0.084	0.381	-0.020	0.070	0.773
Family Attitude	0.036	0.019	0.062	0.075	0.041	0.064	0.078	0.085	0.361	0.136	0.073	0.061
Family Involvement	0.019	0.020	0.348	0.040	0.043	0.348	0.040	0.103	0.697	0.082	0.087	0.347
Managing Feelings	-0.003	0.020	0.892	-0.006	0.043	0.892	0.064	0.104	0.537	0.017	0.092	0.852
Optimism	0.016	0.019	0.407	0.033	0.040	0.408	0.184	0.098	0.060	0.175*	0.082	0.033
Orderly Conduct	0.121*	0.020	<.0001	0.257*	0.045	<.0001	0.217*	0.101	0.032	0.372*	0.087	<.0001
Relat. w/ Sch. Pers.	0.033	0.021	0.107	0.071	0.044	0.109	-0.014	0.114	0.902	0.040	0.098	0.685
School Climate	-0.033	0.018	0.067	-0.070	0.038	0.069	-0.166	0.096	0.084	-0.160	0.082	0.052
Think. Bef. Acting	-0.024	0.018	0.186	-0.051	0.039	0.188	-0.101	0.095	0.287	-0.176*	0.083	0.035
10 <sup>th</sup> grade GPA							2.117*	0.126	<.0001			

Note. \* Significant at  $p < 0.05$