Academic Self-Handicapping and Self-Efficacy as Predictors of Mathematics Achievement of African American Middle School Students

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Introduction

- Graham and Weiner (1996) argued that motivational psychology for African Americans should turn to contemporary self-theories for investigating relationships between ability and achievement.
- Social cognitive theory provides a useful framework. Its central construct is *self-efficacy*, or the belief individuals hold about their capability to succeed within a specific domain or at a particular task (Bandura, 1997).
- Students with high mathematics self-efficacy tend to perform well in mathematics. Students with low mathematics self-efficacy, on the other hand, may be inclined to adopt strategies to help cope with possible failure (Bandura, 1997).
- Academic self-handicapping (ASH) is a strategy that some students use to avoid the demonstration of incompetence, often in a specific academic domain (Smith, Sinclair, & Chapman, 2002).
- In this study, we test whether self-handicapping is a significant predictor of students' achievement over and above self-efficacy.

Purpose Statement

The purpose of this study was to examine the relative contributions of academic self-handicapping and self-efficacy to the prediction of achievement in mathematics for African American students in Grade 8. We also examined whether this relationship differed by gender.

Method

Participants and Procedure

Participants in the study were 462 eighth-grade students (227 girls, 235 boys) from one suburban middle school in the Southeastern United States. Participants were primarily Black (98%). Half of the participants (n = 234) qualified to receive free or reduced-priced lunch. Students completed a paper survey during one of their regular math classes. All items were read aloud to students by the researcher.

Measures

General Mathematics Self-Efficacy

- General Mathematics Self-Efficacy was measured using 8 items (e.g., "In general, how confident are you in your abilities in math?") adapted from Bandura (2006).
- A 6-point Likert-type response scale (1 = *Not confident at all*; 6 = *Completely confident*) was used.

Academic Self-Handicapping

- The Academic Self-Handicapping scale (Midgley & Urdan, 2001), was used to measure self-handicapping.
- The scale comprises six statements to which students rate how true or false each is for them (e.g., "Some students fool around the night before a math test. Then if they don't do well they can say that is the reason. How true is this of you?") on a 6-point scale (1 = *Definitely false; 6 = Definitely true).*

Achievement

- Grade point average in mathematics
- Score on the mathematics section of the state criterion-referenced competency test.

Gender and *socioeconomic status* (i.e., qualification status for free or reduced-price lunch) were obtained from school records.

Analyses

- Bivariate correlation analysis to examine relationships among math self-efficacy, self-handicapping, and achievement.
- Independent samples t tests for gender differences in variables of interest.
- Hierarchical linear regression analysis to examine relative contributions of self-efficacy and self-handicapping to the prediction of math achievement. Predictors at Step 1: gender and SES; added at Step 2: self-efficacy; added at Step 3: self-handicapping.

Results

Table 1

Means, Standard Deviations, and Zero-Order Correlations for Variables of Interest

	N	*Mean*	*SD*	1	2	3	4	5
1. Gender	462	.51	.50					
2. SES	462	.93	.96	-.04				
3. General Math SE	462	4.45	1.17	.03	-.06			
4. Self-Handicapping	462	2.93	1.30	-.04	.07	-.19*		
5. Math GPA	454	77.93	9.67	-.12*	-.08	.38**	-.15**	
6. CRCT Math Scores	248	325.92	21.92	-.09	-.12	.17**	-.24**	.28**

Note. SES = socioeconomic status; SE = self-efficacy; GPA = grade point average; CRCT = criterion-referenced competency tests. Gender was coded with female = 0, male = 1. Lunch status was used as proxy for SES and coded with regular lunch = 0, reduced lunch = 1, free lunch = 2.
*p < .05. **p < .01.

Table 2

Hierarchical Linear Regression Analyses for Math GPA and CRCT Math Scores for Total Sample

Variables	Math GPA (n = 454)			CRCT Math Scores (n = 248)		
	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
Gender	-.12*	-.13*	-.14*	-.11	-.11	-.12
SES	-.09	-.06	-.05	-.18*	-.18*	-.16*
General Math Self-Efficacy		.38**	.37**		.17*	.14*
Self-Handicapping			-.08			-.22**
R^2	.02*	.16**	.17**	.04*	.07*	.12**
Change in R^2		.14**	.01		.03*	.05**

Note. GPA = grade point average; SES = socioeconomic status; CRCT = criterion-referenced competency tests. Standardized beta values are reported with significance indicators.
*p < .05. **p < .01.

Table 3

Hierarchical Regression Analyses for CRCT Math Scores by Gender

Variables	Girls (n = 129)			Boys (n = 119)		
	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
SES	-.22*	-.23*	-.19*	-.13	-.11	-.11
General Math Self-Efficacy		.15	.13		.22*	.18
Self-Handicapping			-.26*			-.14
R^2	.047*	.068*	.133**	.017	.066*	.084*
Change in R^2		.022	.065*		.049*	.018

Note. GPA = grade point average; SES = socioeconomic status. Standardized beta values are reported with significance indicators.
*p < .05. **p < .01.

Table 4

Hierarchical Regression Analyses for CRCT Math Scores by SES

Variables	Regular Lunch (n = 129)			Reduced/Free Lunch (n = 119)		
	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
Gender	-.14	-.16	-.16	-.07	-.05	-.09
General Math Self-Efficacy		.17	.16		.19*	.13
Self-Handicapping			-.09			-.36**
R^2	.02	.05	.06	.005	.04	.16
Change in R^2		.03	.01		.035*	.12**

Note. GPA = grade point average; SES = socioeconomic status. CRCT = criterion-referenced competency tests. Lunch status was used as proxy for SES and recoded with regular lunch = 0 and reduced/free lunch = 1. Standardized beta values are reported with significance indicators.
*p < 0.05. **p < 0.01.

Table 5

Means, Standard Deviations, and Independent Samples t Tests for Gender Differences

Variables	Girls			Boys				Cohen's
	n	*M*	*SD*	n	*M*	*SD*	*t*	*d*
Math GPA	225	79.07	9.38	229	76.81	9.83	2.51*	.24
CRCT Math Scores	129	327.89	23.78	119	323.78	19.60	1.48	.19
Math Self-Efficacy	227	4.41	1.24	235	4.49	1.10	-.70	-.07
Self-Handicapping	227	2.98	1.33	235	2.88	1.25	.91	.08

Note. GPA = grade point average; CRCT = criterion-referenced competency tests; SE = self-efficacy.
*p < .05. **p < .01.

Key Findings

- Self-efficacy was negatively associated with self-handicapping and positively associated with math GPA and CRCT math scores.
- Academic self-handicapping was negatively related to math GPA and CRCT math scores.
- Gender significantly predicted math GPA but not CRCT math scores.
- SES significantly predicted CRCT math scores but not math GPA.
- Self-efficacy significantly predicted both math GPA and CRCT scores, whereas self-handicapping significantly predicted CRCT math scores but did not predict math GPA.
- Girls had significantly higher math GPA scores than did boys. No significant gender differences were obtained for the other variables of interest.

Conclusion

- Students with higher mathematics grades reported greater self-efficacy and lower self-handicapping tendencies.
- Mathematics self-efficacy and academic self-handicapping predict grades and test scores in mathematics with self-efficacy accounting for more of the variance.
- Absence of significant gender differences in self-handicapping may be a good sign particularly in area of mathematics, where girls have been historically stigmatized as lower-achieving.
- Our models explained only a modest portion of the variance in achievement outcomes such that other factors should be investigated.
- Our race-homogeneous investigation shows promise in exploring indicators of achievement strivings within a group, future studies should examine further the predictors of math achievement among ethnic minorities.

References

Bandura, A. (1997). *Self-efficacy: The exercise of control. New York: W. H. Freeman.*

Bandura, A. (2006). Guide for constructing self-efficacy scales. In F. Pajares, T. Urdan (Eds.), *Self-efficacy beliefs of adolescents (p. 307-337). Greenwich, CT: Information Age Publishing.*

Midgley, C., & Urdan, T. (2001). Academic Self-Handicapping and Achievement Goals: A Further Examination. *Contemporary Educational Psychology, 26, 61–75. doi:10.1006/ceps.2000.1041*

Midgley, C., Arunkumar, R., & Urdan, T. C. (1996). "If I don't do well tomorrow there's a reason": Predictors of adolescents' use of academic self-handicapping strategies. *Journal of Education Psychology, 88(3), 423-434*

Smith, L., Sinclair, K. E., & Chapman, E. S. (2002). Students' Goals, Self-Efficacy, Self- Handicapping, and Negative Affective Responses: An Australian Senior School Student Study. *Contemporary Educational Psychology, 27, 471–485. doi:10.1006/ceps.2001.1105*

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