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Associations Between Student Engagement and Drug Use: Age and Gender Comparisons Using the California Healthy Kids Survey

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Abstract

This study examined relations between student engagement and drug use using data obtained from the statewide biennial California Healthy Kids Survey. Latent variable modeling with confirmatory factor analysis indicated four conceptually distinct and psychometrically sound factors capturing academic motivation, school connectedness, caring relations, and meaningful participation. Further tests indicated relative invariance of the measurement models across grade (7th, 9th, and 11th) and gender. Structural equation models indicated unique prediction of drug use from the four engagement factors with academic motivation providing the largest magnitude of effect. Evidence of suppression was corrected statistically to show consistent prediction across the four constructs. The relative magnitude of regression coefficients diminished considerably with the introduction of relevant covariates. Results are discussed in terms of designing educational programs that emphasize multiple facets of engagement while at the same time also addressing pedagogical means to boost student academic motivation.

Keywords Confirmatory factor analysis · Drug use · Measurement invariance · Structural equation modeling · Student engagement · Suppression

Student engagement has received increased attention for its pivotal role in academic performance (e.g., Chase et al. 2014; Fredricks et al. 2004; Hospel et al. 2016). Ever since Finn's (1989, 1993) early work (and see Finn and Zimmer 2012, for a review) on studies of behavioral participation in classroom activities, there has been a steady stream of research findings supporting that motivated and engaged students show higher academic proficiency including better grades (Corso et al. 2013; Furrer and Skinner 2003; Li and Lerner 2011; Wang and Eccles 2012) and reading literacy (Lee 2014). Moreover, engaged students also enjoy school more, leading to greater interest in educational activities, higher reports of intrinsic value, and perceive greater utility in school (Gillen-O'Neel and Fuligni 2013).

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In Finn's participation-identification model, student engagement reflected participation in school and the requirements or demands of being a student. This entailed showing up to class, being prepared, paying attention, completing homework assignments, being responsive to instruction (i.e., following classroom rules), contributing to class, and avoiding disruptive behavior. Through their participation, students would grow fond of school, feel valued, and identify with the values of school creating a cycle of "investment" (Voelkl 1997). This conceptualization was then broadened to include an affective component capturing students' attachment to school, whether students feel they belong (i.e., bonding) as part of the school, are warmly received (accepted and respected), and find comfort in their teachers (e.g., Davis and Dupper 2004; Janosz et al. 2008). Teachers can form interpersonal bonds with students that support and encourage their continued involvement in education (e.g., Klem and Connell 2004; Patrick et al. 2007). A third cognitive component entails student's beliefs and appraisals regarding the value of school (e.g., Appleton et al. 2008; Eccles and Wang 2012; Fredricks et al. 2004; Greene et al. 2004). This involves student's internal self-regulatory processes and their willingness to master skills that lead them to be psychologically invested in learning (Newmann et al. 1992), a position consistent with the tenets of self-determination theory (SDT: Connell and Wellborn 1991; Ryan and Deci 2000).

Student Engagement and Drug Use

As students lose traction with school and begin to devalue the role of school in their self-concept, they often become attracted to deviant peer groups, forming friendships with rule-breaking peers that share their disaffection with school and disparage conventional norms. This supposition is supported by several studies that show students who lack motivation, are distracted or bored and feel detached from learning activities, are at greater risk to use drugs (Bond et al. 2007; Griffiths et al. 2012; Henry et al. 2012; Li and Lerner 2011; Wang and Fredricks 2014). Bond et al. (2007) reported that Australian youth in the lowest quintile of school and social connectedness were 48% more likely to drink alcohol 2 years later compared to the youth assigned to the highest quintile, adjusting for sociodemographic and baseline measures of health behavior. Henry et al. (2012) constructed a school disengagement warning index comprised five binary risk factors obtained from school records (academic performance, attendance, failing, suspension, and grade retention) and found it prospectively predicted both dropout and problem substance use in adolescence (ages 14-18) and early young adulthood (ages 21-23). Analyses of the Add Health data (McNeely and Falci 2004) showed that teacher support (e.g., getting along with teachers, teachers caring about students) and social belonging (e.g., feeling close to people at your school), both facets of school connectedness, decreased the probability of initiating or transitioning to higher levels of health-risk behaviors over 1 year in 7-12th graders. This included moving from occasional to regular cigarette smoker, never drunk to occasional or regular episodes, and never use to occasional and regular use of marijuana.

Social control theory (SCT: Hirschi 1969) provides a framework from which to understand the pivotal relations between student engagement and drug use. According to SCT, students presented with favorable opportunities to bond with conventional institutions like school, and who actively engage in classroom and school-related activities, will develop strong affective ties (i.e., social bonds) that when reinforced inculcate prosocial values and attitudes. Being around hard working, attentive, and diligent peers, listening to and following directions from teachers, and benefiting from learning and instruction build competency. When these activities are rewarded, it fosters an enduring attachment to and belief in the value of school. Continued reinforcement of the skills and behaviors learned in school encourages youth to internalize self-regulation, and instills a yearning for and commitment to the moral code of society, which prevents them from rule transgression and committing deviant acts.

Concerns and Focus of the Present Study

Despite the richness of theoretical explanation for the engagement-drug use connection, there are a number of concerns that need to be addressed. First, there are conceptual issues related to the distinction between behavioral and cognitive engagement, both of which may tap similar underlying mental structures. Whereas behavioral engagement captures observable metrics that entail participation in class, cognitive engagement applies to a student's use of self-regulation strategies, which subsume control of effort on tasks, sustained attention, and application of learning skills with a goal of mastery. For a student to master material to the point of strategy formation, they must pay attention and give effort to learning (e.g., Corno and Mandinach 1983; Yair 2000). In essence, they must be motivated, exert themselves, remain persistent, and deploy cognitive resources regardless of whether this is conceptualized as participation or psychological investment (Kahu 2013; Skinner et al. 2008).

A second concern is that few studies have teased apart the relative contribution of the different facets of student engagement to drug use (e.g., Li and Lerner 2011; Janosz et al. 2008). Most of the studies implicated in the engagement-drug use discussion have used a limited measure of engagement, modeled it as a single composite (e.g., Bond et al. 2007; Voelkl 1997), or not been able to distinguish the relative contribution of the different facets in a single model. As a result, we do not really have a handle on which facet of engagement is most likely to be instrumentally related to drug use and thus amenable to intervention.

In the present study, we take several steps that should provide conceptual clarity to the discussion of student engagement. First, we include a wider array of measures assessing different facets of student engagement and test their factorial validity using confirmatory factor analysis (CFA) techniques. The dimensions of student engagement include academic achievement, school connectedness, caring relations, and meaningful participation, the latter which has received far less attention in comparison to behavioral or emotional engagement (Jennings 2003). By addressing their relative contribution in a single unified model, we can test their convergent and divergent validity and help unpack the construct of student engagement empirically (e.g., Martin 2007; Reschly and Christenson 2012; Zilvinskis et al. 2017). The use of CFA techniques is also more rigorous by controlling for measurement error (i.e., estimating and disaggregating the error variance from the true indicator variance). It can be used to model higher-order structures and posit a priori simple structure by restricting items to load on only one factor. The latter model specification strategy prevents items from cross-loading on more than one factor, which obfuscates the meaning of a factor. In addition, CFA provides a means to test the inferential fit of a hypothesized model against the sample variance/covariances, thus providing a means to engage in rigorous hypothesis testing and provide clear indications of statistical fit.

We also apply conventions for testing measurement invariance (Dimitrov 2010), examining differences in the factor

structure (configural, metric, and scalar) for three different age groups (7th, 9th, and 11th grades) and by gender. This extends previous work that has established mean differences in engagement by age (Marks 2000); however, with few exceptions (e.g., Wang et al. 2011) these efforts have not elaborated whether the factor structure of student engagement remains consistent and retains the same meaning for younger and older students or male vs. female students. The intrinsic meaning of different facets of engagement may change over time, reflecting both developmental and socialization effects. Conducting invariance tests by gender stems from evidence that females report higher emotional and behavioral engagement (e.g., Gillen-O'Neel and Fuligni 2013; Lietaert et al. 2015; Wang and Fredericks 2014) and this difference holds for both middle and high school and for different instruments assessing engagement. Finally, we obtained the data used in these model tests from a large-scale school-based survey routinely administered in the State of California, thus providing adequate power for analyses of a racially and demographically unbiased sample.

Method

California Healthy Kids Survey

The California Health Kids Survey (CHKS) is a statewide survey biennially administered to all middle and secondary school students as part of a mandated program instituted by the State of California Department of Education. Survey administration is handled by WestEd under a contract with the State of California. The purpose of the survey is to gather information on health risks and resilience and gain coverage regarding academic activities and student perceptions of school to learn more about what students think and feel about their time in school. This information is part of the emphasis on school accountability and can be used to marshal resources and also address whether newly implemented programs are capturing the minds and hearts of students.

The survey contains a Core module along with specialized modules that can be customized to a school's needs. The Core module administered to students in grades 7, 9, and 11 includes demographics (gender, race/ethnicity, grade in school, living situation, parent education, reduce priced lunch, language spoken in the home), school participation measures (e.g., grades, school attendance, absenteeism, skipping school), and school climate (i.e., connectedness, caring relations and teacher support, participation, school safety, harassment and bullying, violence). Pupil engagement includes items assessing academic motivation and mindset, quality of the school physical environment, and items assessing school engagement. Additional Core questions assess lifetime and past 30-day use of a wide range of illicit drugs (alcohol, cigarettes, marijuana, e-cigs) and legal prescription drugs (i.e., diet pills, Ritalin, Adderall). There are also items assessing use of the same drugs on school property, perceived physical harm from drugs, and ease of access to obtain drugs, quitting attempts, driving under the influence, and items assessing perceived school safety, bullying, violence, social aggression, and harassment on school property.

Given the large size of the potential sample that took the CHKS in 2017 (> 400,000 students), we drew five random samples ($N = 5000$) without replacement for the analyses. One sample was reserved for the confirmatory factor analysis (CFA), one for testing measurement invariance, one for the structural equation model (SEM), one for testing covariate-adjusted models, and one for examining group mean differences in the model variates and covariates. All of the CFA and SEM models were tested using the Mplus statistical program version 8.4 (Muthén and Muthén 2008-2014).

Measures

A total of 18 items were used to reflect four exogenous latent constructs of Student Engagement. Four items assessing task mastery (task involvement and striving for excellence) were taken from the Inventory of School Motivation (ISM; McInerney and Sinclair 1991) and used to reflect a latent construct of Academic Motivation. A stem read, "How strongly do you agree or disagree with the following statements," and the four items included, "I try hard to make sure that I am good at my schoolwork," "I try hard at school because I am interested in my work," "I work hard to try to understand new things at school," and "I am always trying to do better in my schoolwork." The items used a 5-point Likert-type scale ranging from 1 "Strongly disagree" to 5 "Strongly agree." The ISM has been studied extensively and the items shown to have good reliability, construct, and criterion validity (predicting school performance and absenteeism) obtained from relatively large cross-cultural school-based samples (McInerney et al. 2001).

Five items were used to reflect a latent construct of School Connectedness. A stem read, "How strongly do you agree or disagree with the following statements?" "I feel close to people at this school," "I am happy to be at this school," "I feel like I am part of this school," "The teachers at this school treat students fairly," and "I feel safe in my school" using the same 5-point Likert-type response scale. The five items were taken from the School Connectedness Scale (SCS) originally created for the Add Health Study (Resnick et al. 1997), a nationally representative study of risk and protective factors related to adolescent health and well-being. The psychometric properties of the SCS have been studied extensively in different race groups (McNeely 2005), using split-half cross-validation techniques (Sieving et al. 2001), and in relation to school structural characteristics (McNeely et al. 2002). In addition, Furlong et al. (2011) reported evidence of measurement

invariance in different sociocultural groups based on multi-group confirmatory factor analyses. In all cases, analyses support a one-factor scale with evidence of adequate reliability (α's = .75-.93) with no reported differential item functioning across subgroups.

Six items were used to reflect a latent construct of Caring Relations. A stem read "At my school, there is a teacher or some other adult…" and the six items included "Who really cares about me," "Who tells me when I do a good job," "Who notices when I am not there," "Who always wants me to do my best," "Who listens to me when I have something to say," and "Who believes that I will be a success," with a 4-point response scale ranging from 1 "Not at all true" to 4 "Very much true." Hanson and Kim (2007) reported reliability of .90 for the six items and this was further validated in the study by Furlong et al. (2011) using the CHKS data. Three additional items were used to reflect a latent construct of Meaningful Participation. A stem read, "At school,…" and the three items included "I do interesting activities," "I help decide things like class activities or rules," and "I do things that make a difference," with responses ranging from 1 "Not at all true" to 4 "Very much true." More extensive documentation on the factor structures, reliabilities, and differential item functioning across grades and for different subgroups (e.g., gender and race) for the 18 student engagement items can be found in Hanson and Voight (2014) for the 7th grade data and in a more recent report using confirmatory factor analysis and differential item functioning (Mahecha and Hanson 2020).

The structural portion of the model included an endogenous latent construct assessing general involvement in Drug Use, reflected by four multi-item composite indicators. A single 6-item indicator captured alcohol involvement including frequency of lifetime use for one full drink of alcohol, drunkenness (very drunk or sick after drinking alcohol), being drunk on alcohol or "high" on drugs on school property after drinking, and past 30 days number of days used at least one drink, binge drinking (used five or more drinks of alcohol in a row), and drank on school property (at least one drink of alcohol). The lifetime items used a 6-point response format ranging from "0 times" to "7 or more times" and the past 30-day items used a 6-point response format ranging from "0 days" to "20-30 days."

A 9-item composite indicator assessed frequency and intensity of combustible cigarettes and other tobacco products. This included frequency of lifetime use of a whole cigarette, smokeless tobacco (dip, chew, or snuff), electronic cigarettes, e-cigarettes, or other vaping devices (e-hookah, hookah pens, or vape pens), past 30-day use of cigarettes, smokeless tobacco, and electronic cigarettes, and past 30-days number of days using cigarettes, smokeless tobacco, and electronic cigarettes on school property. The response formats were identical to the alcohol items using the same time frame. A 3-item composite indicator assessed marijuana use and included frequency of lifetime use, lifetime frequency using marijuana by smoking, in an electronic, e-cigarette, or other vaping device, or eat or drink it. The response formats matched those of the alcohol and cigarette items using the same time frame. A fourth 8-item indicator assessed other drug use (inhalants, cocaine, pills, heroin, ecstasy, LSD or other psychedelics, prescription pain medicine, diet pills, Ritalin or Adderall, cough or cold medicine, and any other drug used to get "high" or for non-medical reasons). The time frames and response formats mapped to the same questions posed for alcohol and cigarettes including lifetime frequency of use, number of days in the past 30 days, and past 30-day use on school property. The use of these four multi-item indicators with a latent variable configuration is better suited to capture general involvement in drug use. It is also an appropriate modeling strategy to counter the influence of highly skewed measures, often encountered with self-reported drug use measures in younger age groups (e.g., Newcomb and Bentler 1988).

Covariates in the adjusted SEMs included sex (male = 1), race (coded white vs. other), Hispanic (yes = 1), free or reduced lunch (yes = 1), attending an afterschool program (yes = 1), skipping school (yes = 1), missing school in the past 30 days because of feeling sad, hopeless, anxious, stressed, or angry (yes = 1), feeling sad or hopeless almost every day in the past year (yes = 1), and grades (ordinal measure ranging from Mostly A's (1) to Mostly F's (8)). Prior to engaging the analyses, a Monte Carlo simulation with 10,000 replications showed the samples were sufficiently powered to detect a multi-construct model configuration and obtain efficient and bias-free parameter estimates (> 95% accuracy) in the structural portion of the analysis (Muthén and Muthén 2002).

Results

Participant Characteristics

The average of the five random samples drawn for the different analyses shows there were 1778 students in the 7th grade, 1694 in the 9th grade, and 1528 in the 11th grade (the total sample included ~ 357,000 students). The sample contained slightly more female students (49.7%, 46.2% male, and 4.1% were missing gender) and this representation was consistent in each grade. The entire sample was 31.28% White, 11.38% Asian, 5.07% African-American, 3.71% American Indian or Alaska Native, 1.83% Native Hawaiian or Pacific Islander, and 46.72% indicated being mixed or other (54.6% of the sample indicated they were Hispanic, with minor sampling fluctuations when examined by grade).

Table 1 shows grade and gender differences for all the observed measures used in the CFA model. The far-right three columns show the p values for main effects of gender and separately grade with a test of their interaction. As depicted,

Table 1 Prevalence for items used in CFA and SEM analyses

	7th grade (N = 1775)		9th grade (N = 1695)		11th grade (N = 1530)		ANOVA effects (p values)		
	Female	Male	Female	Male	Female	Male	Gender	Grade	Interaction
Lifetime, used a whole cigarette?[a]	1.8%	2.8%	6.2%	7.3%	10.1%	13.5%	*0.002*	*0.000*	0.055
Lifetime, used smokeless tobacco?	2.0%	3.0%	3.4%	5.7%	3.5%	9.4%	*0.000*	*0.000*	*0.000*
Lifetime, used electronic cigarettes, e-cigarettes, or other vaping	7.5%	9.9%	19.8%	21.1%	28.1%	30.8%	0.100	*0.000*	0.578
Past 30 days, used cigarettes?	1.8%	2.5%	2.9%	3.9%	3.9%	6.6%	0.121	*0.000*	0.268
Past 30 days, used smokeless tobacco?	1.2%	1.9%	1.7%	3.3%	1.5%	4.6%	*0.000*	*0.013*	0.095
Past 30 days, used electronic cigarettes, e-cigarettes, or other vaping	3.5%	4.7%	7.2%	8.4%	8.4%	11.5%	*0.021*	*0.000*	0.396
Past 30 days on school property, smoked cigarettes?	0.7%	1.4%	1.1%	2.2%	1.1%	2.8%	*0.006*	0.285	0.054
Past 30 days on school property, used smokeless tobacco?	0.7%	1.3%	1.0%	2.3%	0.8%	3.0%	*0.001*	*0.009*	*0.048*
Past 30 days on school property, used e-cigarettes	1.6%	2.5%	2.8%	4.3%	2.4%	4.9%	*0.000*	0.363	0.825
Composite cigarette use[b]	8.2%	10.7%	20.7%	22.1%	29.4%	32.6%	*0.000*	*0.000*	0.272
Lifetime, used one full drink of alcohol?	12.4%	12.7%	29.0%	24.2%	44.5%	41.0%	*0.001*	*0.000*	0.104
Lifetime, have been very drunk or sick after drinking alcohol?	3.2%	3.7%	12.4%	10.1%	23.7%	21.2%	0.196	*0.000*	0.467
Lifetime, have been drunk on alcohol or "high" on drugs on school	2.1%	2.5%	7.7%	7.4%	12.7%	13.9%	0.147	*0.000*	0.495
Past 30 days, used at least one drink of alcohol?	7.2%	6.9%	16.4%	12.4%	23.5%	21.5%	*0.001*	*0.000*	0.212
Past 30 days, used five or more drinks of alcohol in a row	1.9%	2.3%	6.2%	5.6%	10.9%	11.8%	0.767	*0.000*	0.767
Past 30 days on school property, had at least one drink of alcohol?	2.3%	2.7%	4.4%	4.3%	3.9%	5.2%	0.523	0.066	0.245
Composite alcohol use	12.3%	12.9%	29.0%	24.7%	44.5%	41.3%	0.058	*0.000*	0.261
Lifetime, used marijuana?	5.1%	6.6%	17.7%	17.6%	31.4%	32.1%	0.959	*0.000*	0.400
Past 30 days, used marijuana?	3.2%	4.1%	10.4%	10.3%	16.5%	18.6%	0.408	*0.000*	0.429
Past 30 days on school property, smoked marijuana?	1.4%	2.2%	4.0%	4.8%	4.1%	6.5%	*0.035*	*0.002*	0.399
Composite marijuana use	4.9%	6.3%	17.0%	17.0%	30.4%	31.1%	0.416	*0.000*	0.391
Lifetime, used inhalants?	4.6%	4.6%	5.8%	5.8%	5.1%	6.8%	0.083	*0.022*	0.694
Past 30 days, used inhalants?	1.7%	2.1%	2.2%	3.0%	1.7%	3.4%	*0.010*	0.428	0.447
Lifetime, used cocaine, methamphetamine, or any amphetamines?	14.8%	14.8%	1.9%	3.6%	3.3%	6.0%	0.761	*0.000*	0.196
Lifetime, used ecstasy, LSD, or other psychedelics?	13.3%	14.5%	2.6%	4.4%	4.5%	7.8%	0.822	*0.000*	0.956
Lifetime, used any other drug, pill, or medicine to get "high"	3.0%	3.7%	6.5%	6.6%	6.8%	8.4%	0.911	*0.000*	0.788
Past 30 days, used any other drug, pill, or medicine to get "high"	1.8%	2.4%	3.0%	3.6%	2.8%	4.4%	*0.028*	0.184	0.807
Past 30 days on school property, used any other illegal drug or pill	1.1%	1.8%	2.3%	3.0%	2.0%	3.8%	*0.027*	*0.039*	0.336
Lifetime, have been "high" from using drugs?	3.8%	4.7%	14.7%	14.0%	26.4%	26.9%	0.243	*0.000*	0.946
Composite other drugs use	7.5%	8.3%	18.4%	17.6%	28.2%	29.4%	*0.004*	*0.000*	0.572
Student engagement items[c]									
Close people at school	3.84 (0.99)	3.78 (1.00)	3.63 (1.05)	3.69 (1.05)	3.47 (1.11)	3.59 (1.11)	*0.507*	*0.000*	0.081
Happy at school	3.80 (1.07)	3.83 (1.11)	3.56 (1.08)	3.68 (1.11)	3.42 (1.09)	3.51 (1.14)	*0.019*	*0.000*	0.815
Part of this school	3.67 (1.07)	3.67 (1.11)	3.44 (1.05)	3.51 (1.10)	3.37 (1.08)	3.38 (1.13)	*0.018*	*0.000*	0.905
Teachers treat students fairly	3.67 (1.10)	3.63 (1.16)	3.47 (1.04)	3.51 (1.12)	3.40 (1.04)	3.48 (1.09)	*0.060*	*0.000*	0.132
Feel safe in school	3.82 (1.04)	3.80 (1.10)	3.65 (0.98)	3.65 (1.07)	3.66 (0.96)	3.65 (1.05)	*0.649*	*0.000*	0.879
Try hard good at schoolwork	4.37 (0.86)	4.2 (0.94)	4.22 (0.88)	4.01 (0.99)	4.17 (0.86)	3.89 (0.99)	*0.000*	*0.000*	0.474
Interested in my work	3.84 (1.05)	3.67 (1.11)	3.73 (1.06)	3.56 (1.12)	3.67 (1.06)	3.48 (1.13)	*0.000*	*0.000*	0.807
Understand new things	4.15 (0.93)	3.99 (1.00)	4.01 (0.93)	3.84 (1.02)	3.96 (0.92)	3.76 (1.02)	*0.000*	*0.000*	0.514
Try to do better schoolwork	4.36 (0.87)	4.20 (0.96)	4.19 (0.89)	4.01 (1.00)	4.13 (0.89)	3.87 (1.01)	*0.000*	*0.000*	0.980
Teacher cares about me	2.80 (0.95)	2.73 (0.97)	2.61 (0.95)	2.60 (0.96)	2.78 (0.95)	2.71 (0.97)	*0.002*	*0.000*	0.617
Notices when I am not there	2.77 (1.01)	2.78 (1.02)	2.56 (1.01)	2.62 (1.01)	2.67 (1.01)	2.69 (1.00)	*0.551*	*0.000*	0.825
Listens to me	2.99 (0.98)	2.95 (0.97)	2.80 (0.98)	2.80 (0.97)	2.90 (0.96)	2.85 (0.96)	*0.190*	*0.000*	0.845
Tells me good job	3.04 (0.93)	2.96 (0.94)	2.83 (0.94)	2.79 (0.95)	2.87 (0.94)	2.80 (0.95)	*0.022*	*0.000*	0.942
Wants me do my best	3.35 (0.85)	3.31 (0.88)	3.08 (0.91)	3.07 (0.93)	3.09 (0.90)	3.04 (0.92)	*0.300*	*0.000*	0.659
Believes I will be successful	3.18 (0.94)	3.11 (0.97)	2.95 (0.97)	2.91 (0.99)	2.98 (0.96)	2.90 (0.98)	*0.054*	*0.000*	0.519

Table 1 (continued)

	7th grade (N = 1775)		9th grade (N = 1695)		11th grade (N = 1530)		ANOVA effects (p values)		
	Female	Male	Female	Male	Female	Male	Gender	Grade	Interaction
Do interesting activities	2.65 (1.01)	2.74 (1.01)	2.52 (1.05)	2.60 (1.05)	2.51 (1.06)	2.52 (1.06)	*0.002*	*0.000*	0.344
Decide class activities/rules	2.00 (1.02)	1.90 (1.01)	1.83 (0.96)	1.83 (0.97)	1.89 (1.01)	1.85 (0.99)	*0.023*	*0.001*	0.928
Do things make difference	2.32 (1.01)	2.25 (1.01)	2.09 (0.96)	2.11 (0.99)	2.13 (1.00)	2.11 (1.01)	*0.674*	*0.000*	0.889

[a] All drug used items dichotomized as "use" vs. "nonuse" and summed into a unit-weighted index

[b] Denotes indicator label

[c] Engagement item continuous measures with means (standard deviations)

p-values in italics are significant

there were numerous grade differences in almost every drug category as well as a more moderate number of gender differences in the drug use items. There were significant grade differences for almost all of the student engagement items but there were no significant gender differences for eight of the 18 engagement items. Notable was a consistent decrease in levels of engagement across all three grades. By grade, male students in the 7th grade scored higher on three of the 18 engagement items, males in the 9th grade scored higher on 7 of the 18 items, and males in the 11th grade scored higher on six of the 18 items; however, in most cases, these differences were quite trivial. Also, there were only two significant interaction terms, both involving smokeless tobacco. The lack of significant interactions for the remaining drug and engagement items suggests that the observed male and female differences were consistent within each age group.

We also tested whether there were gender and grade differences (and their interaction) on the other seven covariates using logistic regression models. These models included the two main effects and the interaction term. There was a significant grade effect for free lunch, $\beta = .079$, $p < .01$ with more 11th grade students stating they received free lunch (45.9%, 43.3%, and 51.8% for the 7th, 9th, and 11th grades, respectively). There was a significant grade effect for skipping school, $\beta = .157$, $p < .001$ with a greater percentage of the 11th grade students stating they skipped school for an entire day in the past 30 days (30.6%, 31.6%, and 44.0% for the 7th, 9th, and 11th grades, respectively). There was a significant effect for feeling sad, hopeless, anxious, stressed, or angry in the past 30 days for both gender, $\beta = -.826$, $p < .01$ with more females reporting these symptoms (13.5% vs. 5.7%) and grade, $\beta = .236$, $p < .001$ with older students more likely to report these symptoms (5.9%, 9.4%, and 13.5% for the 7th, 9th, and 11th grades, respectively). There was a significant effect for feeling sad or hopeless almost every day in the past 12 months for gender, $\beta = -.922$, $p < .001$ with more females reporting these symptoms (37.1% vs. 20.7%) and grade, $\beta = .127$, $p < .001$ with older students more likely to report these symptoms (24.5%, 29.6%, and 33.5% for the 7th, 9th, and 11th grades, respectively). Analysis of variance indicated that females, $F(1) = 92.70$, $p < .001$, and younger students, $F(2) = 13.32$, $p < .001$, reported higher grades.

Confirmatory Factor Analysis

We first tested the hypothesized latent variable configuration using CFA separately for all three age groups. The model configuration includes the four exogenous student engagement latent factors and drug use modeled as the endogenous construct[1]. Figure 1 shows the results of this analysis with standardized parameter estimates for all three age groups (factor loadings and correlations). All three age models fit well with adequate absolute and relative fit indices (Hu and Bentler 1999). The Comparative Fit Index (CFI; Bentler 1990), Root Mean Square Error of Approximation (RMSEA; Steiger and Lind 1980), Standardized Root Mean Square Residual (SRMR; Hu and Bentler 1998), and ratio of chi-square to degrees of freedom (χ^2/df) were well within their desired benchmarks (Hu and Bentler 1999) indicating the hypothesized model adequately represented the sample data, χ^2 (199) = 824.686, CFI = .968, RMSEA = .04 (CIs: .039-.045), and SRMR = .035 for the 7th grade, χ^2 (199) = 854.047, CFI = .966, RMSEA = .045 (CIs: .042-.048), and SRMR = .035 for the 9th grade, and χ^2 (199) = 893.254, CFI = .966, RMSEA = .048 (CIs: .045-.051), and SRMR = .032 for the 11th grade.

Factor loadings were of moderate magnitude and highly significant ($p < .001$) for the three age groups ($\lambda_{avg} = .750$ for the 7th, $\lambda_{avg} = .774$ for the 9th, and $\lambda_{avg} = .798$ for the 11th grade). The average correlation among the five factors was $r = .40$ for the 7th grade ($r_{avg} = .54$ for the engagement factors), r

[1] Specification of the four-factor model was preceded by Exploratory Structural Equation Modeling (ESEM), which provides more efficient and less biased parameter estimates compared to CFA (e.g., Marsh et al. 2011). As a result of these exploratory analyses, a fifth 3-item factor assessing high expectations by teachers was collapsed with caring relations, given their high multicollinearity ($r > .95$) for all three age groups.

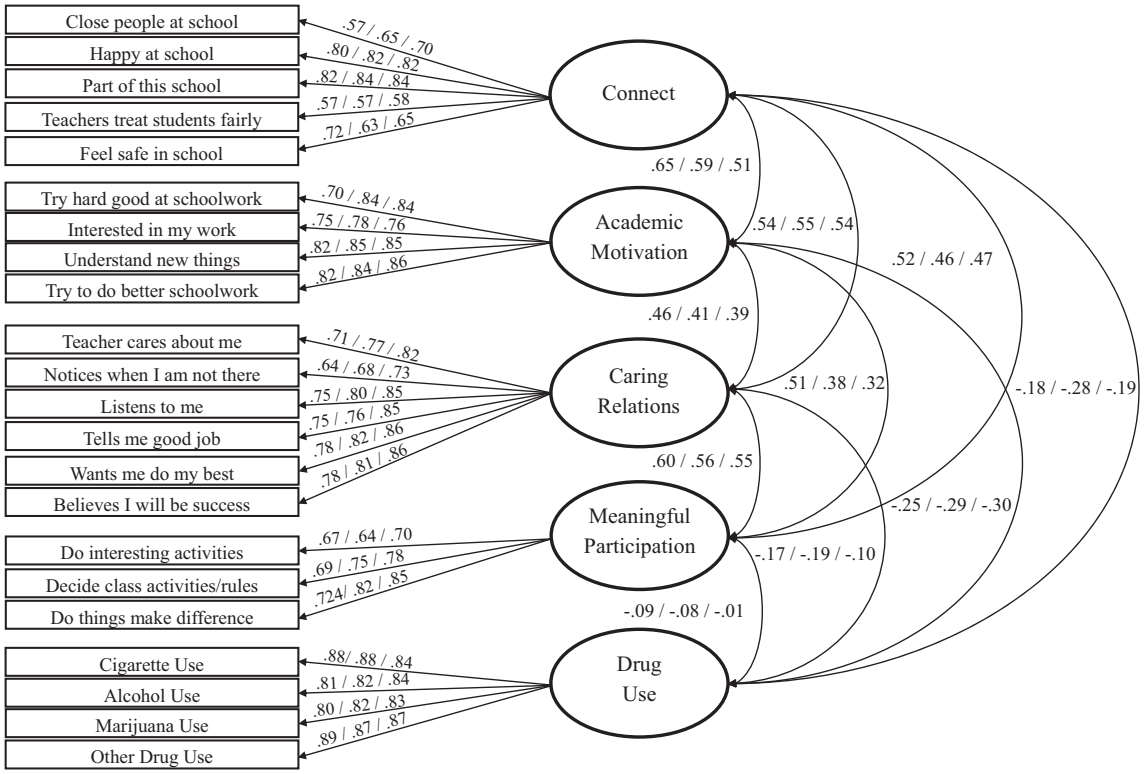

Fig. 1 Results of the confirmatory factor analysis with standardized parameter estimates for all three age groups

= .38 for the 9th grade (r_{avg} = .49 for the engagement factors), and r = .34 for the 11th grade (r_{avg} = .46 for the engagement factors). Across all three grade levels, academic motivation had the largest magnitude of association with drug use (r = − .25 for the 7th grade, r = − .29 for the 9th grade, and r = − .30 for the 11th grade). With the exception of meaningful participation (p < .05), all the remaining factor-to-factor correlations were significant at the p < .001 level[2].

Measurement Invariance

We next tested the invariance of the CFA model across age groups and gender. Procedurally, this included moving from testing configural invariance specifying equality of the factor structure (i.e., equivalent number of factors with identical pattern of fixed and free parameters) to weak invariance testing metric (equivalent factor loadings) and strong scalar invariance testing equality of intercepts (Dimitrov 2010). Evaluation of model fit followed established conventions by comparing a restricted model specifying equivalent parameters across subgroups to a relaxed model with no cross-group parameter constraints (Cheung and Rensvold 2002). The χ^2 test is sensitive to sample size (trivial deviations will be significant); therefore, we used the CFI as an indication of model fit using the benchmark of .01 difference in fit indices to test the null positing no difference in factor structure across groups (Cheung and Rensvold 2002).

Table 2 shows the results of the measurement invariance tests by both gender and grade. Although the model comparisons based on fit indices were statistically significant, any deviations in loadings (or intercepts) between age and gender subgroups were quite trivial. The average difference in loadings across the three age groups from the test of configural invariance was λ_{avg} = .029 for the 7th to 9th grade comparison and λ_{avg} = .037 for the 7th to 11th grade and the same comparison for gender was λ_{avg} = .014. In all of the comparisons between the restricted and less restricted models, the change in CFI was negligible and met the explicit benchmark of .01. In effect, the models posing restrictions on the number of factors, the factor loadings, and intercepts were equivalent for the gender and age groups.

[2] Both Betts (2012) and Fredricks et al. (2004) suggest that engagement is best conceived as a "meta-construct" subsuming different components under a broad rubric akin to a higher-order factor. A model testing a more parsimonious higher-order factor fits well for each age group (χ^2 (131) = 760.719, CFI = .957, RMSEA = .053 (CIs: .049-.056), SRMR = .042, for the 7th, χ^2 (131) = 759.532, CFI = .961, RMSEA = .054 (CIs: .050-.057), SRMR = .045, for the 9th, and χ^2 (131) = 796.558, CFI = .959, RMSEA = .058 (CIs: .054-.062), SRMR = .042, for the 11th grade). However, we maintain the primary factor model specifying four distinct predictor constructs provide additional information consistent with the goals of the paper, which includes differentiating prediction of drug use by multiple facets of student engagement.

Table 2 Results from measurement invariance tests

	χ^2	df	RMSEA	90% *L*	90% *U*	CFI	TLI	SRMR	$\Delta\chi^2$	Δdf	ΔRMSEA	ΔCFI	ΔTLI
Gender (male, female)													
Configural invariance	2416.6	398	0.046	0.044	0.048	0.965	0.959	0.035					
Metric invariance	2693.8	420	0.048	0.046	0.049	0.961	0.957	0.043	277.3	22.0	0.002	− 0.004	− 0.002
Scalar invariance	2908.0	442	0.048	0.047	0.05	0.957	0.955	0.047	214.2	22.0	0.000	− 0.004	− 0.002
Grade (7th, 9th, 11th)													
Configural invariance	2736.3	597	0.047	0.045	0.048	0.964	0.959	0.036					
Metric invariance	3167.1	641	0.049	0.047	0.051	0.958	0.954	0.06	430.7	44.0	0.002	− 0.006	− 0.005
Scalar invariance	3808.9	685	0.053	0.051	0.054	0.948	0.947	0.072	641.8	44.0	0.004	− 0.010	− 0.007

Structural Equation Models

We next tested the structural model positing all four exogenous engagement factors and drug use modeled as an endogenous latent construct. The models fit well[3]; however, there was evidence of negative suppression in all three grades with all four exogenous latent factors modeled simultaneously (Tzelgov and Henik 1991). The magnitude of association for meaningful participation with drug use was quite small (β's = .14, .13, and .13 for the 7th, 9th, and 11th grades, respectively), its associations with the other facets of engagement were moderate and positive (r_{avg} = .57, .48, and .46 for the 7th, 9th, and 11th grades, respectively), and the sign corresponding to the regression coefficient from Meaningful Participation to Drug Use was positive (opposite to its expected sign). As further indication of suppression, the validity coefficients (zero-order correlations) between the items comprising the latent factor of Meaningful Participation and Drug Use were individually all negative, providing further evidence of suppression (Conger 1974). We further examined these discrepant regression findings by removing the latent factor of Meaningful Participation from the multivariate equation, revealing that the remaining associations between engagement factors and drug use remained, as expected, negative. When modeled by itself, the latent constructs of Meaningful Participation and Drug Use had a negative validity coefficient (7th grade: $\beta = -.10$, $p < .001$; 9th grade: $\beta = -.07$, $p < .001$; 11th grade: $\beta = -.10$).

We followed conventions outlined by Beckstead (2012) for isolating and removing sources of suppression to account for criterion-irrelevant variance in the exogenous engagement factors. This procedure involved several integrated steps. First, we fitted a two-factor CFA model to the covariance matrix (Σ) of estimated factor scores for both the exogenous (engagement) and endogenous (drug use) factors. The two latent factors $\xi 1$ and $\xi 2$ modeled are posited to be orthogonal (correlation constrained to zero) and represent criterion-relevant variance and criterion-irrelevant variance respectively. The most important feature of this CFA model is that the exogenous engagement factors load on both $\xi 1$ and $\xi 2$, whereas the criterion variable (drug use) loads only on $\xi 1$ and has a zero loading on $\xi 2$. Taking advantage of the CFA model, we were next able to calculate the correlation matrix (Σ^*) of predictors and criterion excluding the criterion-irrelevant components. To obtain Σ^*, we use the factor loadings from the first factor $\xi 1$ (taking only criterion-relevant variance into account) and follow the general CFA model (Jöreskog and Sörbom 1996-2001): $\Sigma^* = \Lambda \Lambda' + \Theta$, where Λ is a vector of standardized factor loadings (Λ' is a transposition of the vector) and Θ is a diagonal matrix containing residual variances. Finally, we conducted a multiple regression analysis predicting drug use based on engagement factors, now using the suppression-corrected correlation matrix (Σ^*) among the criterion and predictors.

With this revised model framework and adjusting the part correlations for criterion-irrelevant variance in the model, the signs corresponding to the associations between the four engagement factors and drug use were all consistently negative. Figure 2 shows the results of the suppression-corrected SEM. Comparatively speaking, for all three age groups, the magnitude of association with Drug Use was largest for Academic Motivation and this was followed by School Connectedness. The latent factor of Caring Relations was significant only for the 9th grade.

The pattern of correlations among the exogenous constructs reinforced that Academic Motivation and Student Connectedness were always the largest in magnitude for the two younger grades ($r = .61$, $p < .001$ for the 7th and $r = .60$, $p < .001$ for the 9th grade) while for the 11th grade, this pattern shifted and the largest magnitude of association was between School Connectedness and Caring Relations ($r = .55$, $p < .001$). This was followed in decreasing order by Caring Relations and Meaningful Participation ($r = .54$, $p < .001$),

[3] This model produces an identical fit to the CFA; however, through specification of this model in a regression format, we can detect the unique contribution of each factor to drug use.

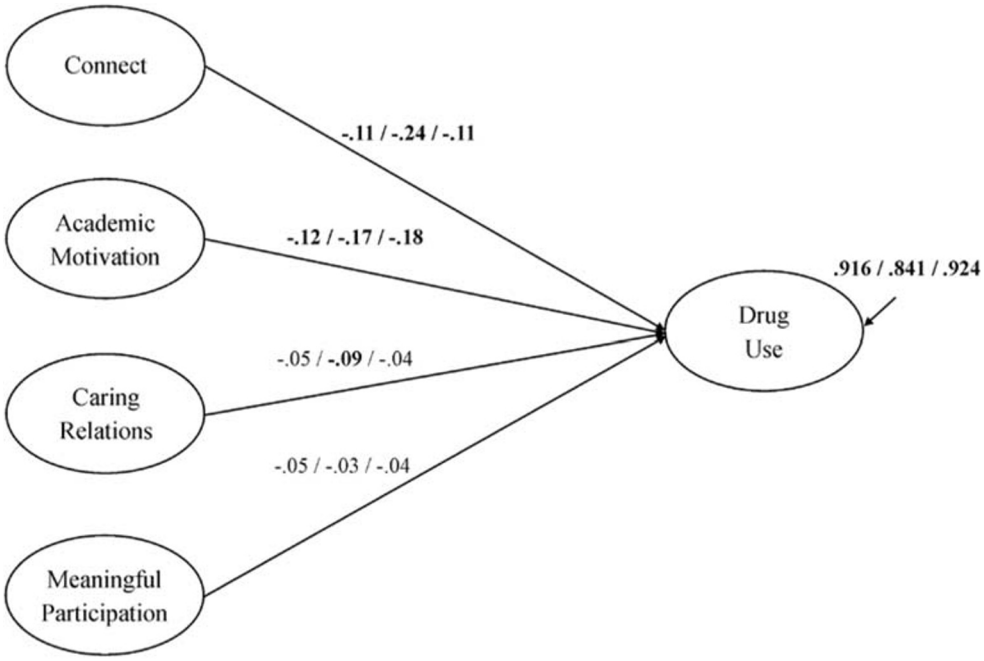

Fig. 2 Results of suppression-corrected SEM. Bold values are significant. Values are for the 7th/9th/11th grades respectively. Cases with missing values excluded (sample sizes: 7th grade N = 1790; 9th grade N = 1698; 11th grade N = 1456)

Academic Motivation and School Connectedness (r = .49, p < .001), Meaningful Participation and School Connectedness (r = .48, p < .001), Caring Relations and Academic Motivation (r = .37, p < .001), and Meaningful Participation and Academic Motivation (r = .35, p < .001).

Covariate-Adjusted Models

We adjusted the suppression-corrected SEM in each grade by important covariates that could also account for meaningful variance in Drug Use. Table 3 shows the main hypothesized

Table 3 Results of covariate-adjusted regression models corrected for suppression

	7th grade		9th grade		11th grade	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Engagement factors						
Connectedness	**− 0.107**	− 0.041	**− 0.129**	**− 0.055**	**− 0.128**	**− 0.106**
Academic Motivation	**− 0.179**	− 0.049	**− 0.189**	**− 0.053**	**− 0.151**	**− 0.074**
Caring Relations	**− 0.059**	− 0.038	**− 0.069**	− 0.044	**− 0.079**	**− 0.079**
Meaningful Participation	**− 0.050**	− 0.029	− 0.039	− 0.028	− 0.047	**− 0.052**
Covariates						
Grades		**0.151**		**0.220**		**0.108**
Gender		0.007		0.002		− 0.019
Race		0.033		0.011		− 0.001
Reduced lunch		0.021		0.012		0.006
Skipping school		0.025		0.033		**0.070**
Miss school depression		0.041		0.037		**0.101**
Feeling hopeless		0.041		0.033		**0.091**
Hispanic		0.033		0.019		0.016
After school program		0.002		− 0.006		− 0.019
Model R^2	**0.065**	**0.088**	**0.084**	**0.131**	**0.075**	**0.158**

Bold values are significant at α = 0.05.

Covariates included gender, race (White vs. Other and Hispanic vs. Other), free or reduced lunch (yes = 1), grades in school, (continuous), attending an afterschool program (yes = 1), skipping school (yes = 1), missing school in the past 30 days because of feeling sad, hopeless, anxious, stressed, or angry (yes = 1), and feeling sad or hopeless almost every day in the past year (yes = 1)

parameter estimates in both the suppression-corrected model and the same model with the addition of the covariates. With few exceptions, there was a modest decrement in the magnitude of the regression coefficients between a model with and without covariates. In the 7th grade, all four regression weights in the unadjusted model were significant but when covariate-adjusted these same regression coefficients were no longer significant. In the 9th grade, three out of four of the regression weights in the unadjusted model (excepting meaningful participation) were significant but with the addition of the covariates, the effect associated with Caring Relations was no longer significant. In the 11th grade, three out of four exogenous constructs were significant and Meaningful Participation became marginally significant ($p < .06$). However, in the covariate-adjusted model, all four regression coefficients associated with the exogenous constructs were now significant.

By grade level, the largest magnitude of effect for the covariates was noted for self-reported grades (7th: $\beta = .15$, $p < .001$; 9th: $\beta = .22$, $p < .001$; 11th: $\beta = .11$, $p < .001$). No other covariate was significant in the 7th and 9th grade models; however, three additional covariates were significant in the 11th grade model including skipping school or cutting class ($\beta = .07$, $p < .01$), past 30 days missing school because felt sad or hopeless, anxious, stressed, or angry ($\beta = .10$, $p < .001$), and past 12 months feeling sad or hopeless every day for 2 weeks or more ($\beta = .09$, $p < .001$). The proportion of variance in each of the three models was larger with the addition of covariates (7th: $R^2 = .065$ to .088, 9th: $R^2 = .084$ to .131, 11th: $R^2 = .075$ to .158) reinforcing these measures accounted for meaningful variance in the model.

Discussion

This study provided evidence that four reliable facets of student engagement are significantly and independently related to drug use across a wide age range. Consistent with the literature, student engagement was conceptualized as multidimensional consisting of measures of academic motivation, school connectedness, teacher caring and support, and meaningful participation. Collectively, these tap participation, feelings of belonging and attachment, and investment in "mental labors" that others suggest comprise the principal components of student engagement (Fredricks et al. 2004). Unlike claims that the different facets of engagement are distinct (e.g., Li and Lerner 2013), we found moderate relations between the four latent constructs. In fact, the average correlation for each grade indicated no less than 21% overlap for the 11th grade with the largest overlap observed for the 7th grade at 29%.

The magnitude of the associations between student engagement and drug use in the suppression-corrected models was quite consistent with other studies that have examined similar outcomes. For instance, Hirschfield and Gasper (2011) reported cross-sectional associations between emotional, behavioral, and cognitive engagement and delinquency ranging from − .13 to − .20, the largest association observed for behavioral engagement. In the unadjusted models using the current data, the largest magnitude of association was observed for academic motivation for all three age groups, followed by school connectedness, again for all three grades. Academic motivation captures interest in and positive valuation of schoolwork, diligence, and task persistence, where students apply effort to be "cognitively engaged." This is considered the impetus that propels students to learn by applying their skills repetitively and remaining focused on task. School connectedness, on the other hand, captures affective ties to the people at school, feeling attached to school, characterized by a sense of closeness with teachers, and perceiving safety in the school environment.

The engagement literature also suggests that students lacking academic motivation are going to struggle in school not only with grades, but also with valuation of school and belief in its inherent purpose. The work product for school at any grade level requires rote memory, consistent study habits that promote familiarity with the course materials, and concentration both in and outside of class. It is conceivable that the road to disenfranchisement for these students begins with a struggle to focus their learning efforts, building the necessary scholastic skills required to achieve by paying attention, being diligent about their schoolwork, and making sure they follow classroom and school rules. Lacking proficiency in these skills, and faced with nagging doubts about the value of school, these youth drift away from the school environment and interact with deviant peers that value norm-violating activities, including drug use.

The gradual process of disenfranchisement is a mainstay of the Social Development Model, emphasizing the importance of school bonding as a means of protecting youth against delinquency involvement (Catalano and Hawkins 1996; Catalano et al. 1996; Hawkins and Weis 1986). As one of the several conventional institutions, schools exemplify prosocial behaviors through the activities of powerful socializing agents like classroom peers and adults. These role models provide opportunities to interact, acquire beneficial skills, and receive favorable reinforcement for law-abiding behaviors, encouraging youth to form social bonds that instill self-regulation (Catalano et al. 2004). When students fail to form strong supportive bonds with teachers and likewise fail to obtain support from their conventional peers, they are less concerned with injunctive norms for prosocial behavior and more willing to break rules, transgress conventional norms, be disruptive, and engage in deviant activities like drug use.

The importance of school connectedness, strongest for the 9th graders, but salient for the other two age groups, is also not surprising. Affective ties can reflect students' growing

familiarity with their school culture, the strong peer bonds they form at school, and the development of supportive relations with teachers that strengthen their continued interest in school. Indeed, the school environment becomes a central focus for students as it provides a platform for future success. Thus, feeling connected to school and forming caring relations take on additional meaning because school provides students with a culture that supports friendships, and allows teachers to nurture a students' individual growth both personally and academically (Patrick et al. 2007).

Models that adjusted for covariates produced some shrinkage in the regression coefficients for all four exogenous constructs and for all three grades. Apparently, grades received in class account for substantial variance in drug use even in the presence of student engagement measures. The increase in variance accounted for by the addition of the covariates went from 2% in the 7th grade to 5% and 8% in the 9th and 11th grades, respectively. This increase in criterion variance reinforces that the select covariates, many of which reflect psychological processes, gain efficiency as predictors of drug use with increasing age. For the older 11th grade youth, their future outlook, their feelings of "what lies down the road," and their ability to feel good about themselves matter in their decision to remain engaged in school or adopt a deviant lifestyle. Notably, even with these measures controlled in the 11th grade model, all four student engagement constructs contributed significantly to variation in drug use.

The results of the invariance tests were consistent with other findings supporting no major grade or gender differences in the configuration of the factor structure, factor loadings, or intercepts (e.g., Betts et al. 2010; Wang et al. 2011). This is an important finding because the relative stability of the composition of student engagement means that attempts to intervene with students can focus on the same components of student engagement with different age groups.

Limitations

The study has several limitations worth noting. For one thing, the data is cross-sectional and we cannot firmly establish causality, which requires temporal precedence among other things. Conceivably, the process of engagement may begin much earlier than identified in the current study (i.e., elementary school). Moreover, like many other school-related behaviors (i.e., dropout), (lack of) engagement is a "process" that takes time to unfold in a cumulative fashion, manifesting in different ways over time. Testing the relations in three age groups at the very least helps determine developmental consistency in the patterns of relation over time, but unfortunately cannot indicate stability of behavior, which requires repeated measures on the same individual. We were also not able to determine whether one form of engagement fuels another (i.e., school connectedness promotes academic motivation) and the process by which they are related to drug use (i.e., whether one facet of engagement promotes or inhibits drug use through another by testing mediating pathways, see for example Skinner et al. 2008). Again, multi-wave panel data with repeated and appropriately spaced measures is required to test intervening mechanisms. This also holds true for testing reciprocal relations, underscoring that drug use may have consequences on engagement just as much as engagement protects against drug use (Hirschfield and Gasper 2011).

Distinguishing the different facets of student engagement provides an improvement over prior research, which has either identified a single measure of engagement or not used as varied a measurement as the current study. Notwithstanding, future studies may want to include an even more diverse set of measures that tap into different aspects of engagement (e.g., extracurricular activities, community engagement, and school bonding, to name a few) and also control for other factors that may spuriously influence drug use. Included as potential third-variable alternatives are family (i.e., parent-child relations including attachment) and peer relations (i.e., perceived peer support), personality (i.e., self-esteem, self-control, and autonomy seeking), and contextual measures (i.e., school climate and neighborhood factors) that have been shown to influence drug use (Scheier 2015). Many of these factors are also "facilitators" of engagement, which may increase model precision with their inclusion. Furthermore, we did not use multilevel models to identify any school-level factors (i.e., size or location) that may influence engagement and likewise drug use (e.g., Mayberry et al. 2009). There is now growing evidence that school characteristics influence levels of drug use, which may occur through the school's climate, through teachers' pedagogical values and their philosophical approach to students (e.g., Debnam et al. 2013; LaRusso et al. 2008), or through the normative climate perpetuated at schools (e.g., Eitle and Eitle 2004). Racial composition may also affect school connectedness and this warrants further inquiry. Although we controlled for racial/ethnic group in the SEM, we did not explore model invariance by race/ethnicity. Measures of student engagement were based on a single informant, an approach that might be improved with multiple informants providing observational data (i.e., parent and teachers). The validity of this process has been brought into question because much of the effort that goes into engagement is covert and not subject to objective validation by outside parties (Eccles and Wang 2012). In addition, we measured different facets of student engagement on a continuous scale, but we did not include factors that assess student "disengagement," which as Jimerson et al. (2003) point out, is not just a polar opposite to engagement. In other words, fixing the troubles that contribute to "disengagement" may not foster engagement by itself.

Implications for Interventions

Programs targeting improved student engagement have provided a modicum of success preventing school dropout (e.g., Wilson and Tanner-Smith 2013) and truancy (e.g., Lehr et al. 2004). For the most part, these interventions target the individual student in an effort to improve academic skills and instill greater motivation for academic achievement. Many programs utilize remedial skill training framed by cognitive-behavioral strategies to teach decision-making and problem-solving as the core active ingredients. These programs provide students with systematic means to combat negative self-beliefs, ascribe success to effort and personal choice, and help build self-confidence through performance mastery and competence building activities. Teaching basic learning skills will go a long way to helping students find school rewarding on a personal level, feel more intrinsically motivated to participate in school, and boost their commitment to learning.

There is also evidence that using school-based mentoring programs can boost the performance of students struggling with academic proficiency (e.g., Lapan et al. 2014). Mentoring programs rely on personal relations with a significant adult figure who can provide character guidance, support remedial training, and foster school connectedness that is the bedrock of academic proficiency. Underperforming students may be falling behind for the very reasons outlined in this study (e.g., lack of school connectedness coupled with poor academic motivation) as well as what Finn described as "status" factors including family issues (whether home life supports academic endeavors), poverty, social mobility, and limited English proficiency. Studies of school-based mentoring show they can reduce the risk of school failure by teaching study skill habits, meta-cognitive strategies, and coping skills, all of which help to increase school engagement. When professionally trained (e.g., school counselors), mentors can also provide outreach to families that feel stressed because of social marginalization (i.e., recent immigrants) or socioeconomic factors that can be disruptive to home life (English may not be the primary language used at home). Evidence obtained from quasi-experimental studies shows that mentored students report fewer absences and discipline referrals, better school climates, and more school connectedness. They also report greater attachment to adult figures, higher self-esteem, and better school performance (Chan et al. 2013; Gordon et al. 2013; King et al. 2002). The benefits of these programs extend to peer cross-age mentoring programs as well and have been shown to benefit the older mentor as well as the mentee (e.g., Karcher 2008). Although these findings are quite promising, more rigorous longitudinal designs are required to properly evaluate these programs and assess implementation, dosage, and other factors (e.g., quality of mentor-mentee matching) that may influence program outcomes (Randolph and Johnson 2008; Wood and Mayo-Wilson 2012).

A different "whole school approach" focuses on improving school climate and bolstering students' perceptions of their schools as a place to build positive emotions and safe haven (e.g., Rowe et al. 2007). Here, the emphasis is on improving teacher-student relations as a means of improving student academic outcomes (e.g., Caldarella et al. 2011; Murray and Malmgren 2005; Sinclair et al. 2003). Several rigorously designed evaluation studies indicate that school climate programs, particularly those that emphasize teachers giving more positive feedback and praise and conducting more frequent monitoring of student performance through routine progress checks result in increased student engagement, produce better academic outcomes, reduce misbehavior, and improve student-teacher relations (e.g., Gregory et al. 2014). The resulting positive emotions that students accrue from being accepted, rewarded, and valued are crucial resources that foster well-being (Reschly et al. 2008). Taken as a whole, student engagement is more than a relevant concept; it is the core active ingredient in keeping students attentive, focused, actively participating in classroom activities, enjoying school, and attached to the institution as a bedrock of learning activities and future success.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Informed Consent This study was exempt from requiring ethics approval as it involved secondary analysis of a public use data file that was de-identified. Permission to use the files was granted to the authors by the California Department of Education, Coordinated School Health and Safety Office in conjunction with the California Department of Health Care Services, through a Memorandum of Agreement involving WestEd (contract # CN170260), as part of the California Safe and Supportive Schools Project (School Climate Health & Learning Survey System – Cal-SCHLS). Since 1989, WestEd has been granted a waiver of consent under US Department of Health & Human Services' Office for the Protection from Research Risks (45 CFR 4.116[d] and 117[c]) specifically because: (1) the research involved no more than minimal risk to the subjects; (2) the waiver did not adversely affect the rights and welfare of the subjects; and (3) the research could not practically be carried out without the alteration. The protocol requesting this waiver was reviewed and approved by the California Health and Human Services Agency's Committee for the Protection of Human Subjects (CPHS) as a requirement of the funding provided originally by the Department of Alcohol and Drug Programs (ADP) and now undertaken by the Department of Health Care Services (DHCS).

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