Psychology in the Schools, Vol. 53(3), 2016
View this article online at wileyonlinelibrary.com/journal/pits

DOI: 10.1002/pits.21901

INTRINSIC MOTIVATION, LEARNING GOALS, ENGAGEMENT, AND ACHIEVEMENT IN A DIVERSE HIGH SCHOOL

JOHN MARK FROILAND

University of Northern Colorado

FRANK C. WORRELL

University of California-Berkeley

Using structural equation models, with gender, parent education, and prior grade point average (GPA) as control variables, we examined the relationships among intrinsic motivation to learn, learning goals, behavioral engagement at school, and academic performance (measured by GPA) in 1,575 students in an ethnically and racially diverse high school. Intrinsic motivation to learn was indirectly and positively related to academic performance via classroom engagement. Seventy-five percent of the variance in engagement and 33% of the variance in GPA were explained by variables in the study. Results were generally replicated when the model was tested separately with the 336 African American students and the 311 Latin@ students. The significant indirect effect of intrinsic motivation to learn on GPA via engagement, as well as the positive direct association between learning goals and academic performance, suggest that students will benefit from schools fostering intrinsic motivation to learn and learning goals. © 2016 Wiley Periodicals, Inc.

Intrinsic motivation to learn (i.e., enjoyment of learning) has been repeatedly associated with a variety of constructs, including long-term achievement (Froiland & Oros, 2014), conceptual understanding (Vansteenkiste, Timmermans, Lens, Soenens, & Van den Broeck, 2008), giftedness (Worrell, Roth, & Gabelko, 2006), less anxiety during homework and school (Froiland, 2011), mastery goals (Kover & Worrell, 2010), voluntary persistence in educational tasks (Froiland, 2015), lower rates of skipping school (Worrell & Hale, 2001), lower high school dropout rates (Vallerand, Fortier, & Guay, 1997), and various other aspects of academic success and psychological wellbeing (Ryan & Deci, 2000). Intrinsic motivation has its greatest impact on achievement indirectly through classroom or behavioral engagement (e.g., engaging in class discussion, paying close attention to what is taught; Guthrie, McRae, & Lutz Klauda, 2007; Walker, Greene, & Mansell, 2006).

Intrinsic motivation has also been labeled by some researchers as emotional engagement, and researchers have found that emotional engagement predicts the development of behavioral engagement (Skinner, Furrer, Marchand, & Kindermann, 2008). In essence, intrinsic motivation to learn leads to students engaging deeply in reading, math, science, and history (Brophy, 2013; Froiland, 2014; Froiland & Oros, 2014; Guthrie et al. 2007). According to self-determination theory, intrinsic motivation is the highest form of autonomous motivation. Identified regulation, wherein one does not necessarily enjoy learning, but sees it as important, is also a form of autonomous motivation. However, intrinsic motivation has stronger positive relationships with achievement and indicators of psychological well-being (Ryan & Deci, 2000).

In the present study, we examined the interrelationships among intrinsic motivation, learning goals, engagement, and academic achievement using structural equation modeling. Although previous studies have examined the relationship between each of these variables and academic achievement, few studies have looked at all of these variables together. The only other published study that we could find was an intervention study that raised seventh graders' achievement while

---

John Mark Froiland is now at Pearson Clinical Assessment. A travel award from the Society for the Study of School Psychology helped make this collaborative research possible.

Correspondence to: John Mark Froiland, Pearson Clinical Assessment San Antonio, 19500 Bulverde Road, San Antonio, TX 78259-3701. E-mail: john.froiland@pearson.com

preventing declines, relative to the control group, in their intrinsic motivation, learning goals orientation, and behavioral engagement (Grolnick, Farkas, Sohmer, Michaels, & Valsiner, 2007). In that study, the sample ($N = 90$) was too small to analyze whether the treatment worked equally well for Latin@,[1] African American, and European American youth. Based on previous literature, we included gender, parental education, and previous academic achievement in the model, as we were interested in the contributions of the motivational constructs above and beyond the contributions of demographic variables and previous achievement. We also examined the model with only the African American students and with only the Latin@ students to see whether the relationships among the variables held for these two groups of diverse learners who are on the lower end of the achievement gap (Worrell, 2014a, 2014b). To set the stage for this large study among diverse students, we briefly review the extant literature on the relationship of learning goals and engagement to academic achievement.

Learning Goals, Engagement, and Academic Achievement

In general, students who have learning goals or mastery goals are much more likely to enjoy learning than are those who are focused primarily on avoiding failure or getting good grades (Dweck & Leggett, 1988; Kover & Worrell, 2010). Students who emphasize learning goals also obtain higher grades than do students who focus on their performance (Dishon-Berkovits, 2014; Latham & Brown, 2006), although performance-approach goals (e.g., "I want to improve my grade by 5%") are much more beneficial than are performance-avoidance goals (e.g., "I don't want to bomb the test;" Pintrich, 2000).

Blackwell, Trzesniewski, and Dweck (2007) found that middle school students who were taught a growth mindset (a belief that one grows smarter through rigorous mental exercise) also reported developing learning goals (e.g., preferring challenging tasks that stimulate greater learning over easier tasks that make one appear smart) and zeal for math, and these students performed better on math tests than did students in the control group. Froiland (2011) found that students who were explicitly taught to apply learning goals to homework tasks had increased parent-rated intrinsic motivation to learn and student-rated positive emotions toward learning, relative to a control group. Learning goals and intrinsic motivation to learn can work in concert with behavioral engagement to promote achievement (Grolnick et al., 2007).

Engagement in learning opportunities at school is considered an observable manifestation of intrinsic motivation to learn (Froiland & Oros, 2014; Guthrie et al., 2007; Reeve, Jang, Carrell, Jeon, & Barch, 2004). Behavioral engagement includes paying attention in class, expending effort, participating in discussions, and persisting on tasks (Froiland & Oros, 2014; Reeve et al., 2004). Numerous studies have found that engagement predicts academic achievement (e.g., Froiland & Oros, 2014; Greene, Miller, Crowson, Duke, & Akey, 2004). In fact, both theory and research suggest that intrinsic motivation predicts engagement, which in turn, predicts academic performance and achievement (Greene et al., 2004; Walker et al., 2006).

Other Correlates of Achievement

Other important variables are often related to students' engagement and academic performance, including gender, parent education, and prior achievement. For instance, girls are usually more engaged in high school classrooms than are boys (Benner, 2013) and often have higher GPAs (Benner, 2013; Froiland & Davison, 2014b). Furthermore, prior achievement is positively related

[1]Latin@ is a gender-neutral term that concisely includes both males and females. It may be pronounced with an "ow" at the end (Demby, 2013).

to both engagement in the classroom and later achievement (Froiland & Oros, 2014), but is often not included in studies, which can result in an overestimation of the contribution of motivational constructs to current achievement (Froiland, Peterson, & Davison, 2013).

Many studies have also found that parent education is positively associated with achievement (e.g., Froiland, Powell, Diamond, & Son, 2013; Jeynes, 2012; Powell, Son, File, & Froiland, 2012), and there is also evidence that the effects of parent education on achievement are partially indirect via engagement (Fantuzzo, LeBoeuf, Rouse, & Chen, 2012). Race/ethnicity is often a significant predictor of achievement (e.g., Froiland & Oros, 2014). However, Worrell (2014b) has argued that the best way to increase understanding of achievement among ethnicities that have faced significant oppression or disadvantage is not necessarily to include race or ethnicity as a control variable. He contended that it may be more useful to examine whether social psychological factors contribute to achievement similarly or differently among different ethnic groups.

The Present Study

It is important to examine the extent to which learning goals, intrinsic motivation to learn, and engagement contribute in concert to achievement in high school for several reasons. First, although each of these variables predicts achievement, the field will benefit from knowing to what extent they are additive; that is, do these interrelated constructs predict substantially more variance than the individual constructs? Second, although structural equation modeling of cross-sectional data does not allow for causal inferences, it does allow researchers to examine theoretically driven predictive relationships and see how well the data fit, providing guidance for experimental and intervention studies. Third, this study includes students from different racial/ethnic groups, allowing us to examine whether these psychosocial predictors make similar contributions to achievement outcomes across the groups (Worrell, 2014b). Finally, as noted previously, we did not find another high school study that examined these four important constructs simultaneously.

The structural equation model included motivational constructs (intrinsic motivation, learning goals, and engagement), demographic variables (gender and parent education), and academic achievement (GPA in 2010 and 2012). Controlling for parent education, gender, and prior GPA, we hypothesized that (1) intrinsic motivation would be positively associated with engagement, (2) intrinsic motivation would be positively associated with learning goals, (3) learning goals would be positively associated with GPA, and (4) engagement would be positively associated with GPA. We also hypothesized that (5) parent education would have positive direct and indirect (via engagement) associations with GPA and that (6) intrinsic motivation would also be indirectly and positively related to GPA via engagement. In addition, we hypothesized that these findings would hold when the model was tested separately for African American and Latin@ students.

Method

Participants

Participants consisted of 1,575 students (53% female) from a diverse high school in the San Francisco Bay Area. The major race/ethnicity designations were as follows: European American (37.7%), African American (21.8%), Latin@ (20.2%), and mixed race/ethnicity (10.8%). There were a variety of students from other racial/ethnic groups, but they each consisted of 3% or fewer in the sample: 1% Indian, 3% Chinese, 1% Filipino, 0.3% Japanese, 0.1% Laotian, 0.6% Vietnamese, 0.2% Korean, 0.2% Cambodian, 2.7% other Asian, 0.5% Native American, and 0.1% Pacific Islander. Twenty-seven percent of students were in ninth grade, 25% were in 10^{th} grade, 23% were in 11^{th} grade, and 25% were in 12^{th} grade.

Parent education was also obtained from district records. A third of the parents (32.8%) had graduate degrees, 23% had undergraduate degrees, 17.9% had some college classes, 10.9% had a high school diploma, 6.4% did not complete high school, and no information was available on 9.4%. The Bay Area is known for adult education levels that are well above the national average. For instance, 53% of adults in the city of San Francisco have a bachelor's degree or higher (U.S. Census Bureau, 2013); thus, the parents of the students in this diverse sample had levels of education that are representative of the area.

Measures

Major Variables. Intrinsic motivation was a latent variable derived from students' ratings on the four items assessing students' enjoyment in a class context: (a) "When I'm in class, I feel good"; (b) "When we work on something in class, I feel interested"; (c) "Class is fun"; and (d) "I enjoy learning new things in class." Responses to all items were on a 1 to 7 Likert-type scale (e.g., 1 = *not at all true*; 4 = *somewhat true*; 7 = *very true*). These four items were taken from a five-item scale of emotional engagement developed by Skinner et al. (2008). The fifth item, "When we work on something in class, I get involved," was not included because it does not clearly tap into intrinsic motivation or emotional engagement, as people may get involved because they may feel pressured or for extrinsic incentives. Scores on this scale have demonstrated stability over the course of the school year (fall to spring $r = .63$, $p < .001$; Skinner et al., 2008), have exhibited moderate concurrent validity ($r = .57$, $p < .001$) with behavioral engagement, and have predicted the development of behavioral engagement over the course of a school year (Skinner et al., 2008). The internal consistency estimate (α) for these scores was .91 in the total sample, .90 in the African American subsample, and .91 in the Latin@ subsample.

Engagement was a latent variable derived from students' ratings on the five items assessing students' reports of behavioral engagement in the classroom. The items include (a) "I try hard to do well in school"; (b) "In class, I work as hard as I can"; (c) "When I'm in class, I participate in class discussions"; (d) "I pay attention in class"; and (e) "When I'm in class, I listen very carefully." These items were rated on the same 1 to 7 Likert-type scale as the intrinsic motivation items. This scale's scores have demonstrated stability over the course of the school year (fall to spring behavioral engagement $r = .57$, $p < .001$; Skinner et al., 2008). As evidence of validity, this measure of behavioral engagement was negatively related to boredom, frustration, and anxiety (Skinner et al., 2008). These scores also showed evidence of internal consistency; the alpha was .90 for the total sample, .91 for African Americans, and .90 for Latin@s.

Learning goals was a latent variable composed of two variables taken from Dweck's (1999, 2006) goal choice measures, preference for learning and preference for challenge. The preference for challenge question asks students to choose between the following two options: (a) getting a higher grade in an easy course, coded as a zero, versus (b) being challenged in a difficult course, even if one gets a lower grade, coded as 1. Preference for learning was based on responses to the following question: "In school, I prefer to work on" (a) "Assignments/projects/problems that are not too hard, so I do not get many wrong"; (b) "Assignments/projects/problems that I'll learn a lot from, even if I won't look so smart"; (c) "Assignments/projects/problems that are pretty easy, so I'll do well"; or (d) "Assignments/projects/problems that I am pretty good at, so I can show I am smart." Option two, the learning goal, was coded as 1, and each of the other three options were coded as zero. Researchers have reported that the mastery and learning goal options are related to higher levels of intrinsic motivation and achievement than the ego-avoidance and ego-approach goal options (Dweck, 1999, 2006; Smith, 2005). More recently, Atwood (2010) found that students were more likely to endorse the mastery and learning options in relation to sports (60% to 75%) than to

Table 1
Descriptive Statistics for Variables in Study

	Range	Mean	*SD*
Feel good in class	1–7	4.57	1.65
Interested	1–7	4.79	1.54
Fun in class	1–7	4.24	1.72
Enjoy new learning	1–7	5.23	1.53
Prefer learning	0–1	0.45	0.50
Prefer challenge	0–1	0.43	0.49
Parent education	1–5	3.73	1.26
Pay attention	1–7	5.40	1.38
Discussions	1–7	5.12	1.62
Work hard in class	1–7	5.23	1.44
Try hard in school	1–7	5.60	1.45
Listen carefully	1–7	5.19	1.42
GPA 2010	0–4	2.61	1.42
GPA 2012	.46–4.0	2.97	0.85
Age	10–19	16.11	1.26

Note. $N = 1{,}575$.

academic outcomes (25% to 44%). Atwood also found that students with an average grade of A were the only subgroup in his sample in which a majority endorsed mastery goals ("problems that I will learn from even if I won't look so smart").

Students' academic achievement was based on their cumulative GPA in the spring of 2012. GPA data for students in the study were obtained from administrative records at the district's research office. GPA in high school has a strong predictive relationship with first-year GPA in college (Sawyer, 2013; Wolfe & Johnson, 1995).

Control Variables. GPA two years earlier (GPA in 2010), gender, parental education, and age were included as control variables in the model. Gender was coded such that 1 = *girl* and 0 = *boy*. Parent's education level was coded as follows: 1 = *less than high school*; 2 = *high school diploma*; 3 = *some college or associate's degree*; 4 = *four-year college degree*; and 5 = *graduate or professional degree*. Parental education is an important control variable in that it has predicted long-term motivation, engagement, and achievement in many studies (e.g., Froiland & Oros, 2014; Powell et al., 2012). Although intrinsic motivation usually declines with age in elementary and middle school (e.g., Lepper, Corpus, Henderlong, & Iyengar, 2005), it often stabilizes once students are in high school (Gillet, Vallerand, & Lafrenière, 2012); thus, we were not certain whether age would have a significant association with intrinsic motivation. We included age in bivariate correlations to examine whether it was significantly related to key variables. Means and standard deviations for age and all the variables in the models except gender are included in Table 1.

Procedure

Data were obtained from an ongoing study at the high school. The high school collects data on a variety of variables (e.g., motivation, school climate, student achievement) to inform decisions by the leadership team. As the data collection is approved by the district's research office and used by the school and district administration to inform educational decision making at the school site, the district uses student assent for participation. Thus, the survey is administered to all students,

but students do not have to participate if they choose not to. The school administers the surveys, and when the survey data are entered, these data are merged with demographic data from the district using student identification numbers as the linking variable. One of the researchers assists the school in developing the surveys, entering the data from the surveys, and preparing a report for the school leadership team every fall. In return for these services, de-identified data files are made available for research, which has been approved by the institutional review board of the researcher's institution.

In the current study, the sample represents 49% of the student body. Although the final sample is not random, it is considered representative of the school population based on a variety of indicators, including grade-level representation (each grade constitutes ≈ 25% of sample), gender representation, range of GPA, and representation from the learning communities that make up the school. All of the variables in the study, with the exception of the GPA variables, were collected on the 2012 survey.

Data Analysis Plan

Structural equation modeling in AMOS 19 was implemented to test the primary model (see Figure 1), affording a simultaneous examination of the multivariate relations between intrinsic motivation to learn, learning goals, engagement, and GPA in 2012, while controlling for parent education, gender, and prior GPA (GPA in 2010). Model fit was determined by a comparative fit index (CFI), an incremental fit index (IFI), and a Tucker–Lewis Index (TLI) of .95 or higher, as well as a root mean square error of approximation (RMSEA) less than .06 (Hu & Bentler, 1999). Because a large *n* makes the model very unlikely to have a nonsignificant chi-square (Kenny, 2011), the Hoelter Index was used, which indicates how small the sample size would need to be for the chi-square to become nonsignificant (Kenny, 2014). Due to the large sample size in the current study, the CFI, IFI, TLI, and RMSEA were given more weight (Froiland & Davison, 2014a). Because measures of a construct taken at the same time are considered to covary, errors of the observed intrinsic motivation variables were allowed to correlate (Byrne, 2001). The same was done for the observed engagement variables.

Structural equation modeling analyses were conducted with 1,575 cases, including some missing data, which was handled through full information maximum likelihood (FIML) estimation. On most items, the amount of missing data ranged from 1% (e.g., GPA in 2012) to 14% (engagement items). However, data were missing for prior GPA 58% of the time because many students had graduated or moved from the high school over the course of 2 years. To test whether the amount of missing data in prior GPA was affecting the results, we tested Model 1 both with and without prior GPA. FIML is one of the most advanced and effective ways of handling missing data in structural equation modeling (Enders & Bandalos, 2001) and in general (Baraldi & Enders, 2010). To test indirect relations between intrinsic motivation and GPA via engagement, the bootstrapping test was used to examine the significance of the indirect effect (Shrout & Bolger, 2002).

To see whether the model held for African American students, the primary model was employed again, but only with the 336 African American students in the study. Model fit and coefficient comparisons were made to see whether the results were equivalent in value. In a third model, the primary model was tested for the 311 Latin@ students.

Results

Preliminary Findings

Table 2 shows bivariate correlations among each of the noncategorical variables used in the study. As expected, the intrinsic motivation variables were each significantly related ($p < .0005$),

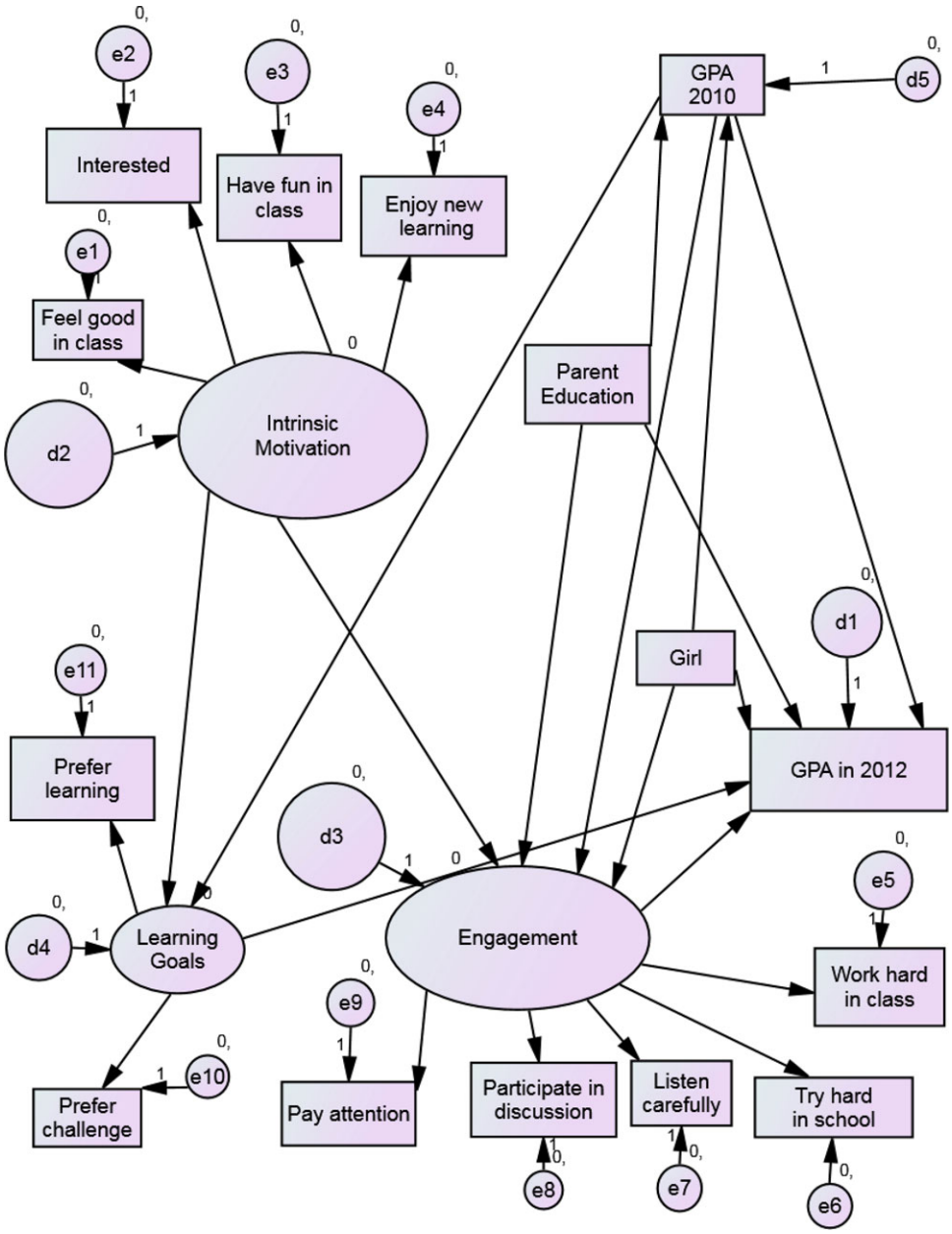

FIGURE 1. Model 1 examining the relationships among Intrinsic Motivation, Learning Goals, Engagement, control variables, and growth in GPA.

albeit modestly, to GPA in 2012. The engagement variables were also significantly related to GPA in 2012, with higher correlation coefficients than those between intrinsic motivation and GPA in 2012. Parent education had a moderate association with GPA in 2012. Students' age was not significantly or meaningfully related to the variables in the study. Therefore, age was not included in the structural equation model.

Table 2
Bivariate Correlations for Noncategorical Variables Relevant to Motivation, Engagement, and Achievement

	1	2	3	4	5	6	7	8	9	10	11	12
1. Feel good	–											
2. Interested	.77*	–										
3. Fun	.75*	.73*	–									
4. Enjoy	.63*	.72*	.67*	–								
5. Parent ed.	–.04	.01	–.04	.04	–							
6. Attention	.63*	.63*	.52*	.61*	.05	–						
7. Discuss	.54*	.54*	.46*	.54*	.18*	.57*	–					
8. Works	.59*	.57*	.48*	.55*	–.01	.69*	.53*	–				
9. Tries	.49*	.47*	.39*	.50*	.07	.59*	.49*	.82*	–			
10. Listen	.68*	.67*	.56*	.65*	.03	.86*	.54*	.71*	.58*	–		
11. GPA 2010	–.07	–.07	–.06	–.05	.07	.01	–.03	.00	–.03	–.01	–	
12. GPA 2012	.11*	.17*	.12*	.23*	.40*	.24*	.28*	.29*	.40*	.20*	.25*	–
13. Age	–.02	–.03	–.02	.02	–.03	.00	–.05	–.07	–.12*	.01	.12	–.04

Note. Fun = fun in class; Enjoy = enjoy new learning; Parent ed. = parent education; Attention = pay attention; Works = work hard in class; Tries = try hard in school; Listen = listen carefully.
*$p < .0005$.

Structural Equation Model Findings

The primary structural equation model (see Figures 2 and 3) provided a good fit with the data, as indicated by the following fit statistics: CFI = .97, TLI = .94, IFI = .97 and RMSEA = .06, 90% CI [.05, .06]. A significant chi-square, $\chi^2(61) = 376.44$, $p < .01$, suggested that the data differed significantly from the model. However, the Hoelter Index indicated that 375 cases or fewer would lead to a nonsignificant chi-square, indicating that significance was due to the size of the sample and not model fit. The RMSEA was right at the cutoff between acceptable and not acceptable. Overall, then, the model fit with the data was adequate.

In keeping with Hypothesis 1, intrinsic motivation ($\omega = .85$) was strongly and positively associated with engagement ($\omega = .93$; see Figure 2 for the standardized coefficients). Hypothesis 2 was also corroborated in that learning goals and intrinsic motivation were moderately and positively associated. As predicted in Hypotheses 3 and 4, learning goals and engagement were positively associated with GPA. The positive association between learning goals and GPA was comparable to the positive association between being a girl and GPA, whereas the effect of engagement was stronger than the effect of sex (see Figure 3). The collective effect of learning goals and engagement was equivalent to the effect of parent education and greater than the effect of prior GPA. All of these coefficients were significant at the .01 level. Comparable results were obtained when prior GPA was not included in the model: Model fit remained good (CFI = .97, TLI = .94, IFI = .97, RMSEA = .06), and behavioral engagement (standardized coefficient = .21, $p < .01$) and learning goals (standardized coefficient = .16, $p < .01$) continued to predict GPA.

As predicted in Hypothesis 5, parent education had both a direct and indirect effect on GPA (standardized indirect effect = .05, $p < .01$); however, the direct effect of parent education on GPA was much larger (see Figure 3). In keeping with Hypothesis 6, intrinsic motivation was indirectly and positively associated with GPA via engagement and learning goals (standardized indirect effect = .26, $p < .01$), such that high school students with higher intrinsic motivation to learn were significantly more engaged at school and preferred intellectual challenges more, which was associated with

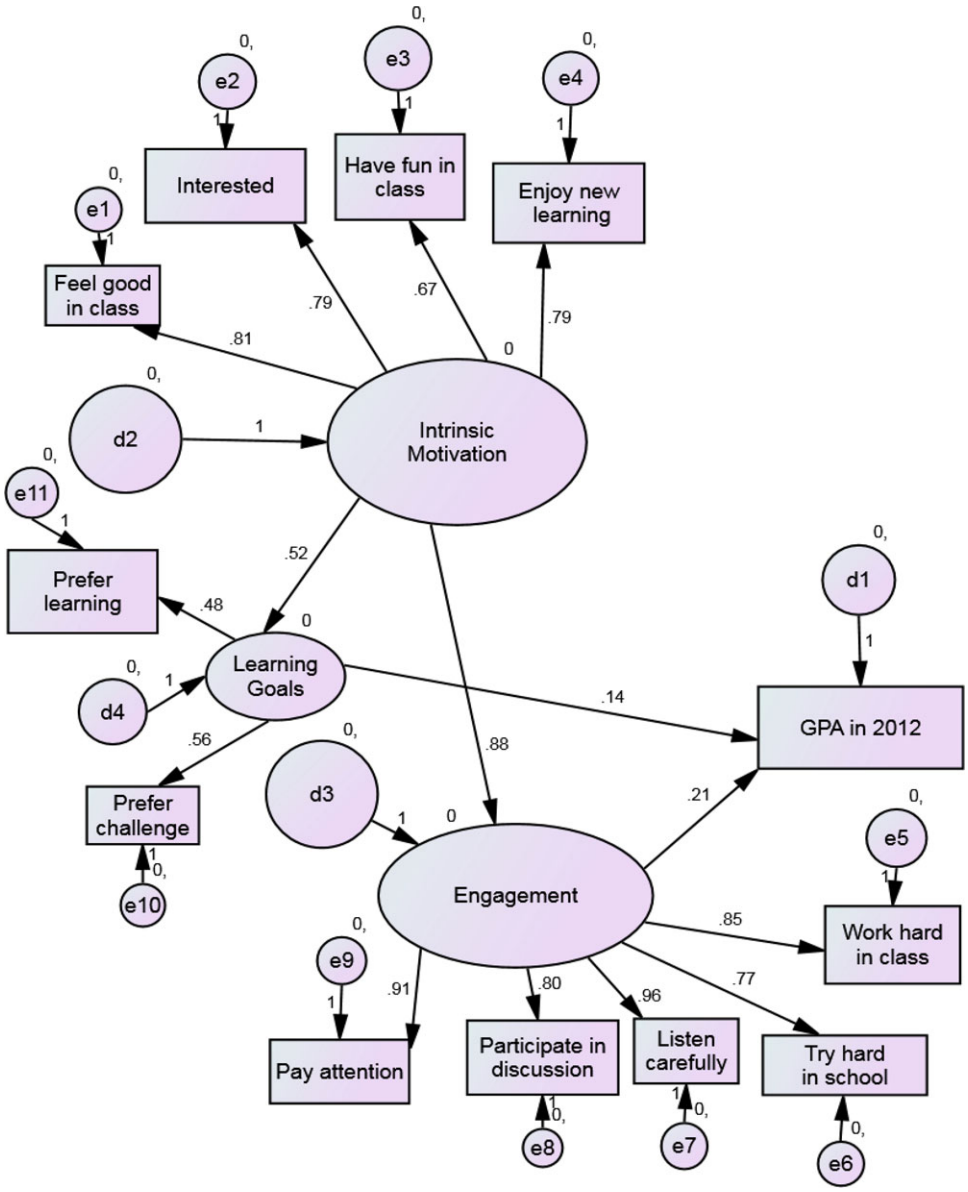

FIGURE 2. All direct paths depicted are significant at $p < .05$. All path coefficients refer to standardized variables with mean 0 and variance 1.0. Control variables were included, but are not depicted in this figure for the sake of visual clarity. See Figure 3 for the full Model 1 that depicts the relationships with control variables. $R^2 = .75$ for Engagement. $R^2 = .33$ for GPA in 2012.

stronger academic performance. Model 1 explained 75% of the variance in engagement and 33% of the variance in GPA in 2012, both of which reflect large effect sizes.

The second model (tested only with African American students) had even better fit than did the first model, based on the fit statistics: CFI = .98, TLI = .97, IFI = .98, and RMSEA = .04. The χ^2 was also somewhat improved, although still significant, $\chi^2(61) = 96.38$, $p < .01$. All of the key social psychological relationships in Model 1 were supported among the African American students.

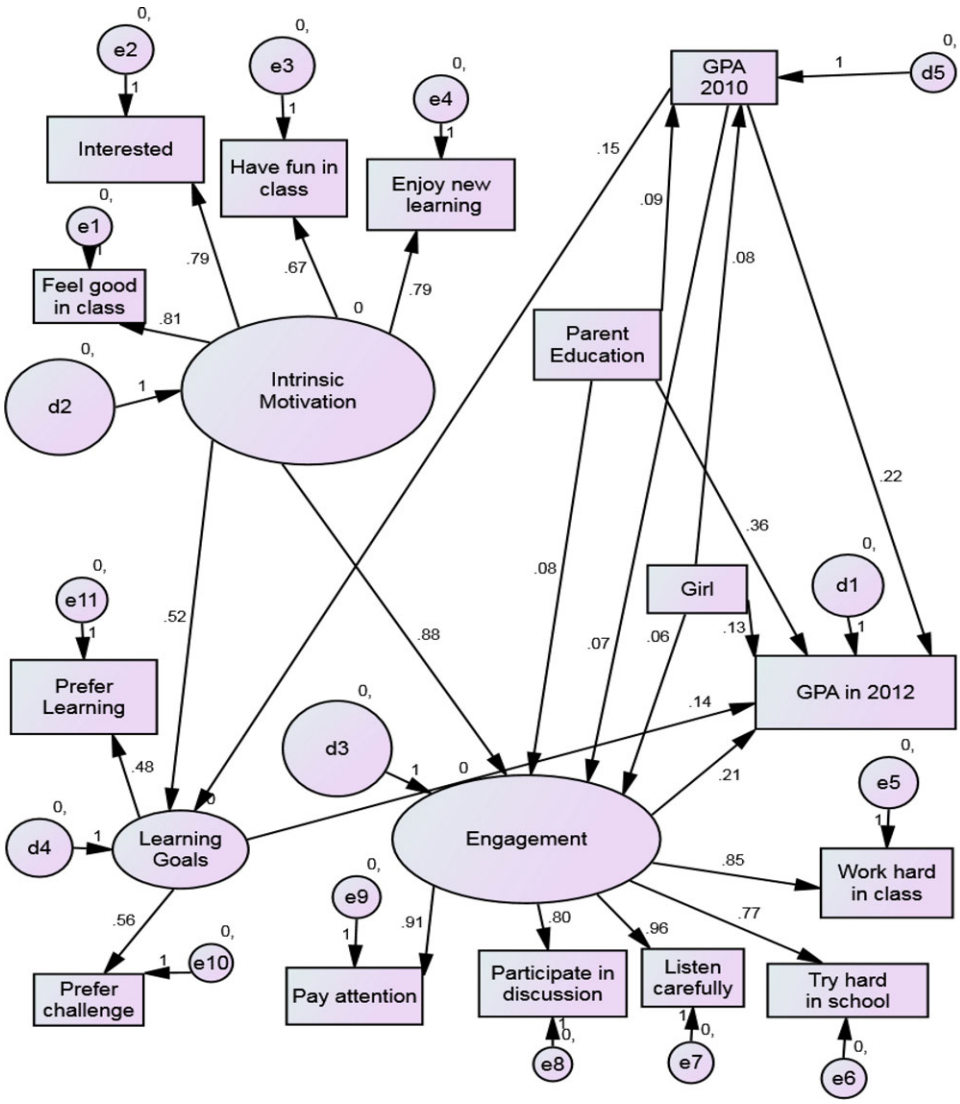

FIGURE 3. All direct paths depicted are significant at $p < .05$. All path coefficients refer to standardized variables with mean 0 and variance 1.0. The following nonsignificant paths were included in the tested model, but are not depicted here for the sake of visual clarity: Learning goals to Engagement, Parent education to Learning goals, Parent education to Intrinsic Motivation, GPA in 2010 to Intrinsic Motivation, and Girl to Intrinsic Motivation. Likewise, exhaustive covariances between all exogenous variables were included in the test of the SEM model, but they are not depicted here for the sake of visual clarity. $R^2 = .75$ for Engagement. $R^2 = .33$ for GPA in 2012.

For instance, intrinsic motivation ($\omega = .84$) was still strongly associated with engagement ($\omega = .92$), and engagement was even more strongly associated with GPA in 2012 (standardized coefficient = .30 in Model 2 vs. .21 in Model 1). These key relationships remained statistically significant with the much smaller sample size. However, the association between learning goals and GPA in 2012 was no longer significant in Model 2, despite having the same standardized coefficient (.14) as in Model 1. The positive association between learning goals and intrinsic motivation remained significant in Model 2, but the standardized coefficient decreased in size from .52 to .38. Model 2 explained the

same amount of variance in engagement ($R^2 = .75$) and slightly more variance in GPA in 2012 ($R^2 = .35$). Overall, the results for African American students were quite consistent with the results for the whole sample.

The third model (tested only with Latin@ students) had comparable fit to the first model: CFI = .97, TLI = .95, IFI = .97, and RMSEA = .06. The χ^2 was also somewhat improved over Model 1, although still significant, $\chi^2(61) = 125.60$, $p < .01$. All of the key social psychological relationships in Model 1 were supported among Latin@ students. For instance, intrinsic motivation ($\omega = .87$) was still strongly associated with engagement ($\omega = .94$). Also, engagement was positively associated with GPA in 2012 (standardized coefficient = .20 in Model 3 vs. .21 in Model 1 and .30 in Model 2). These key relationships remained statistically significant with the smaller sample size. However, the association between learning goals and GPA in 2012 was no longer significant in Model 3, despite having a larger standardized coefficient, suggesting that sample size and not effect size is driving statistical significance. The positive association between learning goals and intrinsic motivation remained significant in Model 3 (standardized coefficient = .48) and was comparable to the standardized coefficient in Model 1 (.52). Model 3 explained a little more variance in engagement ($R^2 = .84$) and slightly less variance in GPA in 2012 ($R^2 = .30$). Overall, the results for Latin@ students were quite consistent with the results for the whole sample.

Discussion

This is the first study that simultaneously examined learning goal orientation, intrinsic motivation, classroom engagement, and students' achievement in a sample of high school students. Furthermore, the findings were replicated with both African American and Latin@ subsamples, which is valuable because not enough studies have examined whether social psychological contributors (e.g., intrinsic motivation) to academic performance are similar among different races and ethnicities (Worrell, 2014b). The current study confirmed and extended the findings of previous studies that have found that intrinsic motivation is positively associated with engagement (e.g., Walker et al., 2006) and achievement (e.g., Froiland & Oros, 2014). In fact, the current findings indicate that intrinsic motivation has an indirect positive association with GPA via engagement, which is in keeping with (a) self-determination theory's claim that intrinsic motivation leads to engagement (Ryan & Deci, 2009), and (b) the self-system model of motivational development, which suggests that engagement is the key mediator between intrinsic motivation and academic performance (Skinner, Kindermann, Connell, & Wellborn, 2009).

The current study also indicates that learning goals are positively associated with both GPA and intrinsic motivation, even when controlling for prior GPA, parent education, and gender. Whereas results from previous studies have also indicated that learning or mastery goals are related to intrinsic motivation (e.g., Froiland, 2011; Kover & Worrell, 2010) and academic performance (e.g., Dishon-Berkovits, 2014; Latham & Brown, 2006), this is the first study that indicates that learning goals contribute to academic performance above and beyond intrinsic motivation, engagement, and demographic variables. Vansteenkiste et al. (2008) have shown that intrinsic goals for learning (e.g., I want to use what I learn to help people) predict intrinsic motivation and deeper conceptual learning of a text in a short-term experiment, but they did not measure classroom engagement. Although the coefficients between learning goals and achievement were not statistically significant in the Latin@ and African American subsamples, given the similar standardized coefficients, the lack of statistical significance is due to lower statistical power in the subsamples and not a difference in practical significance or size of the effect. Nonetheless, it will be worthwhile to examine these relationships in future studies with larger numbers of Latin@ and African American students.

This study also replicated the Fantuzzo et al. (2012) finding that the effects of parent education on achievement are partially mediated by engagement. However, the indirect effect of parent education was much smaller than the positive direct association between parent education and GPA. This difference is probably because parents who are highly educated do a number of additional things to promote educational success beyond promoting engagement, such as supporting learning beyond school (Froiland, 2014). This study also showed that girls have higher engagement and academic achievement, a finding that is becoming more common across national contexts (e.g., Benner, 2013; Martin, 2007; Reeve & Lee, 2014). Interestingly, neither parent education nor gender was directly related to intrinsic motivation, although pathways from these variables toward engagement were significant.

Implications for School Psychologists and Educators

This study indicates that intrinsic motivation to learn is strongly related to classroom engagement for students of diverse ethnic and racial backgrounds. Often, schools and school psychologists focus on increasing classroom engagement (a.k.a. behavioral engagement) and on-task behavior because they are far more readily observable (Froiland & Smith, 2014; Lee & Reeve, 2012). However, intrinsic motivation to learn provides the fuel for sustained engagement (Froiland, Mayor, & Herlevi, 2015) and promotes happiness and high school completion, while preventing academic anxiety and depression (Froiland, 2011; Ryan & Deci, 2000; Vallerland et al., 1997). Therefore, researchers and school psychologists may benefit from greater consideration of intrinsic motivation to learn as an intervention target to promote academic engagement and achievement, while promoting mental health. This strategy is especially important, because teachers often do not realize that they are hampering students' intrinsic motivation and achievement through highlighting the consequences of failure and other unintentionally controlling methods of motivating students (Putwain & Remedios, 2014).

Learning goals and conceptually similar mastery goals also work in tandem with intrinsic motivation (Kover & Worrell, 2010) to promote greater psychological well-being (Froiland, 2011), persistence in homework (Froiland, 2015) and achievement (Greene et al., 2004). School psychologists are usually quite skilled at helping teachers and students set targeted performance-approach goals (Froiland, 2014), which often promote greater effort and achievement (Pintrich, 2000). However, this study indicates that learning goals are also moderately associated with intrinsic motivation and contribute to academic performance in high school. Furthermore, recent studies have found that learning goals can be taught to students and contribute to both emotional health and achievement (e.g., Blackwell et al., 2007; Dishon-Berkovits**,** 2014; Froiland, 2011; Latham & Brown, 2006). Therefore, we suggest that school psychologists can help educators and parents empower students to develop their intrinsic motivation, learning goals, and engagement to achieve more and enjoy the process of learning throughout high school, rather than spending far too many days being bored, anxious, or apathetic toward classes and homework.

Motivation in Different Racial/Ethnic Groups

As noted previously, there is a longstanding achievement gap among racial/ethnic groups in the United States, with European American and some Asian American groups having consistently higher achievement than African Americans, Latin@s, Native Americans, and some Asian groups (Aud, Fox, & KewalRamani, 2010; Worrell, 2014a, 2014b). Several theoretical models positing interactions between cultural identities and achievement orientations have been put forward to explain this gap, with the most prominent of these being Steele's (1997, 2010; Steele & Aronson, 1995) stereotype threat and Ogbu's (1978, 1992, 2008; Ogbu & Simons, 1998) cultural ecological theory. Given (a)

data indicating that African Americans and Latin@s have a strong preference for therapists of the same race/ethnicity (Cabral & Smith, 2011), (b) evidence suggesting that psychotherapy that is specifically adapted to clients of color is more effective (Smith, Domenench Rodríguez, & Bernal, 2011), and (c) the dearth of minority school psychologists (Castillo, Curtis, & Gelley, 2013), it is often assumed that the current, predominantly White and female school psychologist community can do little to address the achievement gap issues. Indeed, some minority scholars have contended that psychological theories that apply to European Americans are not useful in understanding the psychological functioning of ethnic minorities (e.g., Burlew, Banks, McAdoo, & Azibo, 1992).

However, this study adds to a growing set of research that contradicts this claim, at least in the education arena. As the findings in this study indicate, the relationships among intrinsic motivation, engagement, and academic achievement are the same across racial/ethnic groups, and the motivational constructs are equally useful in predicting academic achievement in the different groups. Moreover, there is a growing body of research showing that social psychological interventions have a positive effect on the academic performance of racial/ethnic minority students (Yeager & Walton, 2011). The contention here is not that culture and context do not matter—indeed, they do (Worrell, 2014a); rather, the claim is that other general psychological phenomena, such as motivation, are equally important in minority and majority populations and that many of the academic and behavioral interventions that have been developed will be useful with students, regardless of their racial/ethnic backgrounds (Frisby, 2013; Worrell, 2014b). As Frisby (1992) observed more than two decades ago, we need to be able to distinguish between when culture matters and when it does not.

Limitations and Directions for Future Research

There are several limitations to the current study. First, with the exception of obtaining GPA 2 years prior via administrative records, this study relied on one wave of data, which precludes examining causal relationships. Future longitudinal studies should examine the extent to which learning goals, intrinsic motivation, and engagement contribute in concert to long-term academic development. Furthermore, intervention studies among high school students that seek to elevate learning goals, intrinsic motivation, engagement, and achievement can provide further insight into the role of each in increasing achievement. Based on a related intervention study with middle school students, such an intervention would likely have positive effects on all of these variables (Grolnick et al., 2007).

Classroom engagement should also be assessed via teacher report in the future, because teachers are quite good at observing and estimating students' classroom engagement, whereas students are better at reporting on their own intrinsic motivation (Froiland & Oros, 2014; Lee & Reeve, 2012). Teacher reports of engagement will also reduce the potential inflation of statistical estimates due to shared variance among self-report items. Finally, only African American and Latin@ students were represented in large enough numbers to test the structural model, so we cannot be certain that it applies to all other subgroups. In addition, many of the students involved in this study had parents with higher education levels than the national average, thereby limiting the generalization of these findings to students from less affluent areas. Nevertheless, this study used sophisticated controls, including parent education, gender, and prior academic performance (Jeynes, 2007), and pointed to the importance of engagement as an expression of intrinsic motivation to learn.

Conclusion

Learning goals, intrinsic motivation, and classroom engagement each contribute to academic performance in high school, and this contribution is similar across several racial/ethnic groups. Intrinsic motivation is strongly associated with engagement and indirectly associated with academic

performance via engagement. Rather than solely focus on increasing behavioral engagement as a pathway to increased achievement, school psychologists and intervention researchers may wish to promote intrinsic motivation to learn, because both substantive theory and empirical studies indicate that intrinsic motivation fosters deep engagement. Students who are intrinsically motivated and deeply engaged with learning opportunities not only achieve more, but are more likely to be happy and emotionally healthy (Ryan & Deci, 2000). Learning goals also support both intrinsic motivation (Froiland, 2011) and academic performance (Latham & Brown, 2006), so future longitudinal and intervention studies may wish to assess the combined effects of intrinsic motivation, learning goals, and engagement on achievement in both the shorter and longer term.

References

Atwood, J. R. (2010). Mindset, motivation, and metaphor in school and sport: Bifurcated beliefs and behavior in two different achievement domains. The International Journal of Sport and Society, 1, 1–16.

Aud, S., Fox, M., & KewalRamani, A. (2010). Status and trends in the education of racial and ethnic groups (NCES 2010-015). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Baraldi, A. N., & Enders, C. K. (2010). An introduction to modern missing data analyses. Journal of School Psychology, 48, 5–37.

Benner, A. (2013). Exit examinations, peer academic climate, and adolescents' developmental outcomes. Journal of School Psychology, 51, 67–80.

Blackwell, L. S., Trzesniewski, K. H., & Dweck, C. S. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. Child Development, 78, 246–263.

Brophy, J. E. (2013). Motivating students to learn. Oxford, UK: Routledge.

Burlew, K. H., Banks, W. C, McAdoo, H. P., & Azibo, D. A. (1992). African American psychology: Theory, research and practice. Thousand Oaks, CA: Sage.

Byrne, B. M. (2001). Structural equation modeling with AMOS. Mahwah, NJ: Lawrence Erlbaum Associates.

Cabral, R. R., & Smith, T. R. (2011). Racial/ethnic matching of clients and therapists in mental health services: A meta-analytic review of preferences, perceptions, and outcomes. Journal of Counseling Psychology, 58, 537–554.

Castillo, J. M., Curtis, M. J., & Gelley, G. D. (2013). Gender and race in school psychology. School Psychology Review, 42, 262–279.

Demby, G. (2013). 'Latin@' offers a gender-neutral choice; But how to pronounce it? Retrieved from http://www.npr.org/sections/thetwo-way/2013/01/07/168818064/latin-offers-a-gender-neutral-choice-but-how-to-pronounce-it

Dishon-Berkovits, M. (2014). A study of motivational influences on academic achievement. Social Psychology of Education, 17, 327–342.

Dweck, C. S. (1999). Self-theories: Their role in motivation, personality, and development. Philadelphia, PA: Psychology Press.

Dweck, C. S. (2006). Mindset: The new psychology of success. New York, NY: Random House.

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. Psychological Review, 95, 256–273.

Enders, C. K., & Bandalos, D. L. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. Structural Equation Modeling, 8, 430–457.

Fantuzzo, J., LeBoeuf, W., Rouse, H., & Chen, C.-C. (2012). Academic achievement of African American boys: A city-wide community—based investigation of risk and resilience. Journal of School Psychology, 50, 559–579.

Frisby, C. L. (1992). Issues and problems in the influence of culture on the psychoeducational needs of African-American children. School Psychology Review, 21, 532–551.

Frisby, C. L. (2013). Meeting the psychoeducational needs of minority students: Evidence-based guidelines for school psychologists and other school personnel. Hoboken, NJ: Wiley.

Froiland, J. M. (2011). Parental autonomy support and student learning goals: A preliminary examination of an intrinsic motivation intervention. Child and Youth Care Forum, 40, 135–149.

Froiland, J. M. (2014). Inspired childhood: Parents raising motivated, happy, and successful students from preschool to college. Seattle, WA: Amazon. http://www.amazon.com/dp/B00LT4OX5O

Froiland, J. M. (2015). Parents' weekly descriptions of autonomy supportive communication: Promoting children's motivation to learn and positive emotions. Journal of Child and Family Studies, 24, 117–226.

Froiland, J. M., & Davison, M. L. (2014a). Home literacy, television viewing, fidgeting and ADHD in young children. Educational Psychology. Advance online publication.

Froiland, J. M., & Davison, M. L. (2014b). Parental expectations and school relationships as contributors to adolescents' positive outcomes. Social Psychology of Education, 17, 1–17.

Froiland, J. M., Mayor, P., & Herlevi, M. (2015). Motives emanating from personality associated with achievement in a Finnish senior high school: Physical activity, curiosity, and family motives. School Psychology International, 36, 207–221.

Froiland, J. M., & Oros, E. (2014). Intrinsic motivation, perceived competence and classroom engagement as longitudinal predictors of adolescent reading achievement. Educational Psychology, 34, 119–132.

Froiland, J. M., Peterson, A., & Davison, M. L. (2013). The long-term effects of early parent involvement and parent expectation in the USA. School Psychology International, 34, 33–50.

Froiland, J. M., Powell, D. R., Diamond, K. E., & Son, S.-H. (2013). Neighborhood socioeconomic well-being, home literacy, and early literacy skills of at-risk preschoolers. Psychology in the Schools, 50, 755–769.

Froiland, J. M., & Smith, L. (2014). Advancing the discussion about systematic classroom behavioral observation, a product review of Tenny, J. (2010). eCOVE Observation Software. Pacific City, OR: eCOVE Software, LLC. Journal of Attention Disorders, 18, 385–391.

Gillet, N., Vallerand, R. J., & Lafrenière, M. A. K. (2012). Intrinsic and extrinsic school motivation as a function of age: the mediating role of autonomy support. Social Psychology of Education, 15, 77–95.

Greene, B. A., Miller, R. B., Crowson, M., Duke, B. L., & Akey, K. L. (2004). Predicting high school students' cognitive engagement and achievement: Contributions of classroom perceptions and motivation. Contemporary Educational Psychology, 29, 462–482.

Grolnick, W. S., Farkas, M. S., Sohmer, R., Michaels, S., & Valsiner, J. (2007). Facilitating motivation in young adolescents: Effects of an after-school program. Journal of Applied Developmental Psychology, 28, 332–344.

Guthrie, J. T., McRae, A., & Lutz Klauda, S. (2007). Contributions of concept-oriented reading instruction to knowledge about interventions for motivation in reading. Educational Psychologist, 42, 237–250.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling, 6, 1–55.

Jeynes, W. H. (2007). The relationship between parental involvement and urban secondary school student academic achievement: A meta-analysis. Urban Education, 42, 82–110.

Jeynes, W. (2012). A meta-analysis of the efficacy of different types of parental involvement programs for urban students. Urban Education, 47, 706–742.

Kenny, D. (2014). Measuring model fit. Retrieved from http://www.davidakenny.net/cm/fit.htm

Kover, D. J., & Worrell, F. C. (2010). The influence of instrumentality beliefs on intrinsic motivation: A study of high-achieving adolescents. Journal of Advanced Academics, 21, 470–498.

Latham, G. P., & Brown, T. C. (2006). The effect of learning vs. outcome goals on self-efficacy, satisfaction and performance in an MBA program. Applied Psychology, 55, 606–623.

Lee, W., & Reeve, J. (2012). Teachers' estimates of their students' motivation and engagement: Being in synch with students. Educational Psychology, 32, 727–747.

Lepper, M. R., Corpus, J. H., Henderlong, J., & Iyengar, S. S. (2005). Intrinsic and extrinsic motivational orientations in the classroom: Age differences and academic correlates. Journal of Educational Psychology, 97, 184–196.

Martin, A. J. (2007). Examining a multidimensional model of student motivation and engagement using a construct validation approach. British Journal of Educational Psychology, 77, 413–440.

Ogbu, J. U. (1978). Minority education and caste: The American system in cross-cultural perspective. New York, NY: Academic Press.

Ogbu, J. U. (1992). Understanding cultural diversity and learning. Educational Researcher, 21(8), 5–14.

Ogbu, J. U. (Ed.). (2008). Minority status, oppositional culture, and schooling. New York, NY: Routledge.

Ogbu, J. U., & Simons, H. D. (1998). Voluntary and involuntary minorities: A cultural-ecological theory of school performance with some implications for education. Anthropology and Education Quarterly, 29, 155–188.

Pintrich, P. R. (2000). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. Journal of Educational Psychology, 92, 544–555.

Powell, D. R., Son, S.-H., File, N., & Froiland, J. M. (2012). Changes in parent involvement across the transition from public school prekindergarten to first grade and children's academic outcomes. The Elementary School Journal, 113, 276–300.

Putwain, D., & Remedios, R. (2014). The scare tactic: Do fear appeals predict motivation and exam scores? School Psychology Quarterly, 29, 503–516.

Reeve, J., Jang, H., Carrell, D., Jeon, S., & Barch, J. (2004). Enhancing students' engagement by increasing teachers' autonomy support. Motivation and Emotion, 28, 147–169.

Reeve, J., & Lee, W. (2014). Students' classroom engagement produces longitudinal changes in classroom motivation. Journal of Educational Psychology 106, 527–540.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. American Psychologist, 55, 68–78.

Ryan, R. M., & Deci, E. L. (2009). Promoting self-determined school engagement. In K. Wentzel, A. Wigfield, & D. Miele (Eds.), Handbook of motivation at school (pp. 171–195). London, UK: Routledge.

Sawyer, R. (2013). Beyond correlations: Usefulness of high school GPA and test scores in making college admissions decisions. Applied Measurement in Education, 26, 89–112.

Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. Psychological Methods, 7, 422–445,

Skinner, E., Furrer, C., Marchand, G., & Kindermann, T. (2008). Engagement and disaffection in the classroom: Part of a larger motivational dynamic? Journal of Educational Psychology, 100, 765–781.

Skinner, E. A., Kindermann, T. A., Connell, J. P., & Wellborn, J. G. (2009). Engagement and disaffection as organizational constructs in the dynamics of motivational development. In K. Wentzel, A. Wigfield, & D. Miele (Eds.), Handbook of motivation at school (pp. 223–245). London, UK: Routledge.

Smith, B. P. (2005). Goal orientation, implicit theory of ability, and collegiate instrumental practice. Psychology of Music, 33, 36–57.

Smith, T. R., Domenench Rodríguez, M. M., & Bernal, G. (2011). Culture. Journal of Clinical Psychology: In Session, 67, 166–175.

Steele, C. M. (1997). A threat in the air: How stereotypes shape intellectual identity and performance. American Psychologist 52, 613–629.

Steele, C. M. (2010). Whistling Vivaldi and other clues to how stereotypes affect us. New York, NY: W. W. Norton & Company.

Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. Journal of Personality and Social Psychology 69, 797–811.

U.S. Census Bureau. (2013). Educational attainment: American Community Survey 1-Year Estimates. Washington, DC. Retrieved from http://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t#

Vallerand, R. J., Fortier, M. S., & Guay, F. (1997). Self-determination and persistence in a real-life setting: Toward a motivational model of high school dropout. Journal of Personality and Social Psychology, 72, 1161–1176.

Vansteenkiste, M., Timmermans, T., Lens, W., Soenens, B., & Van den Broeck, A. (2008). Does extrinsic goal framing enhance extrinsic goal-oriented individuals' learning and performance? An experimental test of the match perspective versus self-determination theory. Journal of Educational Psychology, 100, 387–397.

Walker, C. O., Greene, B. A., & Mansell, R. A. (2006). Identification with academics, intrinsic/extrinsic motivation, and self-efficacy as predictors of cognitive engagement. Learning and Individual Differences, 16, 1–12.

Wolfe, R., & Johnson, S. (1995). Personality as a predictor of college performance. Educational and Psychological Measurement, 55, 177–185.

Worrell, F. C. (2014a). School and academic interventions. In F. T. L. Leong, L. Comas-Días, G. C. Nagayama Hall, V. C. McLoyd, & J. E. Trimble (Eds.), APA handbook of multicultural psychology: Vol. 2. Applications and training (pp. 543–559). Washington, DC: American Psychological Association.

Worrell, F. C. (2014b). Theories school psychologists should know: Culture and academic achievement. Psychology in the Schools, 51, 332–347.

Worrell, F. C., & Hale, R. L. (2001). The relationship of hope in the future and perceived school climate to school completion. School Psychology Quarterly, 16, 370–388.

Worrell, F. C., Roth, D. A., & Gabelko, N. H. (2007). Elementary reading attitude survey (ERAS) scores in academically talented students. Roeper Review, 29, 119–124.

Yaeger, D. S., & Walton, G. M. (2011). Social psychological interventions in education: They're not magic. Review of Educational Research, 81, 267–301.