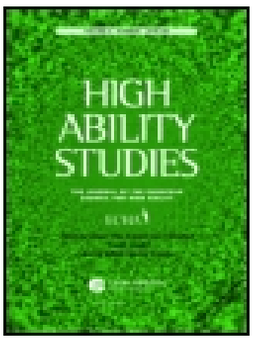

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Is having low motivation the same as not having high motivation? Comparing the CSAS-R and the SAAS-R

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The purpose of the current study was to examine the relationships among the Challenges to Scholastic Achievement Scale-Revised (CSAS-R) and The School Attitude Assessment Survey-Revised (SAAS-R) items and factors to determine whether the negative scales on the CSAS-R seemed to be measuring the same constructs as those that are measured on the SAAS-R. All SAAS-R items are positively worded, and all subscales are designed to measure positive manifestations of the constructs. The CSAS-R is a complementary instrument to the SAAS-R. All items represent negative manifestations of attitudes, cognitions, or behaviors. For this study, we focused on the four constructs from the SAAS-R and the CSAS that are directly comparable and complementary: positive and negative academic self-perceptions, positive and negative attitudes toward teachers and classes, high and low goal valuation, and regulated and unregulated study behavior. This comparison of CSAS-R and SAAS-R examined alternative conceptions of the dimensionality of the positive items (from the SAAS-R) and the negative items (from the CSAS-R) in an effort to better understand whether agreeing to statements about negative behaviors or attitudes seemed to represent the polar opposite of disagreeing to statements about positive behaviors or attitudes.

Keywords: motivation; method effect; measurement; validity; factor analysis; negative items; multidimensionality

The linkage between motivation and achievement is clear: students with higher motivation also exhibit higher academic achievement. However, the etiology of individual differences in motivation is unclear. Further, much research focuses on developing interventions to increase academic motivation in the hope of increasing academic achievement (Wagner & Szamosközi, 2012). Although there are many factors that contribute to achievement, students with high levels of academic motivation tend to share some common characteristics. First and foremost, students find value in their school experience. School is meaningful for them. Motivated students enjoy what they are doing or believe what they are doing will produce beneficial outcomes. Second, they believe they have the skills to be successful. Third, they are more likely to implement self-regulatory behavior, setting realistic expectations, and applying appropriate strategies for academic success (Siegle, 2013; Siegle &

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McCoach, 2005, 2012). Finally, they tend to exhibit positive attitudes toward school (Green et al., 2012).

Over a decade ago, we designed an instrument entitled *The School Attitude Assessment Survey-Revised* (*SAAS-R*) to study attitudinal and motivational differences between high-ability achievers and underachievers. Our goal was to develop an instrument that could help educators to identify academically-able students who were at risk of underachieving. One of the greatest risk factors for underachievement is low motivation for academic tasks. In the current study, we utilized four constructs from the *School Attitude Assessment Survey-Revised* (*SAAS-R*; McCoach & Siegle, 2003a): *academic self-perceptions*, *attitudes toward teachers and classes, goal valuation*, and *self-regulated study behavior*. The *SAAS-R* underwent a rigorous initial validation process (McCoach & Siegle, 2003a), as well as two independent psychometric evaluations (Dedrick, Shaunessy-Dedrick, Suldo, & Ferron, 2015; Suldo, Shaffer, & Shaunessy, 2008). The *SAAS-R* has been used in numerous studies both within and outside the field of gifted education. (See Dedrick et al. (2015) for a list of over two dozen studies that have used the SAAS-R.)

All of the item stems on the SAAS-R measure the presence or absence of achievement-oriented attitudes. As such, the SAAS-R asks questions that high achievers should endorse and then attributes lack of agreement with those statements as indicative of someone who is at risk for low achievement. All SAAS-R items are positively worded, and all subscales are designed to measure positive manifestations of the constructs. Therefore, agreement with the items indicates positive achievement-oriented attitudes. In contrast, low scores on the subscales are assumed to identify negative attitudes or a lack of achievement orientation. However, failing to endorse a positive statement is not necessarily the same as endorsing a negative statement.

A more direct method for determining students' negative attitudes, perceptions, and behaviors, which place them at risk for low achievement, involves asking for responses to statements that represent negative manifestations of the traits of interest. Given their negative tenor, we would expect low achievers to endorse such items. In contrast, high achievers would be expected to disagree with the statements. There could be several advantages to such a scale. First, the scores on the scale more directly represent the constructs related to underachievement and low achievement. Instead of assuming that someone who disagrees with a positive behavior or attitude would actually agree with a comparable negative action/opinion, item support now represents endorsement of the trait of interest. Second, the scores on the SAAS-R subscales were generally quite high. *Goal valuation* in particular seemed to have a high mean, with low variability within and across samples. Therefore, we worried about the possibility of positive response bias in our results. We hypothesized that a survey that included negative behaviors and attitudes might be less prone to such positive response biases. Further, low achievement is a negative trait, and low achievers are expected to exhibit negative manifestations of constructs such as self-perception, attitudes toward teachers, goal valuation, and self-regulation. A central conceptual and methodological question concerns the dimensionality of negative and positive manifestations of the same trait. At first glance, it might appear that negative manifestations of a construct merely represent the low end of the continuum for a positive trait. However, decades of research suggest otherwise (Dunbar, Ford, Hunt, & Der, 2000; Horan, DiStefano, & Motl, 2003; Marsh, 1996; Marsh, Scalas, & Nagengast, 2010; Tomas & Oliver, 1999). For example, although we

consider concepts such as love and hate to be polar opposites, it is quite possible to both love and hate the same person (object) simultaneously.

Therefore, we created a second instrument, the *Challenges to Scholastic Achievement Scale-Revised* (*CSAS-R*). The *CSAS-R* is a complementary instrument to the SAAS-R. The *CSAS-R* measures five constructs related to low academic achievement, including four of the five constructs on the SAAS-R: *negative academic self-perceptions*, *negative attitudes toward teachers and classes*, *low goal valuation,* and *unregulated study behavior*. All items represent negative manifestations of attitudes, cognitions, or behaviors. Thus, they serve as indicators of low achievement or underachievement rather than achievement. As such, low achievers would be expected to agree with the items on the *CSAS-R* (and disagree with the items on the SAAS-R). In contrast, high achievers would be expected to disagree with the items on the *CSAS-R*.

Within the instrument design literature, when a single scale includes both positively- and negatively-worded items, the presence of negatively-worded items generally impacts the scale's factor structure in one of two ways. First, the negative items could result in the identification of separate factors: one factor that contains positively-worded items and another factor that contains negatively-worded items (Carleton, McCreary, Norton, & Asmundson, 2006; DiStefano & Motl, 2006; McCoach, Gable, & Madura, 2013; Rodebaugh, Holaway, & Heimberg, 2004).

Alternatively, including negatively-worded items could introduce a method effect. A method effect represents a characteristic of a measurement procedure that introduces additional systematic variance to scores beyond what is attributable to variance in the substantive construct of interest (Maul, 2013). In other words, method effects represent non-substantive multidimensionality: the second factor is a method factor. Generally, method effects can be modeled by estimating an additional, negative method factor (on which only negatively-worded items load), or correlated errors among negatively-worded items (Bollen & Lennox, 1991; DiStefano & Motl, 2006; Dodeen, 2015; Sliter & Zickar, 2014; Tomás et al. 2013). Occasionally, method effects have been modeled using both a positive and a negative method factor, which are assumed to be orthogonal to each other, or through the use of correlated errors among negatively-worded items and another set of correlated errors among positively-worded items (Marsh et al., 2010). Although these double-method factor models may exhibit better fit than models that include only a negative (or positive) method factor, they are also far more likely to result in non-convergence or inadmissible solutions (Marsh et al., 2010).

One reason that multidimensionality may arise from the inclusion of negative items is because negative items are generally not the polar opposites of their positive counterparts. For example, imagine that an attitude toward school scale contains two items: "I love school" and "I hate school." At first glance, the two items may appear to be polar opposites. However disagreeing with the statement "I love school" does not necessarily mean that the respondent would agree with the statement "I hate school." The same respondent could logically disagree with both "I love school" and "I hate school"; such a response pattern could be indicative of apathy. Disagreeing with a positive item does not mean that the respondent would necessarily agree with its negative counterpart, and this lack of perfect negative correspondence introduces multidimensionality into the measure. Since the 1990s, psychometric research has consistently advised against the use of "polar opposite" and "negated polar opposite" items in self-report instruments (Chambers & Johnston, 2002).

Given the research on negative item stems and wording (DiStefano & Motl, 2006), we did not necessarily expect that the combination of the positive items (from the *SAAS-R*) and the negative items (from the *CSAS-R*) would be strictly unidimensional. In other words, we did not anticipate that a model that collapsed the positive items from the *SAAS-R* and the negative items from the *CSAS-R* into a small number of large factors with both positively and negatively worded items would provide the best fit to the data. Rather, we hypothesized that the paired sets of positive and negative items would be strongly negatively correlated, but that the set of positively- and negatively-worded items from the *SAAS-R* and *CSAS-R* would not necessarily sit at opposite ends of the same conceptual continuum. We were interested in examining the degree and source of the multidimensionality introduced by the negative items. We wondered whether the subscales of the *SAAS-R* and *CSAS-R* would appear to measure the same underlying constructs or if the two scales would seem to measure distinct but strongly-negatively-related, constructs. This comparison of *CSAS-R* and *SAAS-R* examined alternative conceptions of the dimensionality of the positive items (from the *SAAS-R*) and the negative items (from the *CSAS-R*) in an effort to better understand whether agreeing to statements about negative behaviors or attitudes seemed to represent the polar opposite of disagreeing to statements about positive behaviors or attitudes.

For this study, we focused on the four constructs from the *SAAS-R* and the *CSAS* that are directly comparable and complementary: positive and negative *academic self-perceptions*, positive and negative *attitudes toward teachers and classes*, high and low *goal valuation*, and regulated and unregulated *study behavior*.

Review of the literature

Academic self-perceptions

Academic self-perceptions involve an evaluation of one's perceived academic abilities (Byrne, 1996; Hattie, 1992; Van Boxtel & Mönks, 1992). Underachievers often exhibit low academic self-perceptions (Bruns, 1992; Diaz, 1998; Dowdall & Colangelo, 1982; Ford, 1996; Supplee, 1990; Whitmore, 1980), although some research refutes the assertion that gifted underachievers have poor academic self-concepts (Holland, 1998; McCoach & Siegle, 2003a, 2003b). The *CSAS-R*'s *negative academic self-perceptions* subscale is designed to measure the degree to which the student feels incapable of succeeding at academic tasks, whereas the *SAAS-R*'s *academic self-perceptions* subscale is designed to measure the degree to which a student feels confident in his/her ability to succeed academically.

Attitudes toward teachers and classes

Attitudes toward school include students' self-reported interest in and affect toward school. Many underachievers also demonstrate problems with authority, including teachers and school personnel (Mandel & Marcus, 1988; McCall, Evahn, & Kratzer, 1992), and they may even display hostility toward authority figures (Mandel & Marcus, 1988). The *negative attitudes toward teachers* subscale on the *CSAS-R* is designed to measure the degree of negativity that students feel toward classes and teachers, whereas the *attitudes toward teachers* subscale on the *SAAS-R* measures the degree of regard that students have for their teachers and classes.

Goal valuation

Children's goals and achievement values affect their self-regulation and motivation (Wigfield, 1994) because goals influence how children approach, engage in, and respond to achievement tasks (Hidi & Harackiewicz, 2000). When students value a task, they are more likely to engage in, expend more effort on, and do better on the task (Wigfield, 1994). Some students are not motivated to achieve in school because they do not value the outcomes of school, nor do they enjoy completing schoolwork (Siegle, McCoach, & Rubenstein, 2012). The *CSAS-R*'s *low goal valuation* subscale measures the degree to which students eschew the values of school. In contrast, the *goal valuation* scale from the *SAAS-R* measures the degree to which students value the goals of school.

Self-regulated study behavior

Self-regulation refers to students' "self-generated thoughts, feelings, and actions which are systematically oriented toward the attainment of goals" (Zimmerman, 1994, p. ix). Self-regulation comprises processes by which people are metacognitively, motivationally, and behaviorally active participants in their own learning (Zimmerman, 1994). Self-regulation predicts academic achievement (Duckworth & Seligman, 2005), and using self-regulatory strategies may increase academic achievement. The *unregulated study behavior* subscale from the *CSAS-R* measures the degree to which students fail to implement self-regulated study strategies and put forth effort toward academic tasks, whereas the *self-regulated study behavior* subscale from the *SAAS-R* measures students' use of self-regulated study strategies and the degree of effort applied toward academic tasks.

The purpose of the current study was to examine the relationships among the *CSAS-R* and *SAAS-R* items and factors to determine whether the negative scales on the *CSAS-R* seemed to be measuring the same constructs as those that are measured on the *SAAS-R.*

Methods

Instrumentation

Challenges to Scholastic Achievement Scale-Revised

The *CSAS-R* measures negative attitudes and behaviors associated with underachievement. For this study, we used four factors from the *CSAS-R*: *Negative academic self-perceptions, negative attitudes toward teachers and classes, low goal valuation,* and *unregulated study behavior.* (Please see Table 3, which contains the full item stems for all of the subscales in this study.) All items on the *CSAS-R* represent negative manifestations. Thus, the higher the person's score on a given subscale of the *CSAS-R*, the more likely the student is to be a low achiever (McCoach, Picho, & Baslanti, 2010). Prior research has established the adequacy of the scale's factor structure as well as the internal consistency of responses within each of the subscales (McCoach et al., 2010). The *CSAS-R* represents a complementary instrument to the *SAAS-R*; however, the *CSAS-R* measures negative manifestations of the constructs.

School Attitude Assessment Survey-Revised

For the current study, we used four subscales from the *SAAS-R* that we hypothesized to be positively related to achievement and negatively related to underachievement: *Academic self-perceptions*, *attitudes toward teachers and classes, goal valuation, and self-regulated study behavior.* (See Table 3 for item wordings.) All of the items on the *SAAS-R* are positively worded. Thus, the higher a person's score on a subscale of the *SAAS-R*, the more achievement-oriented this person is expected to be. Prior research has also examined the validity of the *SAAS-R*. Studies have revealed support for the factorial validity of its five-factor structure (Dedrick et al., 2015; McCoach & Siegle, 2003b), as well as the full scale's criterion validity (Baslanti & McCoach, 2006; McCoach & Siegle, 2003a; Suldo et al., 2008). McCoach and Siegle (2003a) were able to identify underachieving students based upon their *SAAS-R* responses, with classification accuracy above 80%.

Participants

For the present study, we solicited a total sample of 645 middle- and high-school students from three different schools in the northeast, of which 55.2% were female and 43.6% male (1.2% of students did not indicate their sex). With regard to race/ethnicity, the sample was 71.5% white, 8.5% Asian/Pacific Islander, 4.8% Latino/a, and 3.7% African-American/black, and 8.8% Other/multiracial. The results of an academic grade-level breakdown revealed that the largest percentage of students was in grade 7 (20.0%), followed by grades 8 (19.8%), 10 (18.0%), 12 (16.1%), 11 (14.6%), and 9 (10.4%); 1.1% of students did not provide grade-level information.

Most students in the sample exhibited above-average to average achievement: 154 students reported earning high grade point averages (GPAs), typically getting mostly or all A's, and 394 students reported average-level GPAs, earning either more A's than B's, more B's than A's, mostly B's with some A's and C's, or more B's than C's. Students with the lowest GPAs reported obtaining more C's than B's, mostly C's and D's, or mostly D's and F's ($n = 84$).

In general, the group reported high future educational goals: 44.3% of students planned to complete graduate school (Master's degrees, Law School, Medical School, etc.; $n = 281$), and 38% planned to complete a four-year degree at a college or university ($n = 242$). Other students reported plans to complete technical/vocational training or a two-year degree at a community/junior college ($n = 59$, 9.2%). The remainder of students either indicated plans to finish high school, at most, or no educational goals ($n = 42$, 6.6%). Eleven students did not report their educational aspirations.

Data analysis and procedures

Using M*plus7.3* (Muthén & Muthén, 1994–2015), we conducted confirmatory factor analyses (CFAs), using full information maximum likelihood estimation techniques to deal with missing data. In addition, given the ordinal nature of our response scale, we treated our item-level scores as ordered categorical responses. The analysis utilized items from 8 of the 10 subscales on the CSAS-R and the SAAS-R for which there were positive and negative matched subscales. These four pairs of subscales were: *academic self-perceptions* and *negative academic self-perceptions*, *attitudes*

toward teachers and classes and *negative attitudes toward teachers and classes, goal valuation* and *low goal valuation*, *self-regulated study behavior* and *unregulated study behavior*. The 59 items (29 from the CSAS-R and 30 from the SAAS-R) were subjected to a simultaneous CFA for a rigorous test of model fit.

We conducted a series of confirmatory factor analyses to determine whether the positive and negative sets of items measuring the same underlying construct were best described as measuring different ends of the same underlying continuum or if they appeared to measure separate but strongly-negatively-correlated dimensions. If the five-factor model that included four substantive factors and a negative method factor fit as well as the eight-factor model, then the multidimensionality introduced by including both positively and negatively worded items would appear to be a method effect. However, if the eight-factor model fit better than the five-factor model, then the multidimensionality would appear to be more substantively driven.

To that end, we compared three competing measurement models. Model 1 was an eight-factor model: It included all 8 substantive factors and estimated correlations among the 8 factors. Model 2 was a four-factor model that included the four substantive factors (*academic self-perceptions*, *attitudes toward teachers and classes, goal valuation*, and *self-regulated study behavior*). Model 3 was a five-factor model that included four substantive factors (*academic self-perceptions*, *attitudes toward teachers and classes, goal valuation*, and *self-regulated study behavior*) and a negative method factor to account negative wording of the items on the *CSAS-R*. Therefore, both *SAAS-R* and *CSAS-R* items were specified as indicators of four underlying constructs containing both positive and negative indicators: *academic self-perceptions*, *attitudes toward teachers and classes, goal valuation*, and *self-regulated study behavior*. Incorporating the method factor into the CFA accounted for the negative aspect of these attitudes, as measured by the *CSAS-R* items. Were the model with negative method effect factor the best-fitting model, then the *CSAS-R* and *SAAS-R* would appear to be measuring the same basic underlying constructs. However, the presence of the negative method effect indicates that the negative wording creates an additional dependence among the negative items, which represents a degree of non-substantively-driven multidimensionality.

We hypothesized that Model 2, which did not explicitly account for the negative nature of the *CSAS-R*, would have poorer fit than Model 3, which included a negative method factor. However, we had no strong hypotheses about how the fit of the Model 3 (the five-factor model with a negative method effect), would compare to Model 1, which allowed for eight separate, but correlated, factors. Therefore, we expected either Model 1 (the eight-factor model) or Model 3 (the five-factor model with a negative method factor) to be the best-fitting models.[1] In addition to conducting a series of confirmatory factor analyses, we also conducted reliability analyses and descriptive analyses using all available data. Finally, we conducted a series of analyses to understand how the factors related to both achievement and educational aspirations.

Results

Table 1 contains model fit comparisons for the three CFA models described above. Because we treated the data as ordinal, we could not compute χ^2 difference tests for the competing nested models in the standard fashion. However, we used the DIFFTEST option in M*plus* to compare the eight-factor model (Model 1) and the

Table 1. Comparison of the three confirmatory factor analysis models.

	χ^2 (*df*)	TLI	CFI	WRMSR	RMSEA (90% C.I.)
Model #1: Eight-factor model	4884.66 (*1624*)	.94	.94	1.73	.056 (.054–.058)
Model #2: Four-factor model	5754.09 (*1646*)	.92	.92	2.02	.063 (.061–.064)
Model #3: Five-factor model with negative method factor	5043.35 (*1617*)	.93	.94	1.81	.058 (.056–.06)

Note: The eight-factor model included four positive factors that were indicated by the positively worded *SAAS-R* items and four negative factors that were indicated by the negatively-worded *CSAS-R* items. Both the four- and five-factor models incorporated positively-worded (*SAAS-R*) items and negatively-worded (*CSAS-R*) items for each factor. The five-factor model also included a method factor to account for the negative wording of the *CSAS-R* items, which the four-factor model did not incorporate.

four-factor model (Model 2) and the four-factor model (Model 2) and the five-factor model (Model 3), which were nested. These tests favored the eight-factor model (Model 1) over the four-factor model (Model 2) and the five-factor with a negative method effect model (Model 3) over the four-factor model (Model 2). We could not compare the five-factor model with the negative method factor to the eight-factor model using the DIFFTEST procedure because they were not nested models. However, the global fit of the five-factor model with the negative method effect (Model 3, TLI = .93, CFI = .94, RMSEA = .058) appeared to be very similar to the fit of the eight-factor model (Model 1, TLI = .94, CFI = .94, RMSEA = .056). Such results suggest that the complete set of items can be modeled as indicators of four overarching factors when a negative method factor is also included to model the method effects introduced by the negative items. Table 2 contains the pattern coefficients for the eight-factor solution (Model 1); Table 3 contains the results of the five-factor solution with negative method effect (Model 3).

The eight-factor solution exhibited some discriminant validity issues, as can be seen in Table 4. As expected, the four factors from the *CSAS-R* were strongly, negatively, correlated with the positive factors from the *SAAS-R*. Given that all items on the *CSAS-R* were statements that underachieving students were expected to endorse and all statements on the *SAAS-R* were statements that high-achieving students were expected to endorse, these negative correlations were not surprising. However, in the eight-factor solution, the positive factor and its corresponding negative factor were correlated at −.83 or more, suggesting that both factors appeared to measure the same underlying construct. For example, the correlation between the *academic self-perceptions* and *negative academic self-perceptions* factors was −.92. The correlation between the *attitudes toward teachers and classes* and *negative attitudes toward teachers and classes* factors was −.88, as was the correlation between the *goal valuation* and *low goal valuation* factors. In addition, the correlation between the *self-regulated study* behavior and *unregulated study behavior* factors was −.83. The strength of these correlations indicates that that the matched positive and negative factors appeared to measure the same basic underlying construct.

Table 4 contains the latent correlations among the eight factors, as well as the manifest correlations among the eight subscales. The Cronbach's alpha reliability coefficients, which range from .85 to .94, appear on the diagonal of Table 4. As

Table 2. Standardized measurement weights for confirmatory factor analysis Model #1: eight-factor solution.

Factor/item	Weight	Std. error
Academic self-perceptions		
S2. I am intelligent	.73	.02
S3. I can learn new ideas quickly in school	.78	.02
S5. I am smart in school	.89	.01
S11. I am good at learning new things in school	.88	.01
S13. School is easy for me	.80	.02
S20. I can grasp complex concepts in school	.79	.02
S22. I am capable of getting straight A's	.73	.02
Negative academic self-perceptions		
C1. Getting A's is very difficult for me	.75	.02
C4. I am not smart in school	.77	.02
C19. I am unable to do well in school	.86	.02
C28. I need help to understand many topics in my classes	.69	.02
C32. I am not as smart as most other students in my classes	.77	.02
C40. I can't seem to get good grades in school	.87	.02
Attitudes toward teachers and classes		
S1. My classes are interesting	.81	.02
S9. I relate well to my teachers	.79	.02
S14. I like my teachers	.85	.02
S16. My teachers make learning interesting	.84	.02
S17. My teachers care about me	.82	.02
S31. Most of the teachers at this school are good teachers	.81	.02
S34. I like my classes	.86	.02
Negative attitudes toward teachers and classes		
C9. Most teachers here are bad teachers	.74	.02
C24. I hate the way courses are taught at this school	.75	.03
C30. I have bad relationships with my teachers	.85	.02
C34. Most teachers here are not very bright	.75	.02
C37. I dislike my teachers	.86	.02
Goal valuation		
S15. I want to get good grades in school	.78	.02
S18. Doing well in school is important for my future career goals	.82	.02
S21. Doing well in school is one of my goals	.91	.01
S25. It's important to get good grades in school	.87	.02
S28. I want to do my best in school	.93	.01
S29. It is important for me to do well in school	.91	.01
Low goal valuation		
C5. School is of no value to me	.80	.02
C8. School will not help me with my future plans	.68	.03
C26. Grades don't mean anything to me	.84	.02
C31. I see no purpose to school	.89	.01
C35. School does not fit into achieving my goals	.85	.02
C36. Getting high grades doesn't matter to me	.83	.02
C39. School is useless	.88	.02
C42. Success in life has nothing to do with success in school	.67	.03
Self-regulated study behavior		
S4. I check my assignments before I turn them in	.70	.02
S8. I work hard at school	.82	.02
S10. I am self-motivated to do my schoolwork	.84	.02
S24. I complete my schoolwork regularly	.80	.02
S26. I am organized about my schoolwork	.77	.02

(*Continued*)

Table 2. (*Continued*).

Factor/item	Weight	Std. error
S27. I use a variety of strategies to learn new material	.72	.02
S30. I spend a lot of time on my schoolwork	.76	.02
S32. I am a responsible student	.82	.02
S33. I put a lot of effort into my schoolwork	.88	.01
S35. I concentrate on my schoolwork	.88	.01
Unregulated study behavior		
C3. I am not motivated to study for exams	.73	.03
C6. I have poor study habits	.77	.02
C11. I have trouble keeping track of my assignments	.72	.02
C12. People say that I am a lazy student	.73	.03
C15. I have trouble keeping track of my school supplies	.50	.03
C18. I have trouble concentrating on my schoolwork	.82	.02
C21. I have problems with time management	.55	.03
C25. I have problems staying organized	.60	.03
C33. I do not have regular study routines	.79	.02
C38. I procrastinate when it comes to schoolwork	.59	.03

would be expected, the subscale correlations are somewhat attenuated, and are thus slightly smaller than the correlations among the latent factors.

Further, the five-factor model that included the negative method factor appeared to fit the data substantially better than the four-factor model that did not include a negative method effect. The standardized measurement weights for the negative method factor ranged from .05 to .47. Table 3 contains the pattern coefficients for the five-factor solution.

A comparison of the results of the five-factor model with the negative method factor to the eight-factor model revealed some interesting patterns. First, the items from the *CSAS-R* negative motivation/self-regulation construct appear to have the weakest standardized measurement weights across the two solutions. In fact, for the five-factor solution with the negative method effect, some of the standardized measurement weights for the primary factor were quite low. Second, two of the items from the negative goal valuation factor (CSAS 26 and CSAS 36) had near-zero loadings on the negative method factor, indicating that they fit as well with the original goal valuation factor as the *SAAS-R* items did.

A closer examination of our results revealed that pattern coefficients for the method factor varied by the substantive factor. The method coefficients were largest for the *self-regulated study behavior* factor, where 5 of the 10 negative (*CSAS-R*) items had coefficients above .40. Because the method coefficients were so large, the substantive coefficients for the negative (*CSAS-R*) items were noticeably smaller (range = .34–.67) than the substantive coefficients for the positive (*SAAS-R*) items (range = .70–.80). For the other three factors, the coefficients on the negative factor were much smaller (range = .04–.40), and the substantive pattern coefficients for the negative (*CSAS-R*) items were large (range = .63–.82). In these instances, the path coefficients for the negative items (from the *CSAS-R*) were generally of similar magnitude as the substantive pattern coefficients for the positive (*SAAS-R*) items.

Table 3. Standardized measurement weights for confirmatory factor analysis Model #3: five-factor solution including method factor.

Item	Academic self-perceptions	Attitudes toward school	Goal valuation	Self-regulated behavior	Method
S2	−.72**				
S3	−.78**				
S5	−.88**				
S11	−.87**				
S13	−.80**				
S20	−.78**				
S22	−.72**				
C1	.73**				.18**
C4	.74**				.21**
C19	.79**				.40**
C28	.63**				.33**
C32	.73**				.25**
C40	.81**				.35**
S1		−.81**			
S9		−.79**			
S14		−.85**			
S16		−.84**			
S17		−.82**			
S31		−.82**			
S34		−.87**			
C9		.67**			.16**
C24		.66**			.28**
C30		.74**			.34**
C34		.68**			.18**
C37		.77**			.22**
S15			−.76**		
S18			−.80**		
S21			−.90**		
S25			−.86**		
S28			−.92**		
S29			−.90**		
C5			.74**		.28**
C8			.64**		.19**
C26			.82**		.06
C31			.82**		.36**
C35			.80**		.20**
C36			.81**		.04
C39			.81**		.34**
C42			.65**		.08
S4				−.70**	
S8				−.82**	
S10				−.84**	
S24				−.80**	
S26				−.77**	
S27				−.73**	
S30				−.77**	
S32				−.82**	
S33				−.88**	
S35				−.88**	
C3				.63**	.25**

(*Continued*)

Table 3. (*Continued*).

Item	Academic self-perceptions	Attitudes toward school	Goal valuation	Self-regulated behavior	Method
C6				.65**	.35**
C11				.57**	.48**
C12				.63**	.27**
C15				.34**	.51**
C18				.67**	.45**
C21				.39**	.50**
C25				.46**	.44**
C33				.67**	.34**
C38				.49**	.30**

Note: In the item column, "S" indicates that the item came from the *SAAS-R*, whereas "C" indicates that the item was from the *CSAS-R*.
*$p < .01$; **$p < .001$.

Table 4. Inter-correlations among subscales of the CSAS-R and SAAS-R.

	1	2	3	4	5	6	7	8
1. Academic self-perceptions	.91	−.92	.61	−.48	.45	−.51	.62	−.58
2. Negative academic self-perceptions	−.82	.89	.55	−.55	−.43	.60	−.65	.73
3. Attitudes toward teachers	.56	−.48	.92	−.88	.56	−.61	.60	−.52
4. Negative attitudes toward teachers	−.40	.45	−.76	.85	−.52	.67	−.47	.54
5. Goal valuation	.39	−.31	.51	−.45	.92	−.88	.76	−.51
6. Negative goal valuation	−.44	.50	−.53	.57	−.77	.90	−.67	.60
7. Self-regulated study behavior	.58	−.55	.56	−.40	.65	−.56	.94	−.83
8. Unregulated study behavior	−.51	.60	−.45	.43	−.39	.49	−.72	.89

Note: The correlations among the latent variables appear above the diagonal. The manifest correlations among the subscales appear below the diagonal. Reliabilities for each subscale appear on the diagonal. All correlations were significant at the .01 level.

Comparisons of positive and negative scales

If the *CSAS-R* and *SAAS-R* subscales really measured different ends of a continuum for the same construct, then the extremity of responses should be similar for the parallel subscales. Therefore, we also examined the distance of each subscale's mean from its mid-point (which was a rating of 4 for all subscales on both the *CSAS-R* and the *SAAS-R*). Table 5 contains the means and standard deviations for all of the subscales, as well as their deviations from the response scale mid-point. One goal for creating the *CSAS-R* was to develop a measure of lack of goal valuation that had a less extreme mean and a larger variance than the *goal valuation* subscale on the *SAAS-R*. However, the mean of the *low goal valuation* subscale from the *CSAS-R* was as extreme (in the negative direction) as the mean of the *goal valuation* subscale on the *SAAS-R* (in the positive direction). Both subscales had means that deviated substantially from their mid-point, low variances, and leptokurtic, skewed distributions. On the one hand, this suggests a parallelism among the two *goal valuation* subscales, which may provide additional evidence that they measure the same underlying construct. On the other hand, both *goal valuation* subscales might benefit from the addition of items that elicit less extreme responses and that draw the means of the subscales more toward the mid-point. The other subscales on the instrument did

Table 5. Descriptive statistics for the CSAS-R and the SAAS-R.

Subscale	*M*	SD	Deviation from scale midpoint
Academic self-perceptions	5.11	1.24	1.11
Negative academic self-perceptions	2.66	1.32	−1.34
Attitudes toward teachers and classes	5.30	1.23	1.30
Negative attitudes toward teachers and classes	2.20	1.13	−1.80
Goal valuation	6.23	1.02	2.23
Low goal valuation	1.84	1.05	−2.16
Self-regulated study behavior	5.22	1.23	1.22
Unregulated study behavior	3.32	1.29	−.68

not appear to suffer from this same issue, at least certainly not to the same extent that the *goal valuation* subscales did.

Overall, the negative deviation of all four *CSAS-R* subscales from their mid-points was quite similar to the positive deviation of the four comparable *SAAS-R* scales from their mid-points (see Table 5). For example, the mean score for the *academic self-perceptions* factor was 5.11, which is 1.11 raw-score units above that subscale's mid-point (4). The mean score for the *negative academic self-perceptions* factor was 2.66, which is 1.34 scoring units from the response scale's mid-point; in terms of absolute distance from the mid-point, 1.11 units and 1.34 units are fairly similar. We had been concerned there might be a tendency to agree with the positively-worded items on the *SAAS-R*. The similarity in the absolute distance from the midpoint is an additional indication that the subscales are likely to be measuring positive and negative manifestations of the same underlying constructs.

Relationship of the factors to external criteria

To provide a preliminary glimpse into the criterion-related validity of the *CSAS-R*, and to compare it to the *SAAS-R*, we conducted two sets of exploratory analyses. First, we used the eight-factor model and the five-factor model to predict self-reported achievement to determine whether allowing for the separation of the positive and negative factors actually helped to explain appreciable additional variance in students' GPAs. We also computed two baseline models for comparison purposes: These results appear in Table 6. The first comparison model (Model 4 in Table 6) used only the four factors (and items) from the *SAAS-R* to predict students' GPAs. The four factors from the *SAAS-R* explained 39.3% of the variance in self-reported GPA. When all four factors were entered into the model simultaneously, the two strongest predictors of GPA were *self-regulated study behavior* ($\beta = .52$) and *academic self-perceptions* ($\beta = .34$). The second comparison model (Model 5 in Table 6) used only the four factors and items from the *CSAS-R* to predict students' GPAs. The four factors from the *CSAS-R* explained 40.6% of the variance in self-reported GPA. When all four factors were entered into the model simultaneously, the strongest predictor of GPA was *negative academic self-perceptions* ($\beta = -.60$). Model 6 from Table 6 grouped *SAAS-R* and CSAS-R items together into four large factors, each of which included both positive and indicators. This model explained 40.4% of the variance in students' self-reported GPAs.[2] When all four factors were entered into the model simultaneously, the two strongest predictors of GPA were *self-regulated study behavior* ($\beta = -.36$) and *academic*

Table 6. Comparison of measurement models predicting grade point average.

	Model #4: SAAS-R items only	Model #5: CSAS-R items only	Model #6: SAAS-R & CSAS-R items	Model #7: SAAS-R & CSAS-R items plus method factor
Academic self-perceptions	−.15*	.15*	.16*	.16**
Attitudes toward teachers and classes	−.08	−.06	−.01	.002
Goal valuation	.34**	−.60**	−.43**	−.42**
Self-regulated study behavior	.52**	−.09	−.36**	−.38**
Method factor	–	–	–	−.06
R^2	.393**	.406**	.404**	.412**

Note: Each of the measurement models above was used to predict self-reported grade point average (GPA). This table presents the standardized beta coefficients (β) that capture the regression effects of GPA on each of the four factors: *Academic self-perceptions, attitudes toward teachers and classes, goal valuation* and *self-regulated study behavior*. Model #4 included four positive factors that were only indicated by the positively-worded *SAAS-R* items. Model #5 incorporated four negative factors that were only indicated by the negatively-worded *CSAS-R* items. Model #6 utilized both positive (*SAAS-R*) and negative (*CSAS-R*) items to comprise four overall factors, each of which included items from both instruments. Model #7 also employed both positive (*SAAS-R*) and negative (*CSAS-R*) items as indicators of the four identified factors. However, model #7 also included a method factor to account for the negative wording of the *CSAS-R* items.
*$p < .01$; **$p < .001$.

self-perceptions ($\beta = -.43$). Finally, Model 7 was identical to Model 6, except for the addition of a negative method factor. This model explained 41.2% of the variance in students' self-reported GPAs. (When all five factors were entered into the model simultaneously, the two strongest predictors of GPA were *self-regulated study behavior* ($b = -.38$) and *academic self-perceptions* ($b = -.42$). The negative method factor did not explain a statistically significant portion of the variance in self-reported GPA, and adding the negative method factor increased the percentage of variance explained in GPA by less than 1%. Using the eight-factor model to predict self-reported GPA resulted in a non-admissible solution, most likely due to the extremely strong correlations between the positive and negative versions of the four substantive factors. These results suggest that both the *SAAS-R* and the *CSAS-R* measure self-reported GPA equally well. The *SAAS-R* factors and the *CSAS-R* factors appear to explain fairly-redundant portions of the variance in self-reported GPA. Although the method factor does improve the fit of the model, it does not help to explain GPA, lending further credence to its interpretation as a methodological but non-substantively-meaningful factor.

In addition, we computed descriptive statistics to examine three groups of students based on their self-reported GPAs: high-GPA students, average-GPA students, and low-GPA students, as described earlier. Table 7 reports the means and standard deviations of these three groups for each of the *SAAS-R* and *CSAS-R* subscales. These results further illustrate the trends observed in the multiple regression analyses and highlight critical differences between high and low achievers, both in terms of their level and variability of responses on the *SAAS-R* and *CSAS-R*.

On average, students in the high-GPA group exhibited higher means on the *SAAS-R* subscales and lower means on the *CSAS-R* subscales when compared to average-GPA peers, and the average-GPA group exhibited higher means on the *SAAS-R* subscales and lower means on the *CSAS-R* subscales than their low-GPA peers. For example, on average, the highest achieving students had higher *goal valuation* (*SAAS-R*) subscale scores ($M = 6.68$, SD = .55) than the average-GPA students ($M = 6.19$, SD = 1.01), and both of these student groups demonstrated higher mean ratings than the lowest-performing segment of this sample ($M = 5.53$, SD = 1.33). Conversely, for *low goal valuation* (*CSAS-R*) items, the high-GPA group chose lower ratings ($M = 1.44$, SD = .61) than the average-GPA students ($M = 1.81$, SD = .96), and both of these groups rated the subscale items lower than the poorest-performing group ($M = 2.69$, SD = 1.51).

We expected that, in relation to their lower-performing peers, students with high GPAs would demonstrate higher levels of agreement with positively-worded statements about their academic self-perceptions, attitudes toward teachers and classes, goal valuation, and self-regulated study behavior, etc. Conversely, we expected and found lower levels of agreement with negatively-worded statements regarding these constructs among higher performers than students with lower GPAs.

Interestingly, the variability on the subscales also differed by self-reported achievement level. Across eight of the nine subscales, high-GPA students' scores were less variable than average- and low-performing students' scores. Differences in variability across achievement levels were especially pronounced for the *goal valuation*, *low goal valuation*, and *negative academic self-perceptions* subscales. For example, the variance for the *goal valuation* subscale was .30 for high achievers, 1.02 for average achievers, and 1.77 for low achievers. This means that the *goal valuation* subscale exhibited 5.90 times as much variability in the low-achieving group as it did in the high-achieving group. The variance in the *low goal valuation* subscale was .37 for the high-achieving group, .92 for the average-achieving group, and 2.28 for the low-achieving group. Therefore, the *low goal valuation* subscale exhibited 6.16 times as much variability in the low-achieving group as it did in the high-achieving group. The low-achieving group also exhibited over 2.50 times as much variability on the *self-regulated study behavior* subscale than the high-achieving

Table 7. Comparisons of low, average, and high GPA students across CSAS-R and SAAS-R subscales.

Subscale	Low GPA *M* (SD)	Average GPA *M* (SD)	High GPA *M* (SD)	High GPA *d*
Academic self-perceptions	3.90 (1.32)	5.05 (1.12)	5.94 (.81)	2.00
Negative academic self-perceptions	4.15 (1.40)	2.70 (1.20)	1.74 (.63)	−2.48
Attitudes toward teachers and classes	4.34 (1.47)	5.35 (1.10)	5.68 (1.06)	1.10
Negative attitudes toward teachers and classes	2.96 (1.45)	2.15 (1.02)	1.92 (.99)	−.89
Goal valuation	5.53 (1.33)	6.19 (1.01)	6.68 (.55)	1.27
Low goal valuation	2.69 (1.51)	1.81 (.96)	1.44 (.61)	−1.22
Self-regulated study behavior	3.88 (1.27)	5.17 (1.11)	6.03 (.80)	2.17
Unregulated study behavior	4.46 (1.11)	3.34 (1.18)	2.66 (1.24)	−1.51

Note: Cohen's *d* effect sizes represent the standardized mean differences between the high- and low-GPA groups.

group did. The one exception to this pattern was the *unregulated study behavior* subscale. On this subscale, the highest performing students exhibited more variability in their ratings than the low-GPA group, although the magnitude of the difference was quite modest. The variance in the high-GPA group was 1.23 whereas the variance in the low-GPA group was 1.11. Overall, the differences in variability across the subgroups suggest that achievers tend to be more uniformly high in their responses to the *SAAS-R* subscales and more-uniformly low in their responses to the *CSAS-R* (except on the *unregulated study behavior*) subscales. The higher variability of the low achievers, on the other hand, suggests that low achievers are a less homogeneous group than high achievers; their attitudes and perceptions span a larger spectrum of responses.

Table 7 also presents the Cohen standardized mean differences between the low- and high-GPA groups for each subscale score. The low- and high-GPA groups differed substantially on the nine subscales. These differences ranged from a low of .89 standard deviation units for the *negative attitudes toward teachers and classes* factor to a high of 2.48 standard deviation units for the *negative academic perceptions* subscale. In addition, the positive and negative subscales had effect sizes of somewhat similar magnitudes, albeit in the opposite direction. For example, the standardized mean difference between high- and low-achievers on the *goal valuation* subscale was 1.27, and for the *low goal valuation* subscale, it was −1.22. The largest differences between high- and low-achievers were for *negative academic self-perceptions* ($d = -2.48$), *academic self-perceptions* ($d = 2.00$), and *self-regulated study behavior* ($d = 2.17$); on these scales, high achievers' scores were at least two standard deviation units higher than the scores of the low achievers.

We also compared the means on *CSAS-R* and *SAAS-R* subscales for four groups of students with different educational aspirations: (1) individuals planning to complete graduate school; (2) those planning to complete four-year degrees at a college or university; (3) students planning to complete vocational/technical school or a two-year college degree; and (4) students planning to complete high school or less education, or reporting no educational goals. Table 8 presents mean scores and standard deviations for each *CSAS-R* and *SAAS-R* subscale, as well as standardized mean (Cohen's *d*) differences between the most-educationally-ambitious students (planning to complete graduate school) and least-educationally-ambitious students (those planning to finish high school, at best, or having no educational goals/plans). These effect sizes ranged from .81 to 1.88 standard deviation units, which again constitute very large effects.

As expected, students who reported having higher educational aspirations also tended to have higher means on the subscales of the *SAAS-R*, given the instrument's nature as a measure of positive achievement attitudes and behaviors. Conversely, more-ambitious students tended to have lower scores on the *CSAS-R* because of its focus on negative achievement attitudes and behaviors. The corresponding *SAAS-R* and *CSAS-R* subscales generally exhibited effects of a similar magnitude, but in opposite directions. For example, the effect size differences for the *goal valuation* subscale ($d = 1.27$) and the *low goal valuation* subscale ($d = -1.22$) were quite similar, as were the effect sizes for the *attitudes toward teachers and classes* subscale ($d = .87$) and the *negative attitudes toward teachers and classes* subscale ($d = -.83$).

The *goal valuation* and the *low goal valuation* subscales best differentiated the students with the highest educational goals from the students with the lowest educational goals. For example, students wishing to go to graduate school exhibited the

Table 8. Mean comparison of the CSAS-R and SAAS-R subscales for groups identified by self-reported educational goals.

Subscale	No goals, high school or less *M* (SD)	Vocational/technical, two-year degree *M* (SD)	Four-year degree *M* (SD)	Graduate school	
				M (SD)	*d*
Academic self-perceptions	4.09 (1.37)	4.63 (1.32)	5.00 (1.20)	5.44 (1.10)	1.19
Negative academic self-perceptions	3.59 (1.63)	3.19 (1.18)	2.77 (1.31)	2.30 (1.16)	−1.05
Attitudes toward teachers and classes	4.58 (1.43)	5.08 (1.18)	5.20 (1.31)	5.52 (1.03)	.87
Negative attitudes toward teachers and classes	2.83 (1.48)	2.29 (1.07)	2.28 (1.16)	1.99 (.93)	−.83
Goal valuation	4.98 (1.57)	5.71 (1.22)	6.22 (.86)	6.54 (.76)	1.73
Negative goal valuation	3.17 (1.65)	2.31 (1.23)	1.83 (.86)	1.50 (.71)	−1.88
Self-regulated study behavior	4.24 (1.57)	4.56 (1.20)	5.08 (1.17)	5.59 (1.08)	1.17
Unregulated study behavior	4.06 (1.34)	3.72 (1.15)	3.46 (1.23)	3.02 (1.27)	−.81
Negative environmental perceptions	2.62 (1.17)	2.27 (.98)	2.15 (1.02)	1.87 (.82)	−.87

Note: The descriptive statistics above were calculated for a total sample of 624 middle-school students. Cohen's *d* effect sizes represent the standardized mean differences between students planning to complete graduate school and students who, at most, plan to complete high school or have no educational goals.

largest *goal valuation* scores ($M = 6.54$, SD = .76) and the smallest *low goal valuation* scores ($M = 1.50$, SD = .71), whereas students planning to complete high school or less or who had no educational goals had the lowest *goal valuation scores* ($M = 4.98$, SD = 1.57) and the highest *low goal valuation* scores ($M = 3.17$, SD = 1.65): the two groups differed by 1.73 standard deviation units on the *goal valuation* scale and 1.88 standard deviation units on the low *goal valuation* scale. Additionally, students with lower educational goals tended to have more-variable subscale scores, whereas the scores for students with higher educational goals tended to be more homogeneous across all *SAAS-R* and *CSAS-R* subscales. These differences were largest for the *low goal valuation* subscale (variances were 5.40 times as large for students with lower educational goals than for students with the highest educational goals) and the *goal valuation* subscale, (variances were 4.30 times as large for students with lower educational goals than for students with the highest educational goals).

Discussion, limitations, and implications

The *CSAS-R* and the *SAAS-R* are complementary instruments that measure motivation, school-related attitudes, and academic perceptions that predict academic achievement and underachievement. Four of the five subscales on each of the instruments were designed to measure the same basic constructs. However, whereas the

SAAS-R asks about positive manifestations of the attitudes and behaviors, the *CSAS-R* measures negative manifestations of the attitudes and behaviors. There are three ways to conceive of the complementary positive and negative scales: (1) the positive and negative scales may measure two opposite extremes along the same continuum (2) the positive and negative subscales could measure two separate but highly related constructs and (3) the positive and negative subscales do measure the same basic construct, but negative items introduce a negative method effect, which should be modeled. The results of the CFAs suggest that although the *CSAS-R* and the *SAAS-R* appear to be measuring the same basic underlying constructs, the use of positive or negative items does require the addition of a negative method effect to adequately capture the structure of the data. However, the four parallel factors from *CSAS-R* and the *SAAS-R* appear to be measuring the same underlying constructs, albeit from different ends of the response continuum.

The *CSAS-R* and the *SAAS-R* appear to be measuring the same basic latent constructs using slightly different methods, and the subscales on both instruments appear to differentiate between high- and low-GPA students. Administering either the *CSAS-R* or the *SAAS-R* should allow researchers to predict which students are most likely to suffer from academic achievement issues. If researchers choose to administer both instruments simultaneously, how should they be combined? The positive and negative subscales are highly correlated. Therefore, using the negative and positive subscales as separate subscales in analyses would be problematic. Using the four substantive factors plus the negative method factor is possible when conducting analyses within a latent variable modeling framework. Yet, such a solution is not practical for researchers who seek to use manifest subscale scores within non-latent-variable-based analyses. The greatest disadvantage to Model 3 is interpretability: the negative method effect introduces a degree of non-substantive multidimensionality. How should those method loadings be interpreted? How much does the need for a method factor compromise the simple structure of the factor model? How should substantive researchers create subscales and compute internal consistency reliability coefficients in the presence of a negative method effect? Additionally, combining the positive and negative items into one unidimensional construct did degrade the fit of the model when compared to the five-factor model with the negative method factor. From a pragmatic standpoint, reverse scoring the negative items and collapsing the positive and negative subscales appears to be a reasonable way to combine the items from the two instruments. This would be analogous to fitting Model 2 from Table 1. However, such a strategy begs the question of why one would choose to administer both scales simultaneously. Our future work will continue to explore a variety of methods for combining the results of the two subscales when they are given simultaneously, as well as potential differences between the two subscales, especially in terms of their predictive validity.

The *CSAS-R*, like the *SAAS-R*, appears to differentiate between high- and low-achievers. Furthermore, low-achievers tend to be far more variable on the *CSAS-R* and *SAAS-R* scales than high-achievers are. One practical implication of these differences in variability is that we can do a better job predicting which students are likely to be low-achievers based on their CSAS-R and SAAS-R scores than high-achievers. This is because a student with a low score on a SAAS-R subscale or a high score on a CSAS-R subscale is fairly likely to be a low-achiever. However, the converse is not true: a student with a high score on a SAAS-R subscale or a low score on a CSAS-R subscale is more ambiguous. That student could be a high- or

low-achiever. The Achievement Orientation Model (Siegle, 2013; Siegle & McCoach, 2004) theorizes that if students are low in any one of the four areas (academic self-perceptions, goal valuation, self-regulation, or environmental perceptions) that their achievement may suffer. Therefore, this model predicts that the variability in the scores of low-achievers would be considerably higher than the variability in the scores of high-achievers. Future research will continue to explore the degree to which the Achievement Orientation Model is supported by empirical research data from the *SAAS-R* and the *CSAS-R*.

It is also important to note several limitations to these analyses. First, GPA is self-reported, rather than objectively measured. Therefore, there may be response bias effects that create artificially-inflated correlations among GPA, homework completion, and the constructs of interest. In addition, the current study has no way to assess whether students with low GPAs are underachieving (i.e. is their performance below their potential?). If the self-reported GPA variable reflects an accurate estimate of a student's grades, we are only able to compare low-achievers to high-achievers. We have no way to assess whether these students are actually underachieving because we have no direct measure of ability. Given our theoretical interest in underachievement, future studies will examine the efficacy of the CSAS-R, both alone and in combination with the SAAS-R, for identifying underachieving students. Finally, this sample is a sample of convenience. Therefore, these results may not be generalizable to other student samples. Still, we feel that the initial research on the *CSAS-R* indicates its promise as another self-report tool for measuring low motivation and academic attitudes that place students at risk for low achievement.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes

1. We also attempted to fit a model with both positive and negative method effects (analogous to one of the models presented by Marsh et al. (2010)); however, the model with both positive and negative method effects failed to converge. Although these double-method factor models may exhibit better fit than models that include only a negative (or positive) method factor, they are also far more likely to result in non-convergence or inadmissible solutions (Marsh et al., 2010).
2. We also tried to fit an eight-factor model, in which the positive and negative factors were separate. However, this model produced an inadmissible solution, most likely due to the high correlations among the positive and negative versions of the four substantive factors. (See Table 4).

References

Baslanti, U., & McCoach, D. B. (2006). Factors related to the underachievement of university students in Turkey. *Roeper Review, 28*, 210–215.

Bollen, K. A., & Lennox, R. (1991). Conventional wisdom on measurement: A structural equation perspective. *Psychological Bulletin, 110*, 305–314.

Bruns, J. H. (1992). *They can but they don't*. New York, NY: Viking Penguin.

Byrne, B. M. (1996). *Measuring self-concept across the life span: Issues and instrumentation*. Washington, DC: American Psychological Association.

Carleton, R. N., McCreary, D. R., Norton, P. J., & Asmundson, G. J. G. (2006). Brief fear of negative evaluation scale-revised. *Depression and Anxiety, 23*, 297–303. doi:10.1002/da.20142

Chambers, C. T., & Johnston, C. (2002). Developmental differences in children's use of rating scales. *Journal of Pediatric Psychology, 27*, 27–36.

Dedrick, R. F., Shaunessy-Dedrick, E., Suldo, S. M., & Ferron, J. M. (2015). Psychometric properties of the school attitude assessment survey-revised with international baccalaureate high school students. *Gifted Child Quarterly, 59*, 38–54.

Diaz, E. I. (1998). Perceived factors influencing the academic underachievement of talented students of Puerto Rican descent. *Gifted Child Quarterly, 42*, 105–122.

DiStefano, C., & Motl, R. (2006). Further investigating method effects associated with negatively worded items on self-report surveys. *Structural Equation Modeling: A Multidisciplinary Journal, 13*, 440–464. doi:10.1207/s15328007sem1303_6

Dodeen, H. (2015). The effects of positively and negatively worded items on the factor structure of the UCLA loneliness scale. *Journal of Psychoeducational Assessment, 33*, 259–267. doi:10.1177/0734282914548325

Dowdall, C. B., & Colangelo, N. (1982). Underachieving gifted students: Review and implications. *Gifted Child Quarterly, 26*, 179–184.

Duckworth, A. L., & Seligman, M. E. (2005). Self-discipline outdoes IQ in predicting academic performance of adolescents. *Psychological Science, 16*, 939–944.

Dunbar, M., Ford, G., Hunt, K., & Der, G. (2000). Question wording effects in the assessment of global self-esteem. *European Journal of Psychological Assessment, 16*, 13–19. doi:10.1027//1015-5759.16.1.13.

Ford, D. Y. (1996). Determinants of underachievement as perceived by gifted, above average, and average Black students. *Roeper Review, 14*, 130–136.

Green, J., Liem, G. D., Martin, A. J., Colmar, S., Marsh, H. W., & McInerney, D. (2012). Academic motivation, self-concept, engagement, and performance in high school: Key processes from a longitudinal perspective. *Journal of Adolescence, 35*, 1111–1122. doi:10.1016/j.adolescence.2012.02.016

Hattie, J. (1992). *Self-concept*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Hidi, S., & Harackiewicz, J. M. (2000). Motivating the academically unmotivated: A critical issue for the 21st century. *Review of Educational Research, 70*, 151–179.

Holland, V. (1998). Underachieving boys: Problems and solutions. *Support for Learning, 13*, 174–178.

Horan, P. M., DiStefano, C., & Motl, R. W. (2003). Wording effects in self-esteem scales: Methodological artifact or response style? *Structural Equation Modeling: A Multidisciplinary Journal, 10*, 435–455. doi:10.1207/S15328007SEM1003_6.

Mandel, H. P., & Marcus, S. I. (1988). *The psychology of underachievement*. New York, NY: Wiley.

Marsh, H. W. (1996). Positive and negative global self-esteem: A substantively meaningful distinction or artifactors? *Journal of Personality and Social Psychology, 70*, 810–819. doi:10.1037/0022-3514.70.4.810.

Marsh, H. W., Scalas, L. F., & Nagengast, B. (2010). Longitudinal tests of competing factor structures for the Rosenberg self-esteem scale: Traits, ephemeral artifacts, and stable response styles. *Psychological Assessment, 22*, 366–381. doi:10.1037/a0019225

Maul, A. (2013). Method effects and the meaning of measurement. *Frontiers In Psychology Quantitative Psychology and Measurement*, *4*(169), 1–13. doi:10.3389/fpsyg.2013.00169

McCall, R. B., Evahn, C., & Kratzer, L. (1992). *High school underachievers: What do they achieve as adults?* Newbury Park, CA: Sage.

McCoach, D. B., & Siegle, D. (2003a). Factors that differentiate underachieving gifted students from high-achieving gifted students. *Gifted Child Quarterly, 47*, 144–154.

McCoach, D. B., & Siegle, D. (2003b). The school attitude assessment survey-revised: A new instrument to identify academically able students who underachieve. *Educational and Psychological Measurement, 63*, 414–429.

McCoach, D. B., Picho, K., & Baslanti, U. (2010, April). *Validation of the challenges to scholastic achievement scale (CSAS-R): Comparing the CSAS-R and the SAAS-R.* Paper session presented at the meeting of the American Educational Research Association, Denver, Colorado.

McCoach, D. B., Gable, R. K., & Madura, J. (2013). *Instrument development in the affective domain* (3rd ed.). New York, NY: Springer.
Rodebaugh, T. L., Holaway, R. M., & Heimberg, R. G. (2004). The treatment of social anxiety disorder. *Clinical Psychology Review, 24*, 883–908.
Siegle, D. (2013). *The underachieving gifted child: Recognizing, understanding, and reversing underachievement*. Waco, TX: Prufrock Press.
Siegle, D., & McCoach, D. B. (2004). *Motivating gifted students*. Waco, TX: Prufrock Press.
Siegle, D., & McCoach, D. B. (2005). Making a difference: Motivating gifted students who are not achieving. *Teaching Exceptional Children, 38*, 22–27.
Siegle, D., & McCoach, D. B. (2012). Underachieving gifted students. In C. M. Callahan, & H. Hertberg-Davis (Eds.), *Fundamentals of gifted education* (pp. 377–387). New York, NY: Taylor & Francis/Routledge.
Siegle, D., McCoach, D. B., & Rubenstein, L. D. (2012). Understanding and addressing underachievement in gifted students. In T. L. Cross, & J. R. Cross (Eds.), *The handbook for counselors serving students with gifts and talents: Development, relationships, school issues, and counseling needs/interventions* (pp. 511–526). Waco, TX: Prufrock Press.
Sliter, K. A., & Zickar, M. J. (2014). An IRT examination of the psychometric functioning of negatively worded personality items. *Educational and Psychological Measurement, 74*, 214–226. doi:10.1177/0013164413504584
Suldo, S. M., Shaffer, E. J., & Shaunessy, E. (2008). An independent investigation of the validity of the school attitude assessment survey-revised. *Journal of Psychoeducational Assessment, 26*, 69–82.
Supplee, P. L. (1990). *Reaching the gifted underachiever*. New York, NY: Teacher College Press.
Tomas, J. M., & Oliver, A. (1999). Rosenberg's self-esteem scale: Two factors or method effects. *Structural Equation Modeling: A Multidisciplinary Journal, 6*, 84–98.
Tomás, J. M., Oliver, A., Galiana, L., Sancho, P., & Lila, M. (2013). Explaining method effects associated with negatively worded items in trait and state global and domain-specific self-esteem scales. *Structural Equation Modeling, 20*, 299–313. doi:10.1080/10705511.2013.769394.
Van Boxtel, H. W., & Mönks, F. J. (1992). General, social, and academic self-concepts of gifted adolescents. *Journal of Youth and Adolescence, 21*, 169–186.
Wagner, E., & Szamosközi, Ş. (2012). Effects of direct academic motivation-enhancing intervention programs: A meta-analysis. *Journal of Cognitive and Behavioural Psychotherapies, 12*, 85–101.
Whitmore, J. R. (1980). *Giftedness, conflict, and underachievement*. Boston, MA: Allen & Bacon.
Wigfield, A. (1994). The role of children's achievement values in the self-regulation of their learning outcomes. In D. H. Schunk, & B. J. Zimmerman (Eds.), *Self-regulation of learning and performance: Issues and educational applications* (pp. 101–124). Mahwah, NJ: Lawrence Erlbaum Associates.
Zimmerman, B. J. (1994). Dimensions of academic self-regulation: A conceptual framework for education. In D. H. Schunk, & B. J. Zimmerman (Eds.), *Self-regulation of learning and performance: Issues and educational applications* (pp. 3–21). Mahwah, NJ: Lawrence Erlbaum Associates.