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Will Not Want: Self-Control Rather than Motivation Explains the Female Advantage in Report Card Grades

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Abstract

Girls earn better grades than boys, but the mechanism explaining this gender difference is not well understood. We examined the relative importance of self-control and motivation in explaining the female advantage in grades. In Study 1, we surveyed middle school teachers and found they judged girls to be higher in both school motivation and self-control. In Studies 2 and 3—using self-reported motivation and teacher- and/or parent-reported self-control, and quarterly and final grades obtained from school records—we find that self-control, but not school motivation, helps to explain the gender gap in academic performance. In these studies, girls appeared to be more self-controlled than boys, but—contrary to teacher judgments in Study 1—did not appear to be more motivated to do well in school.

Keywords

Gender; self-control; impulsivity; school motivation; academic performance

1. Introduction

Why do girls earn better grades than boys? The female advantage in course grades has been documented at every level of formal education, from elementary school through college, in all major subjects including math and science (American Association of University Women

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Educational Foundation [AAUWEF], 1998; Cole, 1997; Clark & Grandy, 1984; Kimball, 1989; Mau & Lynn, 2001; Pomerantz, Altermatt, & Saxon, 2002; Willingham & Cole, 1997). Whereas it has been suggested that, in college, female undergraduates earn higher GPAs because they choose easier courses (Elliott & Strenta, 1988; Keller, Crouse, & Trusheim, 1993; Young, 1991), course selection cannot explain the female advantage in grades among younger students who are largely enrolled in identical classes (Cornwell, Mustard, & Van Parys, 2013). Girls are not smarter than boys (Neisser et al., 1996), and differences in general intelligence fail to explain why girls earn higher grades (Duckworth & Seligman, 2006; Steinmayr & Spinath, 2008).

Logic dictates that if girls outperform boys but are comparable in cognitive ability, they may be trying harder. Indeed, girls devote more time and energy to academic work in middle school (e.g., participating in class, completing homework) than do boys (Jacob, 2002; Willingham, Pollack, & Lewis, 2002). And, in a national study of several thousand primary school children, Cornwell et al. (2013) found that the female advantage in course grades was eliminated when accounting for teacher ratings of classroom behavior (e.g., working on an assignment to completion, resisting distractions). This raises the question, why do girls try harder? Do girls simply want to do well in school more than boys do, finding it either more interesting or important (i.e., a difference in motivation)? Or, are girls similarly motivated but better than boys at willing themselves to do the work needed to earn good grades (i.e., a difference in volition)? In the current investigation, we examine the degree to which motivational vs. volitional factors give girls an edge in the classroom. First, we conducted a survey of middle school teachers to assess their intuitions about gender differences in self-control and school motivation. Next, in two longitudinal studies of middle school students, we examined the extent to which the female advantage in academic course grades is explained by motivation, operationalized as self-reported interest in and perceived importance of academic work, or by volition, operationalized as adult informant (i.e., teacher or parent) ratings of self-control.

Duckworth and Seligman (2006) proposed that female students outperform their male counterparts in the classroom because they are more self-controlled (i.e., better at regulating their attention, emotion, and behavior in the service of subjectively valued goals). In two samples of eighth grade students, they found that girls earned higher grades than boys despite comparable standardized achievement and IQ test scores. A composite measure of self-control that included parent, teacher, and self-report ratings as well as delay of gratification measures mediated the gender difference in grades in both samples. Likewise, Kling, Noftle, and Robins (2012) found in a study of undergraduates that self-reported conscientiousness at least partially mediated the association between being female and the tendency to earn higher GPAs than would be predicted by SAT scores.

A growing body of research supports the two component claims in the mediation model proposed by Duckworth and Seligman (2006). First, several studies have found that girls are indeed more self-controlled than boys of the same age throughout childhood and adolescence, whether self-control is measured with informant ratings, self-report ratings, or performance tasks (Chapple, Vaske & Hope, 2010; Cole, 1986; Davis, 1995; Else-Quest, Hyde, Goldsmith, & Van Hulle, 2006; Hartshorne & May, 1928; Humphrey, 1982; Kendall

& Wilcox, 1979; LaGrange & Silverman, 1999; Matthews, Ponitz, & Morrison, 2009; Saarni, 1984; Silverman, 2003). Second, self-control and closely related constructs have been shown to predict academic achievement at every level of schooling from preschool through college; indeed, the effect of self-control on academic achievement is larger than for any other facet of temperament or personality (Duckworth & Allred, 2012; Duckworth & Carlson, 2013; Poropat, 2009). Unfortunately, studies examining gender and self-control, or self-control and achievement, have generally excluded measures of academic motivation. Thus, the possibility that girls simply *want* to do better, rather than *will*[1] themselves to do so, has not yet been examined directly in empirical research.

1.1. Motivation vs. volition

The present investigation was inspired by informal conversations with teachers about individual and group differences in academic achievement. When discussing the tendency for girls to earn better grades than boys, teachers would often comment, by way of explanation, that girls in their classes were more "motivated" than boys. When asked to elaborate, some teachers would describe their more motivated students as caring more about doing well in school than their lower-performing peers. In contrast, other teachers described motivated students as those who had "the will" to complete their homework, pay attention in class, and otherwise work hard. These diverse implicit definitions suggest that teachers may use the term "motivation" very generally to describe how engaged students are in their studies. Likewise, the term motivation is sometimes employed broadly in the psychology literature to encompass all goal-directed, intentional processes (as opposed to automatic, involuntary processes like reflexes).

However, motivation can also be used more narrowly to refer to a particular stage in the generation of goal-directed action. Specifically, motivation is often distinguished from volition (see the Rubicon model, Achtziger & Gollwitzer, 2010; Heckhausen & Gollwitzer, 1987; Hofmann & Kotabe, 2012; Kuhl, 1984). Used in this way, motivation refers to the initial stage of selecting goals and committing to them on the basis of their expected value. In contrast, volition refers to the subsequent stage of planning and enacting behaviors in pursuit of goals to which individuals have committed. In other words, motivation entails *wanting* particular goals, whereas volition entails subsequently *willing* oneself to take action toward their realization. It seems fair to say that we have all experienced failures of volition despite the presence of motivation. Students, too, are capable of maintaining goals toward which they fail to take effective action, instead giving in to sundry temptations that are more pleasurable and less effortful in the moment. Thus, despite vernacular usage, self-control is better understood as a volitional construct than a motivational one (Kuhl, 1984). The capacity to bring attention, emotion, and behavior into alignment with chosen goals is downstream of, and not at all guaranteed by, commitment to goals themselves. In theory, girls might work harder than boys in school for motivational reasons, for volitional reasons, or both.

[1]Here, we are using "will" as a synonym for willpower or self-control (e.g., Baumeister, Vohs, & Tice, 2007; Mischel, Cantor, & Feldman, 1996).

With respect to motivation, both the value of a goal and the likelihood of its attainment are relevant: Individuals commit themselves most strongly to goals that they appraise as both desirable and feasible (Eccles & Wigfield, 2002). Hence, motivation to do well in school is a function of both academic self-efficacy (i.e., confidence in academic ability) and the subjective value of schoolwork (i.e., interest in and/or perceived importance of schoolwork; Eccles, Adler, & Meece, 1984; Eccles, Wigfield, Harold, & Blumenfeld, 1993; Wigfield & Eccles, 2000). If girls are indeed more motivated than boys to do well in school, it could be that they are more confident in their ability to do so, or because they find school more interesting or important.

Collectively, prior empirical studies have not found support for a female advantage in academic self-efficacy. In fact, a recent meta-analysis summarizing over 247 independent studies found that despite some variation by course subject, girls are slightly *less* confident in their overall academic abilities compared to boys ($d = -.08$; Huang, 2013). Thus, it is unlikely that superior academic confidence is the mechanism by which girls tend to earn higher grades than boys in all of their courses.

The empirical evidence for gender differences in the subjective value of school is mixed. Some studies have found that girls tend to value language arts more than boys do, but boys tend to value math more than girls do (e.g., Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2003; Skaalvik & Skaalvik, 2005; Wolters & Pintrich, 1998). Using domain-general measures, some studies have reported that female students are more motivated than male students (e.g., Baumert & Demmrich, 2001; Levitt, List, Neckermann, & Sadoff, 2012; Segal, 2012; Vallerand et al., 1992), while others have not (e.g., Vallerand, Gagné, Senécal, & Pelletier, 1994).

However, secular trends suggest that female students might value school more today than in prior years. Female students have now surpassed their male counterparts in college enrollment and persistence (Buchmann, DiPrete, & McDaniel, 2008; Mather & Adams, 2007; Pollard, 2011). Likewise, for the first time in history, American women now place greater importance on a high-paying career than do their male counterparts (Patten & Parker, 2012). From the 1980s to the 2000s, the proportion of American high school girls intending to earn a post-graduate degree increased, a shift which is sufficient to account for a growing female advantage in report card grades over the same period (Fortin, Oreopoulos, Phipps, 2013). Considering these developments, we remained open to the prospect that girls in our studies would find school more interesting and important than would their male classmates.

1.2. Current investigation

In the current investigation, we conducted three studies. Study 1 was a survey assessing middle school teachers' beliefs about gender differences in self-control and school motivation. Studies 2 and 3 were prospective, longitudinal studies of middle school students taking the same courses in their major academic subjects. In Study 2, teachers and parents at two middle schools rated students on self-control in the fall while students completed self-report questionnaires assessing school motivation. We then collected school records of academic course grades in the spring. Using structural equation modeling (SEM) to correct for measurement error and allow for analysis of all available data, we estimated the extent to

which self-control and school motivation uniquely explained gender differences in final academic performance. We also examined their ability to account for gender differences in *changes* in academic performance over the school year. A finding of self-control or motivation predicting fourth quarter GPA after controlling for first quarter GPA would constitute stronger evidence that the predictor were causally related to academic performance rather than merely associated with it. Finally, given recent concerns about false positive findings in psychological science and the imperative for both actual and conceptual replications (Pashler & Harris, 2012), we conducted a third study at a different pair of schools. In Study 3, we employed the same design and analytic strategy as in Study 2, administering the same measures used in Study 2 as well as additional, alternative measures of self-control and school motivation. The use of both the same and different measures of self-control and motivation in Study 3 as in Study 2 allows for both direct replication of Study 2 and a test of whether the observed associations reflect the true relations among the key constructs or are artifacts of the particular measures used.

2. Study 1

2.1. Methods

2.1.1. Sample and procedure—Middle school teachers were invited to complete an online survey via a link on the first author's webpage. The survey was advertised widely on blogs and forums targeting middle school teachers. The survey began with a description of gender differences in academic achievement: *"We are interested in gender differences in middle school students. Of course, not all boys are the same as other boys, nor are all girls the same as other girls. Nevertheless, it is still possible that there are on average differences between boys and girls, and this survey asks you to reflect on any differences you have noticed as a classroom teacher."* Teachers then completed a multiple choice questionnaire addressing gender differences in self-control and school motivation. The final sample included 179 teachers who completed all questionnaire items. About 59% of teachers indicated they had been teaching for 10 or more years. About 65% of teachers were female; the average age in years was 43.86 (*SD* = 11.30).

2.1.2. Measures

2.1.2.1. Gender differences in self-control: Teachers completed an adaptation of the Brief Self-Control Scale (Tangney, Baumeister, & Boone, 2004) in which items and response options were phrased to solicit the teacher's opinion as to whether, in general, girls or boys were more self-controlled. For example, the item "I have a hard time breaking bad habits" was rephrased as "Who has a harder time breaking bad habits?" The response options for this item were:

1 = *Boys have a much harder time breaking bad habits*.

2 = *Boys have a somewhat harder time breaking bad habits*.

3 = *Both boys and girls have about the same amount of trouble breaking bad habits*.

4 = *Girls have a somewhat harder time breaking bad habits*.

5 = *Girls have a much harder time breaking bad habits*.

The gender ordering of the response options was randomized between subjects, so that half of the subjects saw the answer choices similar in structure to those above ("Boys…" answer choices before "Girls…" answer choices), while the other half of the subjects saw the items in the opposite order ("Girls…" answer choices before "Boys…" answer choices). For this 13-item scale, the coefficient alpha was .76.

2.1.2.2. Gender differences in school motivation: Teachers completed an adaptation of a questionnaire assessing the subjective value of school (Eccles et al., 1993). The response options were phrased to solicit the teacher's opinion as to whether, in general, girls or boys were more academically motivated. For example, the item "I feel strongly that it is important to be good at school" was rephrased to "Who feels more strongly that it is important to be good at school?" The response options for this item were:

1 = *Boys feel much more strongly that it is important to be good at school*.

2 = *Boys feel somewhat more strongly that it is important to be good at school*.

3 = *Both boys and girls feel about equally strongly that it is important to be good at school*.

4 = *Girls feel somewhat more strongly that it is important to be good at school*.

5 = *Girls feel much more strongly that it is important to be good at school*.

The gender ordering of the response options was randomized between subjects. For this 6-item scale, the coefficient alpha was .76.

2.2. Results and discussion

All response scales ranged from "boys are more…" to "girls are more…" with the midpoint reflecting no gender difference. Therefore, one-sample t-tests were used to compare teacher ratings to the scale midpoint (3.00). Ratings that deviated from the midpoint indicated that teachers believed either girls or boys were more likely to exhibit the behavior or hold the belief in question. For purposes of analysis, the scales were coded (or recoded) such that higher scores indicated that girls were more self-controlled or motivated than boys.

Teachers judged girls to be more self-controlled than boys (M = 3.73, SD = .45), one-sample $t(178) = 21.67$, d = 1.62, $p < .001$. Likewise, teachers judged girls to be higher in school motivation than boys (M = 3.61, SD = .50), one-sample $t(178) = 16.47$, d = 1.23, $p < .001$. Whether teachers had been teaching for at least a decade did not appear to influence their judgments of gender differences in self-control (M = 3.75, SD = .43 vs. M = 3.70, SD = .50), $t(161) = .73$, d = .11, p = .47 or motivation (M = 3.66, SD = .48 vs. M = 3.57, SD = .47), $t(161) = .1.16$, d = .19, p = .25. Likewise, teacher gender did not appear to influence judgments of gender differences in self-control (female M = 3.76, SD = .42 vs. male M = 3.66, SD = .54), $t(161) = 1.27$, d = .21, p = .21, or motivation (female M = 3.64, SD = .46 vs. male M = 3.59, SD = .51, $t(161) = .61$, d = .10, p = .54. Response option order did influence teacher judgments of both self-control and school motivation. Specifically, teachers were slightly more inclined to rate girls as more self-controlled (M = 3.80, SD = .47 vs. M = 3.64,

SD = .40) and motivated (*M* = 3.70, *SD* = .48 vs. *M* = 3.51, *SD* = .49) when response options beginning with "Girls…" were listed before response options beginning with "Boys…", $t(177) = 2.44$, $d = 0.37$, $p < .05$ and $t(177) = 2.65$, $d = 0.40$, $p < .05$, respectively. Regardless, for both order presentations, one-sample *t*-tests remained significant, *p*s < .001. The perceived gender difference in self-control (*M* = 3.73, *SD* = .45) was slightly larger than the perceived gender difference in school motivation (*M* = 3.61, *SD* = .50), paired-samples $t(178) = 3.17$, $d = 0.24$, $p < .01$.

3. Study 2

In Study 1, middle school teachers judged girls to be higher than boys in self-control and school motivation. The magnitudes of these perceived gender differences were substantial, and were slightly greater for self-control than for school motivation. In Study 2, we collected longitudinal data at two middle schools to assess the potential of gender differences in self-control and school motivation to explain the female advantage in report card grades.

3.1. Method

3.1.1. Sample and procedure—Participants were 5th through 8th grade students from two public charter schools in New York City recruited using opt-out consent procedures for parents and written assent for students. Ninety five percent of enrolled students (*N* = 509) participated in the study. The mean age of participants was 11.73 years (*SD* = 1.28). Sixty three percent of participants were Hispanic, 36% were African American, and 1% were of other ethnic backgrounds; 52% were female. During the first grading period, parents and teachers were sent questionnaires to complete with students as target; separately, students completed questionnaires and an IQ test in small groups during non-academic periods. At the end of the school year, we collected quarterly and final report card grades from school records.

3.1.2. Measures

3.1.2.1. Self-control: For each child, we asked one teacher and one parent to complete an informant version of the Impulsivity Scale for Children (ISC; Tsukayama, Duckworth, & Kim, 2013). This questionnaire included eight items about specific behaviors nominated by school-age children as common failures of self-control (e.g., "This student did not remember what he or she was told to do," "This student interrupted other people while they were talking"). Informants endorsed each item on a 5-point scale indicating the frequency of such occurrences (1 = *almost never*, 2 = *about once a month*, 3 = *about 2 to 3 times a month*, 4 = *about once a week*, and 5 = *at least once a day*). For ease of exposition, we reverse-scored each item so that higher scores denoted higher self-control. Scale alphas for teacher and parent ratings of self-control were .93 and .84, respectively. We received completed teacher ratings for 95% of students and completed parent ratings for 65% of students.

3.1.2.2. School motivation: Students endorsed six items adapted from a questionnaire assessing subjective task value (Eccles et al., 1993). Three items assessed perceived importance or utility (e.g., "In general, how useful is what you learn in school?"; 1 = *not at*

all useful, 7 = *very useful*), and three items measured school interest (e.g., "Compared to most of your other activities, how much do you like school?"; 1 = *not at all*, 7 = *a lot more*). The school importance items had an alpha of .76 and the school interest items had an alpha of .81. For all six items, alpha = .83. We received completed subjective task value measures for 94% of students.

3.1.2.3. IQ: Students completed the Raven's Progressive Matrices (Raven, 1948), a widely used non-verbal test of general intelligence. The test comprises 60 patterns for which the missing component must be identified from a set of options. Because performance on the Raven's test improves with age and standardized scores are not available, we regressed the raw scores on age and used the residuals as age-adjusted IQ scores in our analyses. (The resultant residual scores were highly correlated—at r = .95—with the unadjusted scores.) We received completed IQ tests for 96% of students.

3.1.2.4. Report card grades: Quarterly grade point averages (GPAs) were calculated as the mean of students' grades in non-elective subjects (i.e., classes all students took in common, including math, writing, English, social studies, music, and science). Final GPA was calculated by averaging students' four quarterly GPAs. We received first quarter, fourth quarter, and final GPAs for 98%, 98%, and 97% of students, respectively.

3.1.2.5 Median income: Using home addresses in conjunction with U.S. Census Bureau figures, we calculated the estimated median neighborhood household income for each participant. This variable was log transformed to reduce skewness. We were able to estimate median income for 97% of students.

3.2. Data Analysis

We used structural equation modeling (SEM) in Amos (version 20.0), to assess the degree to which self-control and school motivation mediated the effect of gender on course grades (GPA). This approach had two notable benefits. First, it allowed us to use full information maximum likelihood (FIML) procedures, which are more efficient and produce less biased parameter estimates than traditional missing data techniques (Enders & Bandalos, 2001; Peters & Enders, 2002). Second, it allowed us to specify latent variables representing self-control and school motivation, which, in turn, enabled us to correct for measurement error and reduce bias in parameter estimates (Kline, 2005).

In Model 1 (Figure 1), final GPA was the key outcome variable. It was regressed on self-control, school motivation, gender, and several demographic covariates (race, median income, age, school, and IQ). The other two endogenous variables (self-control and school motivation) were also regressed on all demographic covariates, as well as gender. Model 2 (Figure 2) was identical except that we controlled for first quarter GPA and used fourth quarter GPA (rather than final GPA) as the outcome, allowing us to determine the degree to which self-control and school motivation mediated the relationship between gender and *changes* in course grades over the academic year. Both models employed latent factors for self-control and school motivation.

Self-control was represented as a latent factor defined by two indicators: teacher report and parent report (measures that were correlated at $r = .45$, $p < .001$). Because there were only two indicators, the fit and factor loadings of this measurement model could not be assessed independently of the structural model. When estimated in the context of the structural model, the standardized factor loadings for self-control were .78 (teacher rating) and .59 (parent rating). We specified school motivation as a latent factor defined by two indicators: importance and interest (measures that were correlated at $r = .52$, $p < .001$). As with the self-control factor, fit and factor loadings for this measurement model could not be estimated independently of the structural model. When estimated in the context of the full structural model, the standardized factor loadings were .61 (importance) and .86 (interest). It should be noted that all models presented utilize simplified latent factor indicators (scale means rather than individual scale items) for the sake of parsimony and to avoid exceeding the number of parameters appropriate for our sample sizes. However, we also tested models in which the scale items were used as indicators and found similar results to those reported here (results available upon request).

Bivariate correlations (reported in Table 1) revealed that, as expected, the indicators of self-control (parent and teach report) as well as the indicators of school motivation (interest and importance) were positively related to school performance (all the measures of GPA). However, the self-control indicators were also related to the change in GPA between the first and last quarter, whereas indicators of motivation were not.

In preliminary analyses, we verified that findings were consistent when subject-specific course grades (e.g., math only, English only) were used in lieu of overall GPAs (results available upon request). To increase reliability and decrease multiple comparisons, we present only the models using overall GPAs. Goodness-of-fit was assessed for all models using three indicators: the chi-square, the Comparative Fit Index (CFI; Hu & Bentler, 1995, 1999), and the Root Mean Square Error of Approximation (RMSEA). To establish mediation, we tested the joint significance of the effects comprising the intervening variable as suggested by MacKinnon, Lockwood, Hoffman, West, and Sheets (2002).

3.3. Results

3.3.1. Gender differences in self-control, school motivation, GPA, and IQ—

Consistent with prior research, girls earned higher grades (ds = .25 to .34, ps < .01) but did not have significantly higher IQ scores ($d = .07$, $p = .29$) than boys. Likewise, both parents and teachers rated girls as more self-controlled than boys. Consistent with the findings of Duckworth and Seligman (2006), this gender difference was more dramatic for teacher ratings than for parent ratings ($d = .61$, $p < .001$ and $d = .22$, $p < .01$, respectively). Because school motivation (self-reported) included both an importance and an interest component, each was tested separately. There was no gender difference in interest in schoolwork ($d = .06$, $p = .52$) and the slight tendency for girls to see schoolwork as more important failed to reach significance ($d = .17$, $p = .07$). Descriptive statistics, effect sizes for gender differences, and bivariate correlations for all variables are displayed in Table 1.

3.3.2. Explaining the effect of gender on GPA (Model 1)—Model 1 fit well [$\chi^2(30) = 75.00$, $p < .001$; CFI = .93; RMSEA = .05]. As shown in Figure 1[2], girls were more self-controlled than boys, and greater self-control at the beginning of the year predicted final GPA, consistent with the hypothesis that self-control mediates the association between gender and academic performance. School motivation was correlated with self-control ($r = .21$, $p < .01$), but neither the path between gender and school motivation, nor between school motivation and GPA was significant. In other words, the model found no evidence that school motivation mediated the relation between gender and academic performance.

3.3.3. Explaining the effect of gender on change in GPA (Model 2)—Model 2 also fit well [$\chi^2(32) = 81.61$, $p < .001$, CFI = .96, RMSEA = .06]. As shown in Figure 2, girls scored higher than boys on self-control, which in turn predicted rank-order improvements in fourth quarter GPA. In other words, self-control was positively associated with fourth quarter GPA after accounting for first quarter GPA, indicating that self-control mediated the association between gender and rank-order improvements in GPA over the school year. In contrast, school motivation, which remained correlated with self-control ($r_p = .21$, $p < .01$), was not significantly related to either gender or GPA, suggesting it played no role in mediating the association between gender and change in grades during the school year.

4. Study 3

In Study 2, we found that girls were more self-controlled than boys, and this advantage explained their higher final grades. Furthermore, the female advantage in self-control explained rank-order improvements in grades over the school year. In other words, self-control, but not school motivation, explained why girls ended the year with better report cards and, in addition, why girls increasingly outperformed boys over the school year.

Study 3 served as both an actual and conceptual replication, the purposes of which were to (a) confirm the findings of Study 2 in a different sample and (b) test whether these findings held using alternative measures of self-control and school motivation. The design of Study 3 was essentially identical to that of Study 2 except that participants completed two different questionnaires assessing their school motivation while adult informants (two different teachers in Study 3 as opposed to one teacher and one parent in Study 2) completed two different questionnaires assessing participants' self-control. One set of measures was the same as those used in Study 2 and one set (the "alternative measures") was different.

4.1. Methods

4.1.1. Sample and procedure—Participants were 5th through 8th graders from two public charter schools in the Philadelphia area. About 97% of enrolled students ($N = 519$) participated in the study. The mean age of participants was 12.45 years ($SD = 1.17$). Ninety four percent of participants were African American, 4% were Hispanic, and 2% were of other ethnic backgrounds; 50% were female. During the first grading period, two different teachers were sent questionnaires to complete with students as target; separately, students

[2]The figures presented are simplified for the sake of legibility; the effects of the control variables are omitted. The effects of the control variables for all the SEMs presented are reported in the supplementary materials.

completed questionnaires and an IQ test in small groups during non-academic periods. At the end of the school year, we collected quarterly and final report card grades from school records.

4.1.2. Measures

4.1.2.1. Self-control: As in Study 2, the Impulsivity Scale for Children was used to measure self-control. Scale alphas for the ISC were .91, and .90 for homeroom and classroom teacher ratings, respectively. We received ISC ratings from both teachers for 81% of students. Additionally, we attempted to obtain for each student the homeroom teacher's and classroom teacher's rating using the Brief Self-Control Scale (BSCS; Tangney et al., 2004), which comprises 13 items assessing control over behavior, attention, and emotion (e.g., "This student has a hard time breaking bad habits"). Items were endorsed on a 5-point scale (*1 = not like this student at all* and *5 = very much like this student*). Alphas for homeroom and classroom teacher ratings were .97 and .96, respectively. We received BSCS ratings from both teachers for 82% of students.

4.1.2.2. School motivation: As with the self-control measures, the school motivation measures from Study 2 were used again in Study 3. School motivation alphas were .60 for the 3-item importance component, .76 for the 3-item interest component, and .75 for all six items combined. We received school motivation self-reports from 82% of students.

We also introduced an alternate measure of school motivation. Participants rated 10 everyday activities (e.g., cleaning my room, eating my favorite food) on how enjoyable they are "in the moment you are doing them" using a 9-point scale ranging from 1 = *not enjoyable at all* to 9 = *very enjoyable*. They rated the same activities on how important they are "to achieving your future goals" using a 9-point scale ranging from 1 = *not at all important* to 9 = *very important* (adapted from Duckworth, Kirby, Tsukayama, Berstein, and Ericsson, 2011). Ratings for "*being in English class*" and "*being in math class*" were of interest in this study while other activities (e.g., "*cleaning my room*") served as filler items and were not included in the calculation of the scale means for academic motivation. The two enjoyment items were averaged, as were the two importance items. The alpha for these four items was .65. We obtained these alternate self-reports of school motivation from 80% of students.

4.1.2.3. IQ: As in Study 2, intelligence was measured using Raven's Progressive Matrices (Raven, 1948) and raw scores were regressed on age so that the residuals could be used as age-adjusted IQ scores. We received completed IQ tests for 78% of students.

4.1.2.4. Report card grades: As in Study 2, quarterly GPAs were calculated as the mean of student's grades in non-elective subjects (i.e., classes all students took in common, including math, writing, English, social studies, music, and science). Final GPA was calculated as the mean of students' four quarterly GPAs. We received 97%, 98%, and 100% of first quarter, fourth quarter, and final GPAs, respectively.

4.1.2.5. Median income: Using home addresses in conjunction with U.S. Census Bureau figures, we calculated the estimated median neighborhood household income for each

participant. This variable was log transformed to reduce skewness. We were able to estimate median income for 99% of students.

4.1.3. Data Analysis—We used the same SEM approach in Study 3 as we used in Study 2. The self-control factor (ISC) was again defined by two indicators (correlated at $r = .60$, $p < .001$) so the fit and factor loadings could not be assessed independently of the structural model. When estimated in the context of the structural model, the standardized factor loadings were .77 and .80. The alternate self-control factor (BSCS) was also defined by two indicators (correlated at $r = .69$, $p < .001$), so fit and factor loadings could not be assessed independently of the structural model. When estimated in the context of the structural model, the standardized factor loadings for this self-control factor were .82 and .86.

As in Study 2, the school motivation factor was defined by the importance and interest components (correlated at $r = .45$, $p < .001$). The fit and factor loadings for this measurement model could not be assessed independently of the structural model. Additionally, the error variance for the interest component had to be fixed (it was set to .0001) to allow for model identification. In the context of the full model, standardized factor loadings were 1.00 (importance) and .45 (interest). The alternate school motivation factor was defined by an enjoyment component and an importance component (correlated at $r = .40$, $p < .001$). Because this latent factor was defined by two indicators, fit and factor loadings could not be obtained independently of the structural model. When estimated in the context of the full model, the standardized factor loadings were 1.00 (enjoyment) and .40 (importance).

Bivariate correlations (reported in Table 2) revealed that, as in Study 2, the indicators of self-control were positively related to school performance (all the measures of GPA), including the change in GPA between the first and last quarter. However, in contrast to Study 1, the indicators of school motivation were not significantly related to school performance.

4.2. Results and Discussion

4.2.1. Gender differences in self-control, school motivation, GPA, and IQ—The gender differences found in Study 3 were largely consistent with those observed in Study 2. Specifically, girls earned higher GPAs than boys on their first quarter ($d = .49$, $p < .001$), fourth quarter ($d = .43$, $p < .001$), and final report cards ($d = .49$, $p < .001$). There were no significant differences between boys' and girls' scores on either measure of school motivation (ds = .02 to .13, ps = .19 to .83), and girls were rated higher than boys on both measures of self-control by both of their teachers (ds = .36 to .49, ps < .001). In contrast to Study 2, girls had slightly higher IQ scores than boys ($d = .20$, $p < .05$). This result, though unexpected, did not pose a significant problem for the SEM mediation analysis because, as in Study 2, IQ was included among the control variables. Descriptive statistics, effect sizes for gender differences, and bivariate correlations for all variables are shown in Table 2.

4.2.2. Explaining the effect of gender on GPA (Model 1)—The model replicating Study 2 fit well [$\chi^2(30) = 45.81$, $p < .05$, CFI = .97, RMSEA = .03] as did the model with alternate measures of self-control and school motivation [$\chi^2(30) = 56.29$, $p < .01$, CFI = .96,

RMSEA = .04]. As shown in Figure 1, both sets of self-control and school motivation measures yielded the same results. Girls again scored higher than boys on self-control, which was in turn associated with higher final GPA, indicating that self-control mediated the association between gender and GPA. In contrast, school motivation (correlated with self-control at r_p = .15, p < .01 in both models) was not related to either gender or GPA.

4.2.3. Explaining the effect of gender on change in GPA (Model 2)—The model replicating Study 2 fit well [$\chi^2(32) = 56.46$, p < .01, CFI = .97, RMSEA = .04] as did the model with alternate measures [$\chi^2(32) = 59.30$, p < .01, CFI = .97, RMSEA = .04]. As shown in Figure 2, self-control mediated the association between gender and rank-order improvements in grades over the school year. Girls scored higher on self-control than boys, and self-control was positively associated with fourth quarter GPA after accounting for first quarter GPA. Although still correlated with self-control (r_p = .16, p < .01; r_p = .15, p < .05), school motivation was not related to gender or either measure of GPA, indicating that it was not a mediator.

5. General Discussion

The current investigation examined motivational vs. volitional explanations for gender differences in academic performance. In Study 1, middle school teachers judged girls to be both higher in school motivation and self-control than boys. Parents (in Study 2) and teachers (in Studies 2 and 3) rated girls as more self-controlled than boys at the beginning of the school year. However, girls (in Studies 2 and 3) did *not* express greater motivation to do well in school than boys, despite earning higher final grades than boys, a gap that widened as the school year progressed. In both longitudinal studies, gender differences in final academic performance and in improvements in academic performance over the school year were mediated by self-control. This pattern held in structural equation models that corrected for measurement error and controlled for demographic background variables and IQ.

A useful means of understanding the differences between motivational and volitional aspects of goal pursuit is the Rubicon model of action phases (Achtziger & Gollwitzer, 2010; Heckhausen & Gollwitzer, 1987). This model highlights the qualitatively different mindsets underlying the selection of goals and their subsequent realization. Specifically, a deliberative mindset characterizes the motivational phase of goal pursuit, in which the chief task is to choose one wish to pursue among many other possibilities. Hence, in this stage, attention turns to various possible future outcomes, the imagined positive and negative consequences of each, and the feasibility of achieving them. “Crossing the Rubicon” entails forming a specific goal intention, with a firm sense of commitment to translating that goal into action. Subsequently, in the volitional phases of goal pursuit, the chief tasks are to plan for and then take action toward the goal. Accordingly, in these volitional phases, attention is oriented to information relevant to the initiation and execution of goal-directed behavior. By distinguishing between goal commitment and goal striving stages of intentional behavior, the Rubicon model illuminates why merely wanting a particular outcome (e.g., academic success) is necessary but not sufficient for its realization.

Given the qualitative differences between motivational and volitional aspects of goal pursuit, how can we explain why observers, including teachers, might conflate the two? In particular, how can we reconcile the findings of our second two studies with the responses of the teachers in our first study? We speculate that the confusion derives from the fact that mental processes are covert. Unlike behavior, the conversion of wishes to goals and the subsequent creation of plans and action impulses are not visible to outside observers. What teachers *are* able to observe, on a regular basis, are academic behaviors such as attentiveness in class and likelihood of completing homework, as well as objective markers of performance such as scores on assignments and course grades[3]. Therefore, teachers may infer from girls' better academic behavior and performance that girls are more motivated to do well in school than boys. Moreover, motivation is indeed necessary for goal-directed action. No doubt there are some students who underperform relative to their classmates for purely motivational reasons. The current findings suggest, however, that boys and girls have comparable levels of motivation to do well academically. What boys lack, relative to girls of comparable intelligence, is self-control.

In terms of practical implications, the current findings suggest that interventions aimed at improving self-control may be especially beneficial for boys. For example, the strategy of mental contrasting with implementation intentions (MCII; Oettingen, 2012) has been shown to help individuals convert positive thoughts and images about a desired future into self-regulated behavior change. Mental contrasting entails imagining a desired future (e.g., earning good grades in school) and, simultaneously, considering obstacles (e.g., failing to complete homework) that stand in the way of this future. Once obstacles have been identified, individuals can form implementation intentions, *if*…*then*… plans that link situational cues to goal-directed behaviors that avoid or overcome identified obstacles (e.g., *if* it is 7pm on a weeknight, *then* I will get up from the dinner table and go to my room to do homework). The efficacy of MCII has been established in random-assignment, placebo-controlled intervention studies, including some in which school-age children were taught MCII with benefits ranging from improved report card grades, teacher ratings of conduct, attendance, and independent studying (Duckworth, Kirby, Gollwitzer, & Oettingen, 2013; Duckworth, Grant, Loew, Oettingen, & Gollwitzer, 2011).

5.1. Limitations and Future Directions

Several limitations of this investigation suggest profitable directions for future research. First, it is possible that the responses of the teachers we surveyed in Study 1 might have been influenced by shared stereotypes in addition to their direct experience with students. This would suggest that better measures are needed to assess students via teacher report. However, even if our measures did capture shared stereotypes rather than accurate observations of the causes of good school performance, it is nonetheless important to test

[3]This introduces a potential methodological issue for our study in that teachers may incorporate students' past grades into their ratings of students' character traits, thereby inflating the correlation between teacher ratings and GPA in our models in Studies 2 and 3. However, this concern is somewhat mitigated in Study 2 by our use of latent variables, which essentially use only the overlap between teacher and parent ratings as the measure of variation in these constructs. Presumably, parents would weigh school performance less heavily than teachers in rating a child's characteristics. It is also reassuring that parents' ratings of self-control bore medium-to-strong correlations with GPA (even though the same correlations were stronger for teachers) and that parents' and teachers' ratings of self-control were similarly strongly correlated with change in GPA during the school year.

these stereotypes empirically and correct erroneous beliefs as necessary. Accurate information about the causes of school performance is critical to educators who wish to intervene efficiently and effectively. An instructor who believes that motivation is more important than volition may dedicate resources to fostering motivation when those resources might be more fruitfully invested elsewhere. Our studies suggest that teachers and students will be better served by interventions fostering habits related to self-control rather than motivation

Second, only informant-report ratings of students' self-control were included in Studies 2 and 3, leaving open the possibility of reverse-causality, in particular the concern that knowledge of report card grades influencing parents' and (especially) teachers' judgments of students' self-control. Our use of latent variables that combined the observations of parents and teachers partially mitigates this concen—see footnote 3. Another reassuring finding is that self-control predicted within-year improvements in report card grades. Although it is theoretically possible that parents' and teachers' self-control ratings were biased by *anticipated* changes in academic performance, it seems unlikely. Nevertheless, future replication studies might eliminate this possibility altogether by employing performance task measures of self-control (e.g., delay of gratification tasks), a multi-method assessment approach demonstrated in Duckworth and Seligman (2006). Likewise, recently developed performance task measures of school motivation (e.g., Levitt, List, Neckermann, & Sadoff, 2012; Segal, 2012) might usefully supplement self-report questionnaires in future research. Additionally, more work is needed to examine the student behaviors and beliefs that teachers rely on to assess motivation and self-control. Although in our survey teachers indicated that girls had advantages in both areas, it is possible that some observable behaviors contribute more strongly to perceptions of one or the other. In our survey, teacher judgments of motivation and self-control were correlated ($r = .49$. $p < .001$), but not identical, suggesting the possibility that they were both driven in part by a third factor (e.g., grades or observed classroom behavior), yet much variance remains unexplained.

Third, the external validity of the conclusions drawn here is limited. Our survey of middle school teachers was not conducted with a representative sample, suggesting the utility of a larger and more representative teacher survey. In Studies 2 and 3, students attended urban middle schools serving mostly low-income communities of non-White students. Although our samples were largely comprised of minority students, we consider this a strength rather than a weakness. The results pertaining to gender differences and self-control were consistent with prior research, suggesting that the role of self-control in school achievement is no less important for Hispanic and African American youth than for Whites, and giving us little reason to suspect that our findings were peculiar to the specific ethnic groups sampled. Nonetheless, our specific study design, which tested the role of motivation simultaneously with self-control, would benefit from replication and extension with younger and older students, and ideally, ethnically and socioeconomically diverse samples.

Finally, the present investigation did not include measures of academic self-efficacy. As noted earlier, prior research has found that girls do not generally feel more confident than boys about their ability to perform well in school (Huang, 2013). Nevertheless, this

possibility was not tested directly in our studies, so there is a need for additional research to do so.

5.2. Conclusion

While many teachers may assume that girls exceed boys in both school motivation and self-control, two longitudinal studies in our investigation tell a different story. Girls and boys were indistinguishable in how much they wanted to do well in school, but girls were better at taking action toward those goals. Superior self-control enabled girls to outperform boys not only in final report card grades, but also in within-year, rank-order improvements in grades. Put succinctly, will, not want, explains the superior performance of girls in the classroom.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Highlights

- Teachers surveyed believe that girls exceed boys in both motivation and self-control.
- We test motivation and self-control simultaneously as predictors of course grades.
- Self-control mediated the relation between gender and grades.
- Motivation did not differ between boys and girls and did not predict grades.

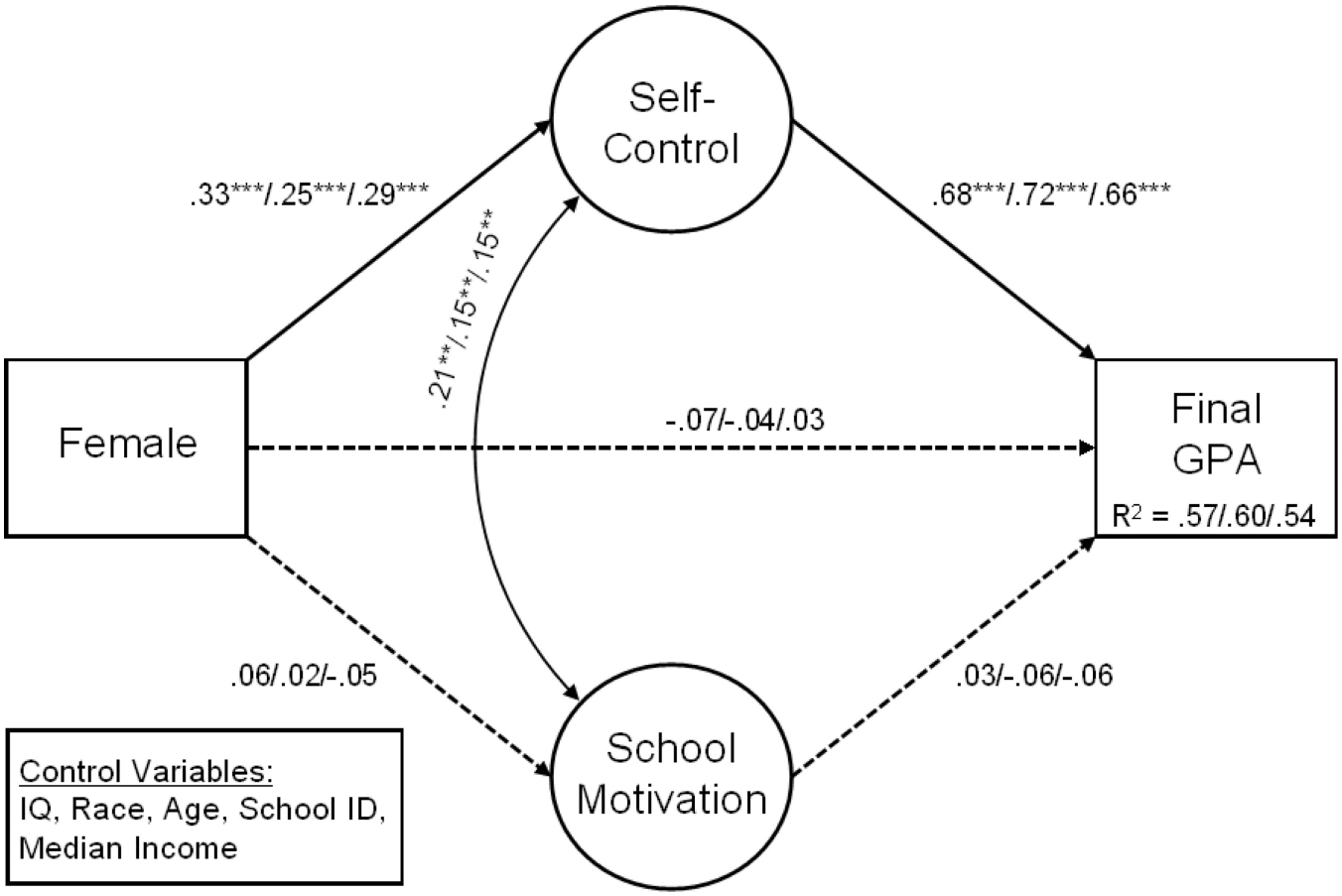

Figure 1.

A model testing whether the effect of gender (female = 1) on final GPA is mediated by self-control and/or school motivation. The first set of standardized coefficients represents Model 1 in Study 2, the second set represents Model 1 in Study 3, and the third set represents Model 1 with alternate measures in Study 3. Significant paths are signified by solid lines, and non-significant paths are signified by dashed lines. Self-control is defined by ISC self-control and School Motivation by measures of interest/importance for the model for which results are reported in the first two sets of coefficients. Self-control is defined by BSCS self-control and School Motivation by alternate measures of interest/importance in the model for which results are reported in the third set of coefficients. The effects of the control variables on self-control, school motivation, and GPA were modeled, but, for the sake of clarity, these paths are not pictured. The effects of the control variables are reported in the Supplementary Materials. *$p < .05$, **$p < .01$, ***$p < .001$.

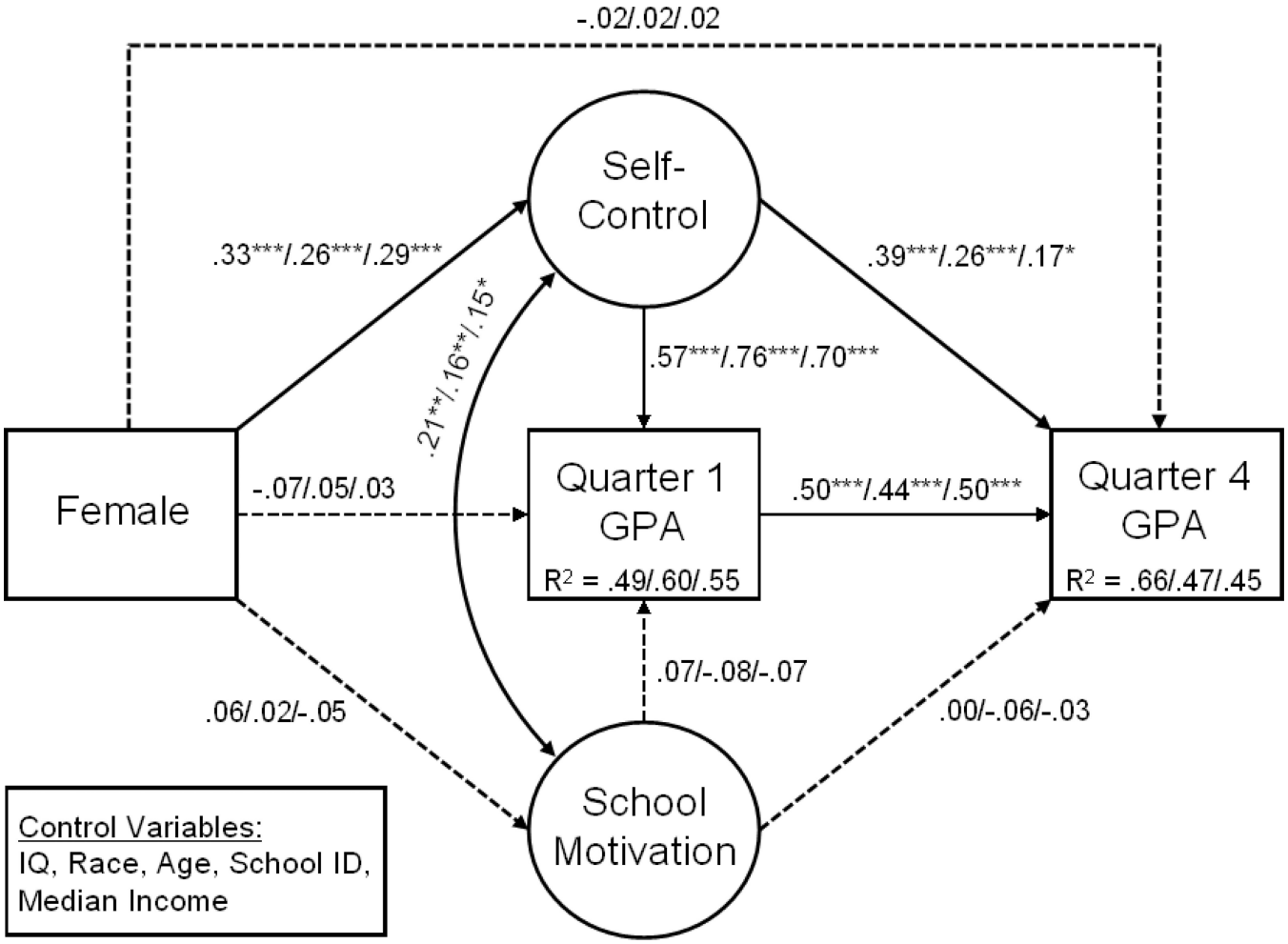

Figure 2.

A model testing whether the effect of gender (female = 1) on fourth quarter GPA (controlling for first quarter GPA) is mediated by self-control and/or school motivation. The first set of standardized coefficients represents Model 2 in Study 2, the second set represents Model 2 in Study 3, and the third set represents Model 2 with alternate measures in Study 3. Significant paths are signified by solid lines and non-significant paths are signified by dashed lines. Self-Control is defined by ISC self-control and School Motivation by interest/importance for the model for which results are reported in the first two sets of coefficients. Self-Control is defined by BSCS self-control and School Motivation by the alternate measures of interest/importance in the model for which results are reported in the third set. The effects of the control variables on self-control, school motivation, and the GPA variables were modeled, but, for the sake of clarity, these paths are not pictured. The effects of the control variables are reported in the Supplementary Materials. *$p < .05$, **$p < .01$, ***$p < .001$.

Table 1

Descriptive Statistics and Bivariate Correlations in Study 2

	Female (52%)		Male (48%)															
Variable	***M***	***SD***	***M***	***SD***	***d***	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
Demographics and Covariates																		
1. Female																		
2. Age	11.74	1.26	11.71	1.30	.03	.01												
3. IQ (age adjusted)	.03	.98	−.04	1.02	.07	.04	.00											
4. Hispanic	65%		62%		.06	.03	−.02	.12 **										
5. Family Income	10.04	.41	10.03	.43	.02	.01	.00	.01	−.01									
6. School[b]	45%		45%		.01	.00	.01	.00	−.22 ***	.02								
Self-Control																		
7. Teacher ISC self-control	4.07	1.01	3.42	1.17	.61 ***	.29 ***	−.09	.23 ***	.18 ***	.00	.02							
8. Parent ISC self-control	4.13	.79	3.95	.88	.22 *	.11 *	−.13 *	.11 +	.22 ***	−.01	.12 *	.45 ***						
School Motivation																		
9. Importance of school	5.95	1.23	5.73	1.40	.17 +	.08	−.11 *	.06	.02	−.08	.09 *	.24 ***	.20 ***					
10. Interest in school	4.25	1.63	4.15	1.80	.06	.03	−.28 ***	−.04	.03	−.06	.12 **	.11 *	.14 *	.52 ***				
Report Card Grades																		
11. Quarter 1 GPA	82.47	8.47	80.25	9.46	.25 **	.12 **	−.17 ***	.38 ***	.01	.06	.22 ***	.50 ***	.30 ***	.22 ***	.18 ***			
12. Quarter 4 GPA	82.23	8.58	79.20	9.26	.34 ***	.17 **	−.14 **	.36 ***	.03	.07	.11 *	.53 ***	.41 ***	.20 ***	.14 **	.75 ***		
13. Final GPA	82.39	7.96	79.69	8.47	.33 ***	.16 **	−.13 **	.41 ***	.03	.07	.13 **	.55 ***	.39 ***	.20 ***	.14 **	.84 ***	.95 ***	
14. Residuals of Q4 GPA on Q1 GPA					−.24 *	.12 **	−.01	.11 *	.04	.03	−.09 *	.24 ***	.29 ***	.05	.02	.00	.66 ***	.47 ***

Notes. Ns range from 482 to 509 with the exception of Parent ISC self-control ratings (N = 332). ISC = Impulsivity Scale for Children.

[a]Denotes percentage of students from the first school (of two schools total).

Female is coded Male = 0, Female = 1.

+ $p < .10$,

* $p < .05$,

** $p < .01$,

$^{***}p < .001$.

Table 2

Descriptive Statistics and Bivariate Correlations in Study 3

	Female (50%)		Male (50%)																		
Variable	***M***	***SD***	***M***	***SD***	***d***	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**
Demographics and Covariates																						
1. Female																						
2. Age	12.47	1.18	12.43	1.17	.03	.02																
3. IQ (age adjusted)	.10	.93	−.10	1.05	−.20 *	.10 *	.02															
4. African American	95%		93%		.10	.05	−.03	−.04														
5. Family Income	10.32	.41	10.35	.43	.07	−.03	.03	−.04	.03													
6. School[a]	46%		42%		.08	.04	−.24 ***	−.03	.08	−.01												
Self-Control																						
7. Teacher 1 ISC self-control	3.93	1.06	3.48	1.15	.40 ***	.20 ***	.08	.17 **	−.12 *	.02	−.17 ***											
8. Teacher 2 ISC self-control	3.90	1.05	3.52	1.06	.36 ***	.18 ***	−.01	.21 ***	−.11 *	.06	−.17 **	.60 ***										
9. Teacher 1 BSCS self-control	3.83	1.06	3.28	1.18	.49 ***	.24 ***	.00	.16 **	−.13 **	.06	−.03	.85 ***	.63 ***									
10. Teacher 2 BSCS self-control	3.78	1.10	3.24	1.23	.47 ***	.23 ***	−.02	.20 ***	−.11 *	.03	−.06	.65 ***	.85 ***	.69 ***								
School Motivation																						
11. Importance of school[b1]	3.96	.81	3.93	.70	.04	.02	−.04	.04	−.01	.01	−.02	.15 **	.09 +	.17 ***	.13 *							
12. Interest in school[b1]	2.82	.98	2.80	.99	.02	.01	−.09 +	−.04	−.05	−.04	.02	.07	.01	.06	.08	.45 ***						
13. School Importance[b2]	7.35	2.27	7.05	2.35	.13	.07	−.02	.11 *	.00	−.04	−.15 **	.05	.08	.04	.08	.29 ***	.28 ***					
14. School enjoyment[b2]	4.94	2.22	5.20	2.24	.12	−.06	−.05	.06	−.09 +	.00	−.07	.11 *	.11 *	.14 **	.12 *	.38 ***	.52 ***	.40 ***				
Report Card Grades																						
15. Quarter 1 GPA	84.53	7.60	80.79	7.60	.49 ***	.24 ***	.06	.28 ***	−.11 *	.02	−.04	.58 ***	.53 ***	.56 ***	.59 ***	.04	.01	.08	.03			
16. Quarter 4 GPA	82.74	7.98	79.25	8.25	.43 ***	.21 ***	−.10 *	.22 ***	−.02	.04	.17 ***	.39 ***	.45 ***	.43 ***	.45 ***	.00	−.01	.03	.01	.62 ***		
17. Final GPA	83.56	7.15	80.04	7.13	.49 ***	.24 ***	−.06	.29 ***	−.07	.06	.17 ***	.50 ***	.53 ***	.54 ***	.56 ***	.05	.02	.06	.03	.78 ***	.90 ***	
18. Residuals of Q4 GPA on Q1 GPA					−.22 *	.11 *	−.18 ***	.10	.06	.04	.26 ***	.10 +	.21 ***	.16 **	.17 **	−.03	−.02	−.01	−.01	.00	.79 ***	.54 ***

Notes. Ns range from 406 to 519. ISC = Impulsivity Scale for Children. BSCS = Brief Self-Control Scale.

[a]Denotes percentage of students from first school (of two schools total).

[b1] Original motivation measures used in Study 2.

[b2] Alternate motivation measures introduced in Study 3.

[+] $p < .10$,

[*] $p < .05$,

[**] $p < .01$,

[***] $p < .001$.