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Self-regulation of learning and performance among students enrolled in a disciplinary alternative school

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ABSTRACT

This paper reports on a study that examined social and academic factors predicting academic performance among 180 high school students enrolled in a disciplinary alternative school. Social and self-regulatory factors are expected to explain students' academic performance in an alternative educational environment. Results indicate that study hours, self-regulation, intrinsic motivation, self-efficacy beliefs, academic delay of gratification, and grade level were significantly related to academic performance. These findings suggest that there are individual differences in the ways in which students respond to these alternative academic settings.

1. Introduction

Self-regulation of learning reflects an outgrowth of students' own behavior and thoughts pertaining to the realization of both their academic and social goals. (Zimmerman, 2013). At school, accomplished self-regulatory learners develop quality skills for optimizing their learning comprehension and academic proficiency (Bembenutty & Karabenick, 1998; DiBenedetto & Bembenutty, 2013; Zimmerman & Kitsantas, 2013). Whether it is their social environment (e.g., help-seeking), behavior (e.g., delay of gratification) or the student's cognitive ability (e.g., transformation), mastery of such techniques normally allow accomplished self-regulatory learners to demonstrate greater incidence of positive regulatory behavior, allowing them to more successfully stay on task towards their predetermined goals (Chen, Cleary, & Lui, 2015).

Research has suggested that students that are placed in a disciplinary alternative education program (DAEP) have a high likelihood towards negative maladaptive behavior (Carver, Lewis, & Tice, 2010; Losen & Martinez, 2013; Wehmeyer & Field, 2007). These students lack the motivation, focus or skill set to self-regulate their academic production or behavior, and have a stronger tendency to seek out negative peer groups that view academics as a lesser priority in lieu of risky alternatives that can generate negative results, such as suspension, expulsion, incarceration or dropping out. Today, a widely-used alternative is the placement of such students in a DAEP (Herndon & Bembenutty, 2014).

The intent of a DAEP is to promote social and educational values in order to reintegrate their students, interred for 45 days by the county or court for delinquent behavior, back into their traditional school settings. The placement is made with the expectation that the stricter environmental setting encourages enrolled students to engage in more responsible social behavior while accomplishing academic tasks in preparation for a second chance at their sending school. This paper presents the results of a study designed to assess social and academic factors predicting academic performance among high school students enrolled in a DAEP and to measure the contribution of demographic factors, study habits, motivational beliefs, self-regulatory behavior, self-efficacy, and after school preferred activities to their academic performance.

1.1. Theoretical framework

Bandura (1997) posits that individuals learn by observing others in a social context. Bandura believes that there is a *triadic reciprocality* between the environment, the person, and behavior. In this reciprocality, an individuals' behavior influences their environment and in turn, the environment influences their behavior; the person's cognition and beliefs; the person's beliefs and values influence the behavior and the environment. In a social cognitive context, schools are agencies for cultivating self-efficacy and are environments where students acquire a great deal of self-regulatory competencies and problem-solving skills in order to function effectively in society. As stated by Bandura (1997), "the school functions as the primary setting for the cultivation and social validation of cognitive capabilities" (p. 174).

In this era of heightened accountability in our schools, the necessity for self-regulation is especially problematic in students that exhibit disruptive, impulsive or otherwise dysfunctional behavior. There is a

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dwindling tolerance among educators for student misbehavior requiring classroom management that consumes valuable learning time (Lane, Menzies, Bruhn, & Crnorbori, 2010). Students who demonstrate seemingly minor behavioral issues such as aggressive noncompliance or lack of focus and productivity pose substantial challenges for educators struggling to adhere to ever stricter levels of accountability. This funnels these students and their peers that engage in even more deviant and felonious behavior into a more punitive form of education (Herndon & Bembenutty, 2014). Disciplinary alternative education programs are utilized more than any other form of dropout prevention in the United States (Carver et al., 2010; Losen & Martinez, 2013; Souza, 1999). Suh, Suh, & Houston, 2007) indicated that a significant factor in a pupils' likelihood to dropout or subsequent detainment in alternative programs is due to their academic deficiency. Wolfe and Johnson (1995) observed that self-discipline (e.g. self-regulation) was the sole variable (32 total) to have a more significant effect on student performance than standardized test scores.

Based on the social cognitive theory of Bandura (1997) and the self-regulation of learning theory of Zimmerman (2013), the literature suggests that social and self-regulatory factors could help to explain students' academic performance in a DAEP. Research findings suggest that there is an association between self-regulation, self-efficacy, academic performance, socially desirable behavior, and intrinsic motivation (Baumeister & Vohs, 2007; Bembenutty, 2010; Bembenutty, Cleary, & Kitsantas, 2013; Boekaerts, Pintrich, & Zeidner, 2000; Zimmerman, 2013). Behaviors such as gratification delay have also been linked to academic success (Herndon & Bembenutty, 2014).

From the theoretical notions and empirical findings discussed above, the three research objectives of the study are: 1) to examine the associations between students' study habits, after school activities, intrinsic motivation, self-efficacy, self-regulation, delay of gratification, and school grade level; 2) to examine what variables among students' self-efficacy beliefs, after school activities, intrinsic interest, self-efficacy, delay of gratification, and educational aspirations predict academic performance after controlling for the effect of each other; and 3) to examine the direct and indirect effect of the variables in the study on the standardized math test scores.

2. Methods

2.1. Participants

Participants were 180 high school adolescents chosen from a disciplinary alternative education program (DAEP). The alternative school is comprised of a rotating population of students that attend for 45 school days, or one quarter, at which time they are reinstated back to their original schools. Students attend the DAEP as ordered by the county or the court as a result of their deviant behavior. Seventy-three percent of the participants were males, 27% were females; 47% Caucasians, 22% African-Americans, and 30% Hispanics. The ethnic demographics mirrored the surrounding community. Students' disciplinary problems included: Drug or alcohol use, violent behavior, court-appointed felonies, hacking, breaking and entering, and sexual incidents (see Table 1). Among the students, 82% were on free or reduced lunch.

2.2. Measures

2.2.1. Academic delay of gratification

The 10-question Academic Delay of Gratification Scale (ADOGS; Bembenutty & Karabenick, 1998) assessed students' willingness to make choices based on long-term consequences rather than short-term, desirable rewards (e.g., "Stay in the library to make certain that you finish an assignment in this course that is due the next day, OR Leave to have fun with your friends and try to complete it when you get home later that night"). Participants answered by using a 4-point scale: *Definitely choose A*; *Probably choose A*; *Probably choose B*; and *Definitely choose B* ($M = 1.84$; $SD = 0.66$; $\alpha = 0.87$).

Table 1
Means, standard deviations, reliability alphas, and correlations among the variables.

	1	2	3	4	5	6	
1. Standardized math test scores	1						
2. Frequency of doing homework	0.45**	1					
3. Intrinsic interest	0.69**	0.30**	1				
4. Self-efficacy	0.89**	0.37**	0.63**	1			
5. Academic delay of gratification	0.75**	0.34**	0.56**	0.64**	1		
6. Educational goal	0.72**	0.28**	0.61**	0.70**	0.51**	1	
7. After school preferred activity	0.38**	0.21**	0.26**	0.39**	0.27**	0.41**	1
Mean	1.73	0.07	1.27	3.19	1.84	0.43	0.15
Standard deviation	0.88	1.27	0.56	2.09	0.66	0.55	0.36
Cronbach Alpha	–	–	0.70	0.98	0.87	–	–

** $p < 0.01$.

2.2.2. Intrinsic interest

Intrinsic interest was assessed with the four items of the Intrinsic Interest Scale (Bembenutty, 2010). The students rated their interest to learn in the course in preparation to the State math test. Response format was a 7-point Likert scale (1 = "*Strongly Disagree*" to 7 = "*Strongly Agree*"). An example item is, "Learning the material for the state standardized math section is fun." The average item score was 1.27 ($SD = 0.56$); Cronbach $\alpha = 0.70$.

2.2.3. Self-efficacy

Self-efficacy beliefs for learning the materials of the State math test were assessed with the Self-Efficacy Scale (Bembenutty, 2010). The students rated their confidence level to perform in the math course. Response format of a 7-point Likert scale (1 = "*Strongly Disagree*" to 7 = "*Strongly Agree*"). An illustrative item is "I am confident that I can successfully learn the material for the state standardized math test." The scale had an average item score of 3.19 ($SD = 0.2.09$); Cronbach $\alpha = 0.98$.

2.2.4. Academic achievement

The State standardized math scores in mathematics were collected as evidence of academic achievement ($M = 1.73$; $SD = 0.88$).

2.2.5. Frequency of doing homework

Homework completion was assessed by students responding in a fill-in blank how many hours per week they spend doing homework in preparation to the state mathematics test ($M = 0.07$; $SD = 1.27$).

2.2.6. Educational goal

Participants reported their higher educational goal. Their answers were recoded: High School ($n = 106$; GED or High School), Some College ($n = 68$; Military Training, Associate Degree or Some College), and College Degree ($n = 6$; Bachelor Degree or Master Degree).

2.2.7. After school preferred activity

Students reported their favorite after school activity. Their responses included 12 different activities, such as computer game, sport activity, reading, date, getting high, work, and shopping. A cluster analysis differentiated between two groups; one with more positive after school activities, such as reading, working, computer game, and shopping, and another with clear negative activities, such as getting high. For analysis purpose, getting high was coded zero (0) and positive activities were coded one (1); thus higher scores indicated preference for positive activities after school.

2.2.8. School level

School level was computed by the grade level of the students: freshmen ($n = 75$), sophomore ($n = 49$), junior ($n = 30$), and senior ($n = 25$) high school students.

2.3. Procedures

After obtaining parental and student consent, the instruments were administered to each student in group in their regular classroom at the beginning of the school quarter. Students were detained in the school during school hours for 45 days by the county or court for delinquent and/or deviant behavior in their traditional schools. Students who were absent on the day of the initial assessment were invited to complete the survey the next time they were in class. The state standardized math scores in mathematics were obtained at the end of the quarter from the students' records. The first author of the study administered the assessments.

3. Results

3.1. Objective 1: correlations

As Table 1 shows, math test scores were positively associated with frequency of doing homework, intrinsic interest, self-efficacy, academic delay of gratification, and educational goal, suggesting that youth who obtained higher academic performance were those with higher educational aspirations, willingness to postpone immediate available rewards, were more confident about their capability to learn, spent time on homework and reported higher interest in the course materials. Additionally, delay of gratification and self-efficacy were positively correlated with intrinsic interest, educational goals, and frequency of homework completion. Specifically, the students that reported high confidence in their competence to learn the course materials and reported higher tendencies to delay gratification also reported willingness to complete a higher educational degree and reported putting effort and time to complete the homework. Preference for after school positive activities was positively associated with high math test scores, delay of gratification, self-efficacy, intrinsic motivation, hours on homework, and educational goals.

3.2. Objective 2: regression

To assess the effect on math test scores of the variables included in the study after controlling for the effects of each other, a series of regression analyses were conducted. All variables were entered in the regression equation. Main effects and all possible interactions terms were examined. Table 2 displays the results of the final regression model. We did not observe main effects for participants' ethnicity, having or not free or reduced school lunch. Although we did not find a main effect for participants' gender, we did observe a significant Gender X Self-efficacy interaction and Gender X Educational Goal interaction. Specifically, male students reported higher self-efficacy beliefs for learning the material for the State test than female students. However, males reported lower educational goals than female students. For males, if their self-efficacy beliefs go up by one unit, their predicted math test scores go up by 0.24 (0.16 + (0.08) = 0.24) while for females the scores only go up by 0.16. Male students got more benefit from self-efficacy on their math test scores. For females, if their educational goals go up by one unit, their predicted math test scores go up by 0.39 while for males it goes down by 0.12 (0.39 – (−0.27) = 0.12). These findings suggest that gender attenuate the effect of educational goals and self-efficacy by males getting more bust by self-efficacy than females and aspirational goals busting more female than male students (see Fig. 1 and Fig. 2). Another interpretation could be that males' level of self-efficacy in the study was accurate and realistic while females in the study appeared to underestimate their level of self-efficacy, especially in mathematics and science.

Table 2
Regression analysis predicting mathematics test scores.

Parameter[a]	B	SE	t	*p*-value	95% CI		η_p^2
					LB	UB	
Gender (male)	−0.12	0.11	−1.10	0.274	−0.33	0.09	0.01
School level (9th grade)	−0.18	0.08	−2.32	0.022	−0.34	−0.03	0.03
School level (10th grade)	−0.17	0.08	−2.05	0.042	−0.33	−0.01	0.03
School level (11th grade)	−0.18	0.09	−2.07	0.039	−0.36	−0.01	0.03
After school preferred activity	0.05	0.07	0.69	0.492	−0.09	0.19	0.00
Homework hours	0.27	0.09	3.20	0.002	0.10	0.44	0.05
Intrinsic interest	0.18	0.06	3.11	0.002	0.07	0.30	0.06
Self-efficacy	0.16	0.04	4.26	0.000	0.09	0.24	0.10
Academic delay of gratification	0.31	0.05	6.17	0.000	0.21	0.40	0.19
Educational goal	0.39	0.11	3.56	0.000	0.18	0.61	0.07
Gender (male) * self-efficacy	0.08	0.04	2.01	0.046	0.01	0.17	0.02
Gender (male) * educational goal	−0.27	0.13	−2.09	0.038	−0.53	−0.02	0.03

[a] $= R^2 = 0.88$ (Adjusted $R^2 = 0.88$). Gender (males are code 0, females are coded 1). Female is the reference group. School levels: 9th grade, 10th grade, 11th grade, and 12th grade. 12th is the reference group

This could probably be a reason why females do better in mathematics in classes where all students are females. On educational aspiration, on the other hand, males focus on the role of being the breadwinner and finding a job and thus plan for educational goals that are below their actual potential. Females, on the other hand, may maintain a more moratorial attitude and plan for educational goals that are in accordance with their academic potential. (Eccles & Wigfield, 2002; Voyer & Voyer, 2014; Watt, Eccles, & Durik, 2006).

We found a significant main effect for school level using 12th grade as the reference group. Ninth graders, 10th, and 11th graders obtained significantly lower math test scores than 12th graders. We observed that grades 9th, 10th, and 11th appear to not have significant differential scores among them. We also observed a significant main effect of homework hours, intrinsic interest, self-efficacy, and delay of gratification on math test scores. These findings suggest that highly confident and intrinsically interested learners are the ones who obtained the higher math scores. Similarly, students with high willingness to delay gratification who also reported putting hours in order to complete

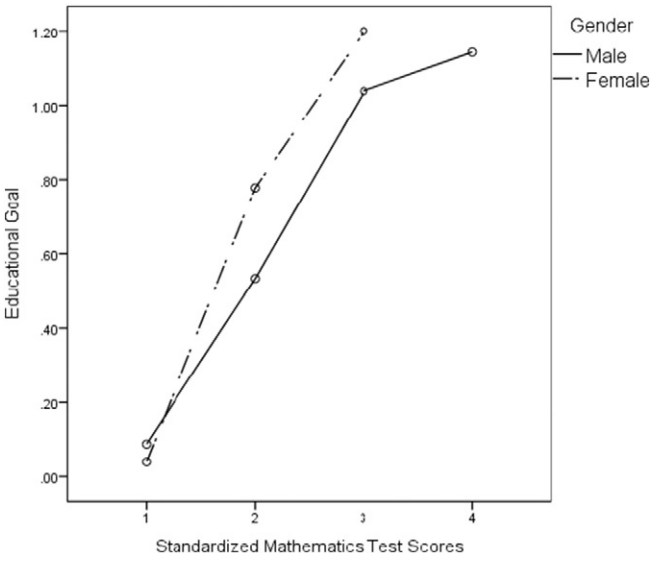


Fig. 1. Interaction between educational goal and standardized mathematics test Scores between genders.

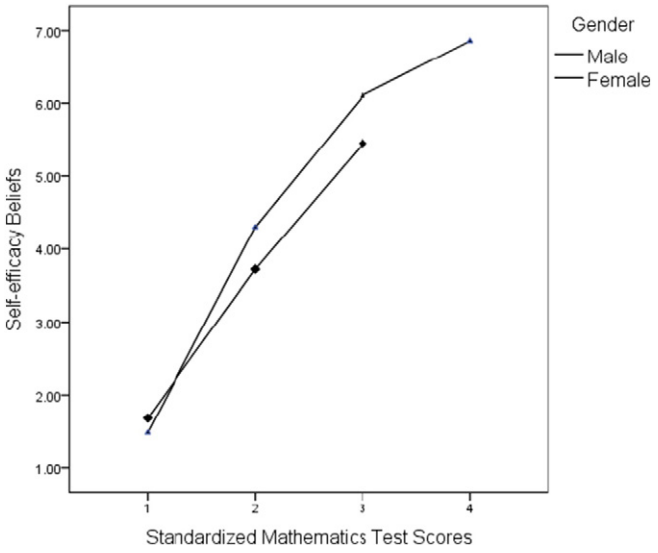


Fig. 2. Interaction between self-efficacy beliefs and standardized mathematics test scores between genders.

homework were the ones who obtained higher academic performance on the State test.

Frequency of doing homework for the standardized math test was significantly correlated ($r = 0.45$) with obtained test scores; the degree of this association was significantly lower than the degree of the association of self-efficacy ($r = 0.89$) and test scores (as indicated by Fisher's r-to-z transformation $= 8.79$, $p < 0.01$). Again, this finding suggested the important role that participants' reported competence beliefs played in their test preparation.

After school preferred activities did not have a significant effect on math test scores after controlling for the other variables in the regression model. This finding is surprising because there was a positive correlation between after school activities and test scores ($b = 0.88$, $p = 0.001$). This observation suggested that the initial observed association could be mediated by other variables in the model. In order to examine further this association, we conducted a follow-up mediation analysis. We considered self-efficacy and delay of gratification as two possible mediators given their associations with the variables.

3.3. Objective 3: mediation analysis

We examined how the mediating effects of motivational and self-regulatory factors could be influenced by the relations between after school preferred activity and math test score. As an index of motivation we selected self-efficacy and as an index of self-regulation we selected delay of gratification. Before testing the mediation, we tested whether gender served as a moderator of these effects; we found that gender was not a moderator. Thus gender was not further considered in the analysis. To test the mediation effects we used PROCESS (Version 2.04 for SPSS) created by Hayes (2009), which is a computational tool for path analysis-based mediation analysis that provides direct, indirect, and total effects, standard regression statistics, and bias corrected bootstrap confidence intervals. We tested Model 6 in PROCESS (Hayes, 2009), which allows up to four mediators operating in serial. Math test scores was the outcome, after school activity was the predictor, and self-efficacy and delay of gratification were the mediators with 5000 bootstrap samples drawn to estimate the effects (Hayes, 2009; MacKinnon, Lockwood, & Williams, 2004; Preacher & Hayes, 2004). We considered that mediation have occurred when the relationship between the predictor and the outcome will not be significant after the serial mediators are included in the model.

The results of the serial mediation analysis revealed that there was evidence of a significant indirect effect of after class activity on math test scores through self-efficacy and delay of gratification (effect = 0.07; Boot SE = 0.02, 95% CI [0.05, 0.11]) meaning that both self-efficacy and delay of gratification indeed functioned as mediators of the after school activity (see Fig. 3). However, there was evidence of a significant indirect effect of after class activity on math test scores through self-efficacy without delay of gratification (effect = 0.27; Boot SE = 0.05, 95% CI [0.18, 0.37]. By the contrary, we also observed that although there was a significant and positive relation between delay of gratification and after school activities, there was no evidence that delay of gratification alone served as a mediator (effect = 0.01; Boot SE = 0.02, 95% CI [−0.04, 0.05]. Alone, delay of gratification was not a significant mediator, yet it suggested that in order for delay of gratification to have a significant effect, participants must also have a high degree of self-efficacy. In order for delay of gratification be a significant mediator, self-efficacy matters.

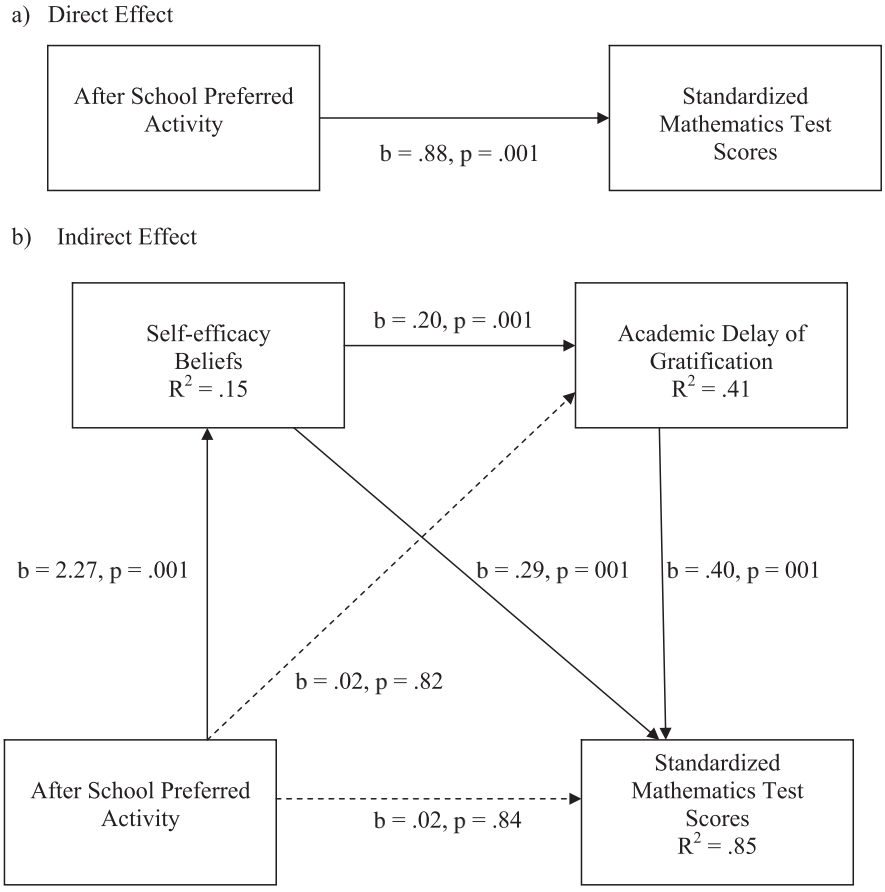
The r-squared (0.15, 0.41 and 0.85) explained a significant amount of variance in self-efficacy, delay of gratification, and math test scores respectively. The positive betas suggest that reported engaging in positive activities after school was associated with reported high competence to master the test materials and high willingness to postpone immediately available rewards for the sake of doing well in the math test. We observed that once the mediators are in the model, a perfect mediation occurred since the effect of after school activity on math test scores was completely wiped out (effect = 0.02 (SE = 0.09), $t = 0.21$, $p = 0.84$; 95% CI [−0.16, 0.20]). This confidence intervals including zero gives assurance to the genuine indirect effect.

4. Discussion

This study builds upon Bandura's (1997) social cognitive theory and Zimmerman's (2013) self-regulation of learning theory. Consistent with Bandura, the study supports the notion that personal, environmental, and behavioral factors influence academic success. In the current study, we found that students who were placed in DAEPs given their deviant behavior were not responding equally to their new school environment; there were variations evident in their motivation and agency. Although all of the participants entered the disciplinary school with similar negative behavior manifestations, for those who reported as focused on their academic tasks, the disciplinary school became a place appropriate for cultivating self-efficacy beliefs (Bandura, 1997), which in turn was associated with positive results in the State required math test.

Among the participants, some of the students reported high cognitive competencies and reported self-regulatory skills while enrolled in the DAEP. They reported confidence in their ability to successfully perform on the State test, by engaging in self-regulation, and by delaying gratification. However, the students that reported having low confidence in their academic abilities experienced transitional phases during adolescence that were deeply affected by social factors and at risk behavior, such as abusing drugs. Students with low confidence and limited self-regulatory skills were at high-risk for further deviant behavior and future encounters with the law.

Our analysis of motivational beliefs and self-regulatory approaches to learning revealed that male students were more acutely calibrated with regard to their self-efficacy beliefs for doing well in the standardized math test than were female students. These findings may suggest that males decide about their educational aspiration on the basis of factors other than self-efficacy. Thus, although males reported higher confidence to do well in the math test, it did not equate to a significant effect on their educational aspirations. However, the elevated level of self-confidence to do well in the math test reported by the males did not produce a significant effect on their educational aspirations. It is possible that males and females are driven primarily towards their math performance primarily by different motivational beliefs, one by capability beliefs and the other one by educational objectives. Our findings are consistent with those of Bembenutty (2010) who found that



Note. Unstandardized coefficients (b) are shown. Complete standardized indirect effect:
Activity -> Self-efficacy -> Test = .27 (Boot SE= .05), 95% CI [.18, .37]
Activity -> Self-efficacy -> Delay -> Test = .07 (Boot SE= .02), 95% CI [.05, .11]
Activity -> Delay -> Test = .01 (Boot SE= .02), 95% CI [-.04, .05]

Fig. 3. Serial mediation model.

delay of gratification significantly and positively mediated the association between self-efficacy beliefs and math test scores among college students. The relative low association between performance and homework also suggests further examination. DAEPs rarely require homework. It is possible that the comparative low association between homework and after school activities may hold the key to why reported homework has a low degree of association with performance.

As observed in the mediation analysis, the results of this study suggest that the effect of positive after school activity was enhanced by students' self-efficacy beliefs and willingness to delay gratification. By the contrary, the negative effects of after school activity (e.g., using drug) were significantly decreased after self-efficacy and delay of gratification were considered as mediators. Thus, the observed differences in math test score for students who used or not used drug after school hours was explained by their differences in self-efficacy beliefs and delay of gratification. This finding suggests that enhancing self-efficacy beliefs among at risk students could result in improved academic performance. As observed in the literature, willingness to delay gratification is one of the self-regulatory skills known to buffer challenging life stressors such as aggression, peer rejection, and low level of education among vulnerable individuals (Ayduk et al., 2000; Mendoza-Denton, Freitas, & Downey, 1997). Our findings correspond to Bembenutty (2010) and Herndon and Bembenutty (2014) who reported an association between delay of gratification and math test scores among students enrolled in disciplinary alternative secondary schools as well as college students.

4.1. Limitations and future directions

Although our research suggests clear patterns of behavior and beliefs among youth enrolled into a DAEP, future experimental studies need to examine these associations and longitudinal studies could examine the stability of these findings. Educators in disciplinary alternative settings may consider integrating into their curriculum the development of intrinsic task motivation as well as enhancing the self-efficacy beliefs and willingness to delay gratification of their at risk students. Specifically, a major goal should be enhancing the self-efficacy beliefs of female learners. This call is consistent with research by DiBenedetto and Bembenutty (2013), who argued that educators could teach self-regulated processes and enhance students' self-efficacy for learning that may increase the number of females who remain in the pipeline to pursue STEM careers. Our research is correlational in nature, our sample size is relatively small, and actual behavior was not observed. Despite these limitations, our analysis underscored the importance of examining the self-regulatory and motivation beliefs of students attending a DAEP. More importantly, these findings call for educators in traditional school settings to enhance their students' self-efficacy beliefs, intrinsic interest, educational aspirations, and willingness to delay gratification in an effort to prevent their students from descending down the disciplinary alternative track due to deviant behavior, anger, violent, problem with the law (Carver et al., 2010; Losen & Martinez, 2013).

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