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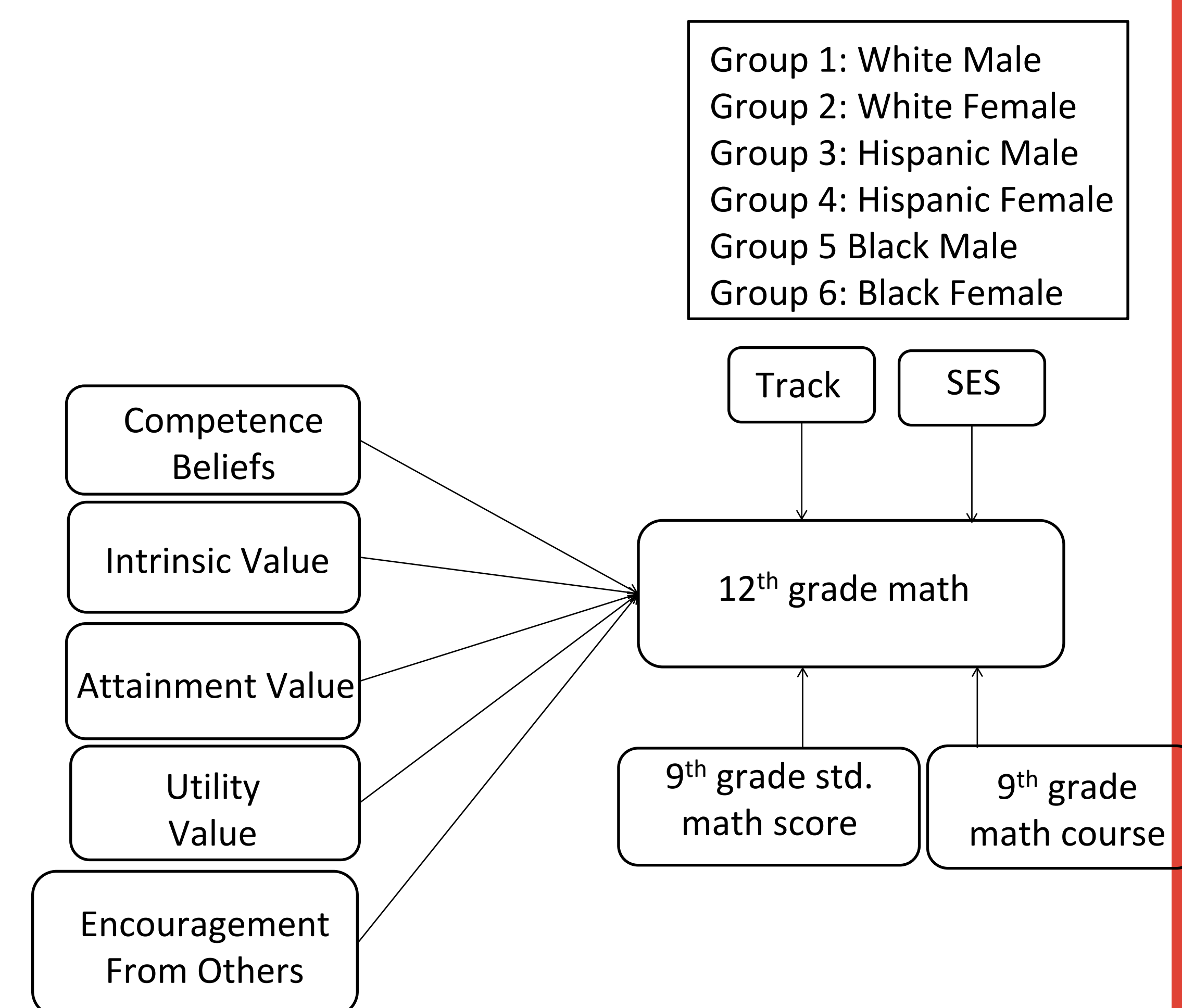
# High School Math Course Enrollment Among Strong Math Ability Students: Motivation and Context

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## INTRO

- Underrepresentation of Black and Hispanic persons and women in STEM careers can be linked to preparation during K-12 education, including advanced math course enrollment during high school.
- It is not enough to understand that disparities exist, but we need to understand why.
- This study investigated the role of motivation and context in math course enrollment, and differences at the intersection of race/ethnicity and gender.

## MODEL



## METHODS

- High School Longitudinal Study of 2009
- Transcript data on student highest enrolled course and curricular track. Student survey data regarding reasons for enrollment.
- Multigroup structural equation model was estimated to identify associations that vary across groups.

## Descriptive Analysis

Table 1

Number and Percentage of Students for Calculus Enrollment, Academic Track, 9<sup>th</sup> Grade Geometry, and Highest Quintile

Group	Overall N	Calculus N (%)	Among calculus enrollees		
			Academic track N (%)	9 <sup>th</sup> grade geometry N (%)	Highest Quintile N (%)
<b>White</b>					
Male	1930	690 (36)	530 (77)	600 (87)	540 (78)
Female	1780	610 (34)	500 (82)	530 (87)	460 (75)
<b>Hispanic</b>					
Male	330	100 (30)	90 (90)	90 (90)	70 (70)
Female	330	90 (27)	70 (78)	70 (78)	60 (67)
<b>Black</b>					
Male	170	40 (24)	30 (75)	30 (75)	20 (50)
Female	180	40 (22)	40 (100)	30 (75)	30 (75)

Note. Unweighted counts were rounded to the nearest ten per NCES guidelines for restricted-use data (National Center for Education Statistics, IES Data Security Office, 2011).

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009 (HLS:09), 2009, 2011, 2013.

## Multigroup Analysis

Table 2

Probit Regression Coefficients (b, SE) for Multigroup SEM Predictors of Calculus Enrollment

	White males	White females	Hispanic males	Hispanic females	Black males	Black females
<b>Motivational factors</b>						
Comp. beliefs <sup>a</sup>	0.07 (.093)	-0.12 (.111)	-0.63 (.316)*	0.44 (.222)*	0.32 (.527)	0.30 (.345)
Intrinsic value	0.23 (.079)**	0.36 (.091)***	1.10 (.286)***	-0.29 (.276)	0.28 (.719)	-0.53 (.281)
Utility value	0.13 (.110)	0.21 (.114)	0.38 (.421)	0.70 (.323)*	0.63 (.709)	-0.48 (.495)
Attainment value	0.34 (.077)***	0.37 (.097)***	0.17 (.309)	0.03 (.198)	1.19 (.540)*	0.44 (.316)
<b>Contextual factors</b>						
Encouragement	0.38 (.126)**	0.21 (.139)	0.86 (.453)	0.33 (.386)	0.36 (.696)	0.58 (.566)
Track	0.56 (.106)***	0.39 (.130)**	1.18 (.371)**	.60 (.318)	1.91 (.611)**	1.32 (.575)*
<b>Covariates</b>						
Geometry <sup>b</sup>	1.01 (.112)***	0.91 (.147)***	0.45 (.385)	1.01 (.324)**	1.68 (.604)*	0.49 (.591)
Math score <sup>b</sup>	0.75 (.093)***	0.76 (.132)***	0.60 (.313)	-0.05 (.233)	-0.36 (.718)	0.90 (.659)
SES	0.26 (.073)***	0.24 (.082)**	0.22 (.207)	0.22 (.167)	1.25 (.471)**	0.22 (.242)

Note. b is interpreted as change in z-score.

<sup>a</sup> Comp. Beliefs = Competence Beliefs. <sup>b</sup> = 9<sup>th</sup> grade.

\* p < .05. \*\* p < .01. \*\*\* p < .001.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009 (HLS:09), 2009, 2011, 2013.

## RESULTS

- Among students enrolled in calculus, nearly all Black female and Hispanic male students were on an academic track.
- Model most predictive for White male students and least predictive for Black female students.
- No motivational factor consistently predicted enrollment across groups.
- Curricular track predicted enrollment for nearly all groups.
- Few paths differed significantly between groups when compared directly.

## DISCUSSION

- Given the model was less predictive for non-White male students, research must consider other potentially important factors in the STEM pathways, especially for Black female students (e.g., like role models).
- Multiple identities (i.e., race/ethnicity and gender) must be taken into account given the independent and collective implications for entry into and persistence in STEM pathways.
- Curricular tracking can present structural barriers that perpetuate disparities in course access and enrollment, and may undermine student motivation. Future research should consider the interplay of curricular tracking and student motivation in course enrollment.