Latino Middle School Students' Identity and School Belonging: Findings for Future Math Careers

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Abstract

Latinos remain underrepresented in obtaining STEM college degrees and underrepresented in STEM careers (NCES, 2016). Research suggests that individual-level factors, such as one's identity, is related to academic performance, including math performance and motivation (Booker, 2004; Rodriguez et al., 2004). Moreover, the importance of individual-level factors related to school, such as cultural capital within schools and school connection are linked to academic performance (Benner, et al., 2017; Delgado et al, 2016; Ladson-Billings, 1995). We hypothesized that ethnic identity, math class-ethnic fit, and school belonging would predict Latino middle school students' commitment to pursue a math career. Results indicated that ethnic identity did not predict a commitment to a math career. However, math class-ethnic fit and school belonging did predict commitment to a math career. Our results indicate that when it comes to commitment to pursue a math career, Latino adolescents perceptions of fit within the math classrooms and the school is more salient than their ethnic identity.

Literature Review

Latino Students
- Latinos continue to be underrepresented in obtaining 4-year college degrees in science, math, engineering, and technology (STEM) and lack representation in math careers (NCES, 2016).
- This underrepresentation inhibits access to job opportunities and potential increased future earnings (NCES, 2016).

Identity
- Identity is particularly salient during adolescence; identity development in adolescents is a time of increased cognitive abilities and logical reasoning (Erickson, 1968).
- For Latino adolescents, identity developmental also includes ethnic identity (Phinney, 1993), the personal importance and identification with one's ethnicity (see Sellers et al., 1997).
- Ethnic identity has been associated with positive academic outcomes for Latino youth (Rivas-Drake et al., 2014), including positive work habits (Supple et al., 2006), higher grades (Chang & Le, 2010), greater academic proficiency (Rivas-Drake, 2011), school engagement (Oyserman, 2008), and educational values (Perreira, Fuligni, & Potochnick, 2010).
- As such, we explored whether ethnic identity is related to Latino adolescents' commitment to pursue a math career.

Class Fit and School Belonging
- Adolescents' fit within their classrooms and school is linked to motivation and academic success (Eccles, 2004).
- Racially and ethnically unbalanced classroom composition can hinder Latino students' sense of fit within middle school advanced math classes (Holas & Huston, 2012).
- A decreased sense of school belonging may make it difficult for students to remain committed to school (Goodenow & Grady, 1993).
- In a sample of older Latino adolescents (undergraduate), students' sense of school belonging was directly linked to success in STEM related academics (Strayhorn, 2012).
- We further explored math class-ethnic fit and school belonging in relation to Latino middle school students' commitment to pursue a math career.

Research aims: In sum, this study explored the relations from Latino adolescents' ethnic identity, math class-ethnic fit based, and school belonging to math career commitment.
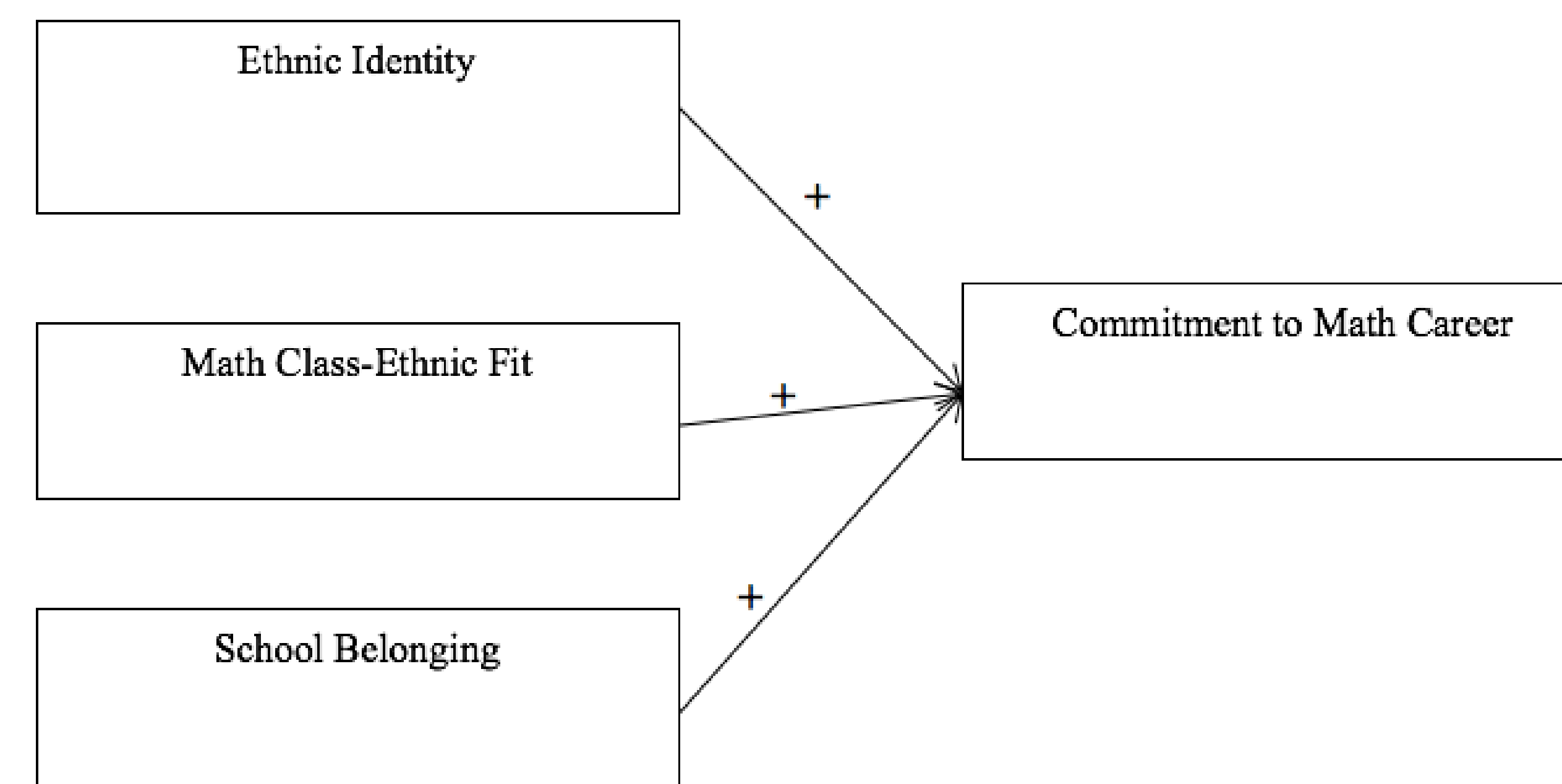

Figure 1. Conceptual Model.

Method

Participants and Procedures
- The sample included 329 families with middle school students (M_{age} = 13.69, SD= .56; 42% female; 86% U.S.-born) who were recruited from middle schools in Central Texas; participants completed telephone interviews in either English or Spanish.

Measures
Demographics: Adolescent gender (0=male, 1=female)

School belonging (Anderman, 2002; Maurizi et al., 2013; Vaquera, 2009): e.g., "I feel close to others at my school," $\alpha = .77$

Math class-ethnic fit (Walker & Syed, 2013); e.g., "I feel like I fit in more in math class when there are other students who are (same ethnicity)" $\alpha = .75$

Ethnic identity-private regard. Ethnic identity was measured using 12 items taken for the scale utilized in the Kiang, Yip, & Fuligni (2008) study. The current study uses the subscale Private Regard, consists of 4 items; e.g., "I am proud to be a member of my ethnic group" $\alpha = .87$

Commitment to Math Career (Chemers et al., 2011); e.g., "I intend to work in a math career" and "I know what it takes to do work with math" $\alpha = .94$

Table 1. Summary of Correlations, Means, Standard Deviation of Study Variables (N=288)

	1	2	3	4
1. Ethnic Identity	--			
2. Math Class-Ethnic Fit	.11	--		
3. School Belonging	.24**	.17**	--	
4. Commitment Math Career	.10	.37**	.25	--
Means	4.42	3.10	3.45	3.22
SD	.71	1.10	.57	1.01
Min.	1	1	1.25	1
Max.	5	5	4	5

Table 2. Summary of Hierarchical Regression Analysis for Predicting Latino Commitment to Math Career N=288

	Model 1			Model 2			Model 3		
	B	SE	ß	B	SE	ß	B	SE	ß
Gender	-.23	.12	-.14	-.18	.11	-.09	-.17	.11.	-.8
Ethnic Identity	.10	.10	.07	.05	.08	.04	-.06	.08	-.04
Math Class-Ethnic Fit				.33***	.05	.36	.31***	.05	.33
School Belonging							.32*	.10	.18
R^2	.02			.14			.17		

* p≤.05; ** p≤.01; *** p≤.001

Results

Analytics Plan
- We conducted all descriptive statistics, correlations, and hierarchical stepwise linear regression models using SPSS version 25.
- Step 1 included adding control variable, gender, and the predictor variable ethnic identity to the model
- Step 2 included the predictor variable math class-ethnic fit
- Step 3 consisted of adding school belonging to the model

Results
Step 1 model results with gender and ethnic identity were not related to commitment to pursue a math career, β= .07, *ns,* and only accounted for 2% variance in the model. Step 2 results indicated that math class-ethnic fit predicted commitment to pursue a math career, β= .36, (SE)=.05, *p*<.001, and accounted for a 12% increase in variance. Step 3 examined school belonging which was also significant, β=.18, (SE)=.10, *p*<.05, and explained an additional 3% of the variance in the model.

Discussion

Discussion
- Prior research has linked ethnic identity to positive academic outcomes (Rivas-Drake, 2014); however, the results from our study indicate that ethnic identity is not directly associated with students' commitment to pursue a math career.
- Yet, ethnicity was a salient factor for Latino students and their math class-ethnic fit predicting their commitment to a math career. This aligns with prior research suggesting that students' fit within their classroom is important to students' academic engagement and achievement (Eccles, 2004; Holas & Huston, 2012).
- Our findings also provide evidence for the importance of Latino adolescents' school belonging in predicting math career commitment (Eccles, 2004), which is consistent with previous work indicating Latino students' school belonging is linked to academic performance (Delgado et al., 2016). Latino students who feel like they belong to their school may feel more motivated and committed to the course work needed for a math career.
- These findings suggest Latino students may feel more like they belong in a math career when they see themselves represented by other peers of the same ethnicity in their math classes. Moreover, feeling connected in one's class and valued within the school may also foster Latino students' commitment to a math career.
- School programming should consider an holistic approach that supports other dimensions of STEM development in addition to academics.

Limitations and Future directions
This study is limited by its cross-sectional design, the use of adolescent self-reported data, and a sample of youth from a specific Texas region. Thus, these findings may not be generalizable to other Latino students. Therefore, future work should examine these links over time, include teachers and parents reports to triangulate findings, and test links with samples in other areas of the US.

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