Examining Latino Adolescents’ Gender and STEM Identities in Relation to STEM Commitment and Grades

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**Method**

Participants and Procedures

The sample included 288 families with middle school students (Mage = 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.

**Scores**

Demographics. Adolescent gender (0=male, 1=female), Parent reports of their highest educational degree (e.g. high school diploma), Nativity (U.S. Born=1, Foreign Born=0)

STEM identity. Science and math identity were assessed using an adapted academic measure of college major academic and identity for use among middle school students (Walker & Syed, 2013). The modified questions focused on academic identity in science and math (the original items focused on college majors). The science identity subscale (9 items; e.g., “I think I am a good science student” α=.85) and math identity subscale (9 items; e.g., “I think I am a good math student.” α=.86).

Grades. Adolescents reported on their overall grades by answering, “What grades do you earn in school?” Response options included “mostly As,” “about half As and half Bs,” “mostly Bs,” “about half Bs and half Cs,” “mostly Cs,” “about half Cs and half Ds,” “mostly Ds,” and “mostly below Ds.”

**Analysis Plan**

All analyses were conducted in SPSS version 24. First, descriptive analyses were conducted. Second, four regression models were run to examine gender and STEM identity’s relation to STEM commitment (Goal 1). Third, to test for gender as a moderator in links between STEM identity and STEM commitment and between STEM identity and overall grades, STEM identities were mean centered and multiplied by gender to create the interaction terms. Finally, the significant interaction terms were probed. Non-significant control variables were removed from the final models to report parsimonious results.

**Results**

**Goal 1: Direct Effect Models (See Table 1)**

- **Gender**: There were no significant gender effects on math commitment, however there emerged a significant relation between gender and science commitment and grades indicating that girls reported higher levels of science commitment and grades than boys.
- **Math Identity**: There emerged significant positive associations between math identity and math career commitment and grades; higher levels of math identity were associated with higher levels of math commitment and grades.
- **Science Identity**: There emerged significant positive associations between math identity and math career commitment and grades; higher levels of science identity were associated with higher levels of science commitment and grades.

**Goal 2: Gender as a Moderator**

A. STEM IDENTITY ➔ STEM COMMITMENT

- Gender did not moderate associations between math identity and math commitment.
- Gender did significantly moderate the association between science identity and science career commitment. The association between science identity and science commitment was stronger for girls (β = .22, p < .05) than boys (β = .22, p > .05; see Figure 3).

B. STEM COMMITMENT ➔ GRADES

- Gender did not moderate associations between STEM commitment and grades.

**Discussion**

Goal 1: Inconsistent with previous work, girls in our sample reported higher levels of science commitment and grades than boys.

- It is likely middle school girls have yet to internalize and conform to stereotypical gender career goals (e.g. girls are teachers, boys are engineers; Kurtz-Costes et al., 2008), thus, placing a high importance on their grades so that they can obtain a job in a scientific field (Eccles, 2009; Eccles & Wigfield, 2002).

- Findings corroborate evidence with older samples to indicate that a strong sense of identity in STEM is indeed an important correlate of STEM commitment (Chemeris et al., 2013).
- Thus prevention/intervention efforts focused on bolstering youths’ sense of identity in STEM may help to address disparities in STEM careers for Latino youth.

Goal 2: Science identity was particularly salient for girls in our sample as we found stronger relations between science identity and commitment for girls than boys.

- Guided by expectancy-value theory, perhaps girls place a higher importance on their science identities and engage in more activities that are science related, thus fostering a stronger commitment to obtain a science career as an adult.
- Perhaps gender differences are more likely due to the variety of science topics (e.g. biology, geology) taught in middle school as opposed to the less variable math topics addressed in middle school.

**Limitations and Future Directions**

- This study used adolescent self-reported cross-sectional data and a sample of youth from a specific southern region in the US. Thus, these findings may not be generalizable to other Latino students.
- Future studies should further examine gender differences between math identity and math commitment over time to examine variations in gender.

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- We use the Spanish shorthand, Latino, for the Spanish word latinoamericano/latino to refer to individuals of Latin American descent living in the U.S.