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The Intrinsic Motivation of Immigrant Women in Male-Dominated Fields of Study

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The Intrinsic Motivation of Immigrant Women in Male-Dominated Fields of Study

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Abstract

The present study examined the hypothesis that female students with first- or second-generation immigrant status (vs. their native-born peers) would be better prepared academically and have stronger intentions of pursuing and staying within their current field of study. We focused specifically on students in STEM versus non-STEM fields, as STEM fields are traditionally male-dominated. We predicted that *female immigrant STEM majors* in particular would not only perform better than their non-immigrant male peers, but also cope with stressors more efficiently and be less vulnerable to stereotype threat. We tested our predictions by assigning participants to one of two possible conditions where their social identity was either made salient at the beginning or end of the study. We measured academic preparedness, likelihood to stay in one's field of study, general and academic stress, coping skills, and parental involvement in academics. The results are discussed in terms of seven research questions. As predicted, female immigrant STEM majors reported a stronger intention to remain within STEM, relative to native-born male STEM majors. This key finding aligns with the hypothesis that female STEM students from immigrant backgrounds can indeed outperform their native-born male peers on some indices of academic performance.

Keywords: STEM education; Academic achievement; Gender; Immigration; Stereotype threat

The Intrinsic Motivation of Immigrant Women in Male-Dominated Fields of Study

Relative to men, women are commonly stereotyped as less capable of thriving in fields of study and careers involving mathematics, sciences, and technology (i.e., STEM fields; Shapiro & Neuberg, 2007; Steele, Spencer, & Aronson, 2002). In addition to such gender stereotypes, socialization also affects women's aspirations in STEM (e.g., Riegle-Crumb, Moore, & Ramos-Wada, 2010). For example, women tend to be influenced by their parents and teachers to favor careers that focus on others, such as professions that deal with helping and nurturing others (e.g., nurse, therapist, teacher; Eccles, 1994; Gunderson, Ramirez, Levine, & Beilock, 2011). By internalizing gender stereotypes, women may begin to personally incorporate these stereotypical characteristics into how they conduct their lives. This process may lead women to believe that they are not able to succeed in male-dominated fields of study and career, including STEM fields (Kiefer & Sekaquaptewa, 2007). Thus, gender biases and stereotypes may discourage women from pursuing their dreams in math and science. However, if women were socialized to possess determination and to believe that anything is possible with hard work, these negative gender stereotypes might lose some of their relevance. Intriguingly, these are qualities often possessed by immigrants. Immigrants are determined in their pursuit of a better life for their families once they have arrived in the U.S., and tend to instill strong values and morals within their children to work hard, become knowledgeable, and attain academic success. In the present research, we examined the possibility that women from immigrant backgrounds may be protected against gender stereotypes in STEM fields, relative to non-immigrant women.

Past research suggests that immigrant students are more successful academically than their native-born peers. This is evident in research comparing immigrant and non-immigrant students' intrinsic motivation and academic and social pressures (Kao, 2004; Kao & Tiendo,

1995). For example, Kao and Tiendo (1995) sought to describe generational differences in academic performance and parental attitudes toward academic pursuits among immigrant and non-immigrant youth. The participants in this study were initially 8th graders who were followed over two-year intervals until their senior year of high school. Kao and Tiendo (1995) distinguished three groups of students: native-born students, first-generation immigrants, and second-generation immigrants. Native-born students were defined as students whose family members had resided in the U.S. for more than three generations. First-generation immigrants were defined as students who were born outside of the U.S. and then immigrated to the U.S., whereas second-generation immigrants were defined as students who are U.S.-born, but whose parents were born in a foreign country. The results of this study indicated that immigrant parents' optimism about their children's socioeconomic and scholastic prospects positively influenced both first- and second-generation immigrant students' personal motivation and allowed them to achieve better educational outcomes (Kao & Tiendo, 1995).

Similarly, Gong, Marchant, and Cheng (2015) surveyed immigrant parents and their children who were in the 10th or 12th grade, assessing factors such as future educational aspirations and parental academic involvement. The results suggested that immigrant families tend to place a heavier focus on values that promote educational achievement, when compared to native-born families (Gong et al., 2015). Specifically, aspirations of higher learning and success among both the parents and children were greater in both first- and second-generation immigrant families in relation to non-immigrant families. Gong et al. (2015) concluded that values emphasizing the importance of academic achievement played a key role in explaining why both first- and second-generation immigrant students academically outperformed non-immigrant students.

Gong et al. (2015) also examined the relationship between family-related factors and academic performance among immigrant students. Their study used data drawn from the Children of Immigrants Longitudinal Study, which were collected from second-generation immigrant students (Gong et al., 2015). Gong et al. (2015) found that family income and parent-child conflict predicted immigrant students' grade point average. Interestingly, lower family income was associated with higher grades; however, there was a negative relationship between grades and parent-child conflict. One possibility is that a lower level of conflict between parents and children serves to increase family cohesion, thus allowing children to work hard and perform well in school. However, as this relationship is correlational, it also possible that high academic success achieved by immigrant students may lead to lower parent-child conflict. This study was among the first to examine how family factors are related to immigrant students' academic performance (Gong et al., 2015).

Moreover, Kao (2004) expanded Kao and Tiendo's (1995) research on comparing native, first-generation, and second-generation children. Once again, Kao's (2004) findings suggested that children with immigrant parents tended to academically outperform those with native-born parents. Kao (2004) attributed the academic success of first- and second-generation immigrant children to the dynamics of parent-child relationships specific to immigrant-background families. In particular, these crucial parent-child relationships, although stricter in immigrant families, tended to vary among racial and generational groups but positively benefited the children of immigrants (Kao, 2004). Immigrant parents were found to be less likely to share decision-making power with their children and less likely to talk about school in general than native-born parents. Even though these factors may seem negative, they were potentially key factors that contributed to children's success. For example, despite the strict parenting style, immigrant

parents were in fact more likely to talk to their children about college and future aspirations. As well, immigrant children reported having closer relationships to their parents than youth of native-born parents (Kao, 2004).

Based on prior research, it can therefore be concluded that familial interactions and relationships, future aspirations, strong family values, and often a strict upbringing in immigrant households are predictors of why children who were born outside of the U.S. or have parents who were born outside of the U.S. often academically outperform their native-born peers. Immigrant students tend to possess more grit and determination when in pursuit of academic achievements, have a stronger work ethic, and are able to perform well under pressure. However, research in this area has generally not been conducted at the collegiate level. Moreover, existing research comparing immigrant and non-immigrant students has not further examined potential gender differences. For instance, research has not investigated whether female first- or second-generation immigrant students may in fact outperform their native-born male peers in fields of study that are traditionally male-dominated. This was the question we sought to address in the present research.

There is an overwhelming amount of research indicating that men tend to outperform women in male-dominated fields of study, specifically in science, technology, engineering, and mathematics (STEM) fields. Issues of gender equity in math achievement, course-taking, and careers have been of longstanding concern (Fennema & Sherman, 1977; Woodruff, 2013). Gender differences persist in the number of students who take advanced math courses and who pursue math-related careers (Gunderson, Ramirez, Levine, & Beilock, 2011). Thus, fewer women than men choose to pursue math coursework or quantitative career paths. Evidence indicates that factors other than "inherent" gender differences in ability play an important role in

influencing the choices that men and women make about science- and math-related careers. For example, beliefs and affective orientations related to mathematics, such as math anxiety, math-gender stereotypes, math self-concepts, and attributions and expectations for success and failure in math are some of the reasons underlying persistent gender differences in pursuing math-related courses and careers (Gunderson et al., 2011). Environmental factors also impact the development of gender-related math attitudes. Parents and teachers represent two major environmental influences on children's development and are particularly important for the formation of academic attitudes (Gunderson et al., 2011). From early on in childhood to when an individual begins university-level education, parents tend to have a substantial amount of influence on their child's academic career, and their views on certain fields of study and their child's academic ability can either positively or negatively influence a child's work ethic, self-confidence, and motivation to be successful academically (Gunderson et al., 2011).

In the present study, we sought to discover whether female students from immigrant backgrounds can outperform their male native-born peers in traditionally male-dominated STEM majors. We hypothesized that when women are reminded of their immigrant background, they will no longer underperform in STEM fields. As mentioned above, women are more than capable of being successful in STEM fields; but implicit and explicit gender stereotypes may discourage female STEM students and cause them to doubt their abilities. However, the values, work ethic, parenting style, and determination of immigrant families may have enabled immigrant women to be resilient in the face of and less vulnerable to the stereotype-induced threat that women are not good in math and not able to succeed in STEM-related careers.

This hypothesis is based on work on stereotype threat. Stereotype threat occurs when one is at risk of confirming a negative stereotype about one's group (Steele & Aronson, 1995). Steele

and Aronson (1995) focused on stereotype threat in the domain of race, examining its effect on standardized test performance among African-American students. Steele and Aronson (1995) demonstrated that African-American students were vulnerable to negative stereotypes about their group's intellectual ability; specifically, reminders of these stereotypes depressed their standardized test performance relative to White participants. Meanwhile, conditions designed to alleviate this threat improved African-American students' performance (Steele & Aronson, 1995). Interestingly, stereotype threat does not typically lead to decreased motivation in testing situations. Instead, it tends to give rise to a greater desire to do well on a given task and disconfirm negative stereotypes (Steele & Aronson 1995). However, more effort does not always translate into better performance. Higher motivation to do well in situations where negative expectations are salient can produce intrusive and distracting thoughts that can impair one's performance (Beilock, Rydell, & McConnell, 2007; Schmader, Johns, & Forbes, 2008).

Although originally assessed and studied with regard to race, stereotype threat also applies to gender differences in math performance. According to Stout, Dasgupta, Hunsinger, and Mcmanus (2011), only 26 percent of graduate students in the physical sciences are female, and only 18 percent of full professors in STEM departments at research universities are women. As well, girls and women are often exposed to messages that their in-group performance is worse than that of their male peers in science and math. The gender gap in academic and professional paths involving STEM has been explained by lack of contact with female experts (advanced peers, professionals, and professors) in academic environments; such exposure to female role models would enhance women's attitudes toward STEM and motivation to pursue STEM careers (Stout et al., 2011). Indeed, there are ways to combat stereotype threat for women in STEM-related contexts. For example, Johns, Schmader and Martens (2005) proposed that the simple act

of informing women about stereotype threat is a useful intervention to improve their

performance in a threatening situation. Women indeed performed worse than men when made

aware that they would be tested on their math skills. However, when women were first taught

about stereotype threat and its effects on performance, they performed on par with male

participants. Thus, teaching about stereotype threat offers a practical means of reducing its

detrimental effects (Johns et al., 2005). Moreover, stereotype threat effects for women in STEM

can also be mitigated by making the negative stereotype irrelevant to performance (Spencer,

Steele, & Quinn, 1999).

In summary, we hypothesized that students with first- or second-generation immigrant

status (vs. non-immigrant students) may have higher academic achievement and better coping

skills when handling academic stress. In particular, we suggest that it is possible that the values

instilled into immigrant students when growing up have allowed them to develop resilience and

the ability to work well under pressure, therefore allowing them to cope effectively with stress.

Thus, we predict that this population of students, specifically female immigrant students, will not

only perform better than their non-immigrant peers but can also cope with stressors more

efficiently. We measured academic performance by asking students to self-report their GPA as

well as their felt preparedness for class, assignments, and examinations. We further predicted

that immigrant-background female students may also be less prone to stereotype threat.

Stereotype threat theory predicts that when women are reminded of their gender, they tend to not

perform to the best of their ability on math- and science-related tasks, succumbing to negative

stereotypes (Johns et al., 2005; Stout et al., 2011). However, it is our hope that reminding female

students of their potential immigrant background will strengthen their self-confidence and lead to

them feeling capable of better academic performance. Research in this area may lead to a greater

understanding as to why minorities tend to work harder and have a greater internal drive, as well as thwart the negative ideals of women in STEM majors that exist due to underrepresentation.

Method

Participants

Two hundred and seventy-one participants (166 women, 105 men; 127 majoring in STEM fields and 144 in non-STEM fields; 185 reported being U.S. citizens; 204 reported that English was their first language; 42.1% reported being White; mean age=18.76, SD=1.24) were recruited through the University at Albany research pool in return for class credit. One hundred and seventeen students reported being from immigrant backgrounds (we did not assess whether students were more specifically first- or second-generation immigrants); 154 reported being native U.S. born.

Procedure and Measures

Participants arrived to a computer lab, where a trained experimenter obtained informed consent and instructed them to complete the study. Participants were randomly assigned to one of two conditions. The conditions were based on whether participants were given a reminder of their gender, possible immigrant background, and major or intended major (STEM vs. non-STEM) before or after responding to the dependent measures. Specifically, participants were told that the study concerned the opinions of students from different backgrounds, and were asked to select the one option from a list of eight that best described their own background (e.g., "I am female, a STEM major/intended STEM major, and a first/second generation immigrant"; "I am male, not a STEM major/intended STEM major, and American native born"). Participants were given brief definitions of STEM, first/second generation immigrant status, and American native born status as part of the task instructions. This task was either the first measure in the

questionnaire (Identity Salient Condition; N=136) or the last measure, completed right before the demographics questions (Identity Not Salient Condition; N=135).

Participants next completed a 5-item measure of how involved their parents are in their academics, and how participants perceived their *parents' values* and future aspirations in regards to academics (e.g., "My parents have high aspirations for me and my education"; "My parents value higher education"; α=.73). Participants responded on a scale on a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

Participants were then asked to report their current overall GPA and the GPA of their most recently completed semester. Unfortunately, the majority of participants did not report or were not able to report this information (e.g., many were freshmen and did not yet have a GPA); thus, GPA was omitted from further analyses.

To assess participants' personal motivation to achieve academic success, we next measured their *academic preparedness* with two items ("I regularly turn in my assignments and homework on time"; "I am usually well prepared for class and exams"; r=.53, p<.001) and their *intention to remain in their chosen field of study* with two items ("I believe that I will continue studying my current major/intended major and will graduate with this major"; "I aspire to have a career within my current field of study" ; r=.62, p<.001). Both constructs were assessed on a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

Next, participants completed three scales measuring perceived stress and coping with stress. First, all items from the 10-item Perceived Stress Scale (Hewitt, Flett, & Mosher, 1992) were revised to index *academic stress*. A sample item is, "How often do you feel that you are unable to control your academic performance?" (1=*never*; 2=*almost never*; 3=*sometimes*; 4=*fairly often*; 5=*very often*; averaged into a single index, α=.87).

Participants then completed the Brief COPE (Carver, 1997), which measured how they tend to respond when confronted with difficult or stressful events that have to do with their academics and how they cope when under academic stress. The instructions for the Brief COPE were thus adapted to represent academic stress and coping, rather than everyday stress. The Brief COPE includes two items assessing 14 different coping styles, some of which are adaptive and some maladaptive. We used 24 of the 28 items (1=*I usually don't do this at all* to 4=*I usually do this a lot*), omitting items assessing religious coping and maladaptive coping associated with substance abuse. Although the Brief COPE is intended to assess 14 distinct coping styles, Carver's (1997) original work on this measure revealed that some items clustered together, resulting in fewer than 14 factors. We thus followed Carver's (1997) analytic strategy and conducted an exploratory principal components analysis with Oblimin rotation. This analysis revealed eight factors with eigenvalues greater than one. Four of these factors consisted of only two items (indexing self-distraction, acceptance, venting, and use of humor) and were omitted from further analysis. Four factors consisted of four items each. The first factor was labeled *active coping* (e.g., "I take action to try to make the situation better"; α=.74); the second factor was labeled *disengagement and denial* (e.g., "I give up trying to deal with the stressful event"; α=.62); the third factor was labeled *use of interpersonal support* (e.g., "I try to get advice or help from other people about what to do"; α=.87); and the fourth factor was labeled *self-blame* (e.g., "I blame myself for what is happening"; α=.63). Thus, two positive and two negative coping styles emerged and were included in analyses.

Participants next completed the original format of the 10-item Perceived Stress Scale (Hewitt et al., 1992), assessing *perceived everyday stress* within the last month (e.g., "In the last month, how often have you felt nervous and stressed?"; 1=*never*; 2=*almost never*; 3=*sometimes*;

4=*fairly often*; 5=*very often*; averaged into a single index, α=.86). Participants finally provided basic demographic information and were debriefed.

Results

We hypothesized that students with first- or second-generation immigrant status (vs. their native-born peers) would be better prepared academically and have stronger intentions of staying within their current field of study. Furthermore, we predicted that this population of students, specifically female immigrant STEM majors, not only perform better than their non-immigrant peers, but can also cope with stressors more efficiently and may be less vulnerable to stereotype threat. We present our results in terms of a series of seven research questions testing these hypotheses. One participant was excluded from all analyses because they reported their gender inconsistently (indicating being female at the beginning of the survey and being male in the demographics section). Sample sizes and dependent measure means and standard deviations for each participant group are reported in Table 1; intercorrelations among all dependent measures across the full sample are reported in Table 2.

Research Question 1: Do immigrant (vs. native-born) students, regardless of gender or major, perform better academically, have lower stress, and have better coping skills? Contrary to expectations, independent-samples *t*-tests revealed that immigrant and native-born students did not differ on academic preparedness, intention to stay within their major, academic stress levels, everyday stress levels, or any of the four coping skill indices, all *p*s>.29.

Research Question 2: Do *female* immigrant students in particular perform better academically, have lower stress, and have better coping skills? A 2 (gender: male, female) × 2 (immigrant status: immigrant, native born) multivariate ANOVA was conducted on academic preparedness and intention to stay in one's major. A univariate main effect of gender was

observed on both academic preparedness, $F(1, 266)=4.14$, $p=.043$, partial eta squared=.02, and intention to stay in one's major, $F(1, 266)=4.84$, $p=.029$, $\eta^2_p=.02$. Women scored higher on academic preparedness ($M=6.12$, $SD=0.76$) than men ($M=5.91$, $SD=0.92$); women also scored higher on intention to stay in major ($M=6.11$, $SD=0.96$) than men ($M=5.84$, $SD=1.22$). Main effects of immigrant status were nonsignificant, Fs<1. No interaction was found for academic preparedness, $F(1, 266)=0.20$, $p=.652$, $\eta^2_p=.00$, or intention to stay in major $F(1, 266)=2.62$, $p=.107$, $\eta^2_p=.01$. However, upon inspecting the means on intention to stay in one's major, a trend emerged suggesting that female immigrant students may be especially likely to want to remain in their chosen field of study ($M=6.25$, $SD=0.88$) compared to native-born women ($M=5.98$, $SD=1.01$), immigrant men ($M=5.74$, $SD=1.29$), and native-born men ($M=5.90$, $SD=1.18$). This trend is in line with our predictions.

Next, a 2 (gender: male, female) × 2 (immigrant status: immigrant, native born) multivariate ANOVA was conducted on academic and everyday stress. We observed univariate main effects of gender on both academic stress, $F(1, 265)=16.68$, $p<.001$, $\eta^2_p=.06$, and everyday stress, $F(1, 265)=19.22$, $p<.001$, $\eta^2_p=.07$. Women were *more* academically stressed ($M=2.94$, $SD=0.56$) than men ($M=2.64$, $SD=0.53$) and also reported more everyday stress ($M=3.04$, $SD=0.65$) than men ($M=2.69$, $SD=0.60$). There were no significant main effects of immigrant status, Fs<1, and no significant interactions, Fs<1. Thus, we found no evidence of a buffering effect of immigrant status, contrary to predictions.

A 2 (gender: male, female) × 2 (immigrant status: immigrant, native born) multivariate ANOVA on the two positive coping styles revealed no significant main or interactive effects on either dependent measure, all ps>.14. Thus, positive coping styles did not vary based on gender or immigrant status. However, the same analysis on the two negative coping styles revealed an

interaction on the use of disengagement and denial, $F(1, 266)=6.42$, $p=.012$, $\eta^2_p=.02$. Male immigrant students ($M=1.81$, $SD=0.47$) appeared to utilize this negative coping strategy more than their native-born counterparts ($M=1.52$, $SD=0.53$), whereas female immigrant students ($M=1.60$, $SD=0.59$) used it to a similar extent as their native-born counterparts ($M=1.68$, $SD=0.57$). There were no significant effects on the use of self-blame.

Research Question 3: Do female immigrant *STEM* students in particular perform better academically, have lower stress, and have better stress coping skills? A 2 (gender: male, female) × 2 (immigrant status: immigrant, native born) × 2 (major: STEM, non-STEM) multivariate ANOVA on academic preparedness and intention to stay in one's major revealed univariate main effects of gender. Women scored higher on academic preparedness ($M=6.12$, $SD=0.76$) than men ($M=5.91$, $SD=0.92$), $F(1, 262)=3.87$, $p=.050$, $\eta^2_p=.02$; women also scored higher on intention to stay in major ($M=6.11$, $SD=0.96$) than men ($M=5.84$, $SD=1.22$), $F(1, 262)=4.23$, $p=.041$, $\eta^2_p=.02$. No other effects were significant, $ps>.12$, contrary to predictions.

A 2 (gender: male, female) × 2 (immigrant status: immigrant, native born) × 2 (major: STEM, non-STEM) multivariate ANOVA on academic and everyday stress revealed no evidence of a buffering effect of immigrant status, with all main and interactive effects of immigrant status being nonsignificant, $ps>.12$. Indeed, all interactions were nonsignificant, $ps>.12$. As in the above analyses, main effects of gender revealed that women reported more academic and everyday stress than men. Moreover, main effects of major revealed that STEM students reported more academic stress ($M=2.93$, $SD=0.58$) than non-STEM students ($M=2.73$, $SD=0.54$), $F(1, 261)=5.90$, $p=.016$, $\eta^2_p=.02$; STEM students also reported more everyday stress ($M=3.01$, $SD=0.65$) than non-STEM students ($M=2.82$, $SD=0.64$), $F(1, 261)=5.47$, $p=.020$, $\eta^2_p=.02$.

A 2 (gender: male, female) × 2 (immigrant status: immigrant, native born) × 2 (major: STEM, non-STEM) multivariate ANOVA on positive coping styles revealed only a 2-way interaction between immigrant status and study major on the use of interpersonal support, $F(1, 262)=5.36$, $p=.021$, $\eta^2_p=.02$. Contrary to predictions, immigrant STEM majors ($M=2.54$, $SD=0.90$) seemed to use less interpersonal support (i.e., had a less positive coping style) than native-born STEM majors ($M=2.90$, $SD=0.88$). Furthermore, native non-STEM majors ($M=2.55$, $SD=0.78$) appeared to use less interpersonal support than immigrant non-STEM majors ($M=2.65$, $SD=0.81$).

A 2 (gender: male, female) × 2 (immigrant status: immigrant, native born) × 2 (major: STEM, non-STEM) multivariate ANOVA on negative coping styles revealed no buffering effect of immigrant status. A 2-way interaction between gender and immigrant status on disengagement and denial, $F(1, 262)=5.81$, $p=.017$, $\eta^2_p=.02$, suggested that male immigrant students use more of this negative coping style than native-born male students, as detailed above. Moreover, a 2-way interaction between gender and major on disengagement and denial, $F(1, 262)=5.16$, $p=.024$, $\eta^2_p=.02$, suggested that male STEM majors ($M=1.79$, $SD=0.57$) reported using *more* disengagement and denial than male non-STEM majors ($M=1.55$, $SD=0.47$), whereas female STEM majors ($M=1.60$, $SD=0.58$) use slightly less disengagement and denial than female non-STEM majors ($M=1.69$, $SD=0.58$). No significant effects emerged on the use of self-blame.

Research Question 4: Do female immigrant STEM students perform better than male native-born STEM students? We tested this key hypothesis with *a priori* contrast tests (female immigrant STEM majors=1; male native-born STEM majors=-1; all other groups=0) on all key dependent measures. Female immigrant STEM majors ($M=6.30$, S$D=0.84$) indeed reported having a stronger intention to stay in the STEM field than male native-born STEM

students (M=5.68, SD=1.37), t(262)=2.33, p=.020, Cohen's d=0.55. However, female immigrant STEM students also reported greater academic stress (M=3.05, SD=0.51), t(262)=2.37, p=.018, Cohen's d=0.58, and everyday stress (M=3.12, SD=0.64), t(261) = 2.24, p=.026, Cohen's d=0.51, relative to male native-born STEM students (academic stress: M=2.72, SD=0.61; everyday stress: M=2.77, SD=0.74). The contrast was nonsignificant for academic preparedness and all four coping styles, ps>.16.

Research Question 5: Do female immigrant STEM students perform better than male native-born STEM students especially in the Identity Salience condition? We conducted the above contrast analyses only within the Identity Salience condition to test the possibility that female immigrant STEM students outperform their male native-born peers especially when their social identities are made salient. However, no significant effects emerged. We acknowledge that this null finding may be due to reduced power, given that only a subset of the sample was included in this analysis.

Research Question 6: Are immigrant (vs. native-born) students' parents more involved in their children's academics? This possibility was examined via an independent-samples t-test on parental values reported by immigrant versus native-born students. Indeed, immigrant students reported that their parents are marginally more involved in their academics (M=6.55, SD=0.57) compared to native-born students (M=6.41, SD=0.60), t(268)=1.89, p=.060, Cohen's d=0.23. However, this dependent measure was extremely strongly skewed, with most participants scoring near the ceiling of the 7-point scale. We thus conducted this test again on the one item ("My parents play a strong role in my academic performance") that showed more variance than the other four items on this scale; the difference remained significant, t(268)=3.04, p=.003, Cohen's d=0.38 (immigrant students: M=6.03, SD=1.19; native-born students: M=5.52,

SD=1.49). However, we interpret these results with caution due to the ceiling effect on the full scale and our use of a single item in the exploratory follow-up analysis.

Research Question 7: Does parental involvement in academics correlate positively with academic performance, especially among immigrant students? In the full sample, parental involvement in academic performance indeed correlated positively with academic preparedness, $r(268)=.19$, $p=.002$, and intention to stay in one's major, $r(268)=.24$, $p<.001$. Moreover, these correlations were larger among immigrant students (academic preparedness: $r(115)=.22$, $p=.015$; intention to stay in major: $r(115)=.44$, $p<.001$) than native-born students (academic preparedness: $r(151)=.17$, $p=.035$; intention to stay in major: $r(151)=.09$, $p=.266$). Fisher's *r*-to-*z* transformations revealed that this difference was nonsignificant for academic preparedness, $z=0.42$, $p=.676$, but significant for intention to stay in major, $z=3.07$, $p=.002$.

Discussion

Overall, the present results provided some support for our hypotheses. Female students generally reported being more academically prepared and having a greater intention to stay in their current field of study, relative to male students. Intention to remain within one's chosen field of study was descriptively the highest specifically among female students from immigrant backgrounds, as predicted. Furthermore, contrast analyses revealed that female immigrant STEM majors reported a stronger intention to remain within STEM, relative to native-born male STEM majors. This finding is in line with our key hypothesis that female STEM students from immigrant backgrounds can outperform their native-born male peers on some indices of academic performance. Specifically, female immigrant STEM majors express a strong intention to remain within their chosen field of study.

We hypothesized that students with first- or second-generation immigrant status would have higher academic achievement and better coping skills when handling academic stress. In particular, we suggested that it was possible that the values instilled into immigrant students when growing up have allowed them to develop resilient characteristics and the ability to work well under pressure, helping them to cope effectively with stress. Therefore, we predicted that this population of students, specifically women, not only perform better than their native-born peers, but can also handle stressors more efficiently. Focusing on STEM majors and immigrant students, our results suggest that STEM majors tend to experience more academic and everyday stress than non-STEM students. More specifically, female immigrant STEM students reported distinctively high levels of academic and everyday stress, relative to male native-born STEM majors (as revealed in contrast analyses). When analyzing coping styles, immigrant STEM students seemed to use less interpersonal support to cope with academic stress, contrary to predictions. Thus, we found no support for immigrant background acting as a buffer against stress. Indeed, although female immigrant STEM majors do well on some indices of academic performance, they also suffer from the related negative consequence of heightened stress. It is possible that STEM majors experience greater levels of stress due to the high demands of the courses and competitiveness of future careers in this field. In particular, female immigrant STEM students may experience more stress than their native-born male peers because of intersecting gender and cultural stereotypes suggesting that they will not succeed in this high-pressure, male-dominated field. Moreover, given that STEM fields have traditionally been male-dominated, there is an underrepresentation of female faculty in STEM. Therefore, female STEM majors have few role models in this field, which may increase stress (Stout et al., 2011).

We further predicted that the degree to which one's parents are involved in one's academics would be positively associated with academic performance, particularly among students from immigrant backgrounds. Indeed, immigrant students reported greater parental involvement than native-born students. Moreover, whereas parental involvement was positively associated with academic preparedness and intention to remain in one's chosen field of study among all students, these relationships were especially strong among immigrant students. This pattern is in line with the notion that parents from immigrant backgrounds instill a strong motivation to succeed academically in their children, which may help students perform well.

Finally, we predicted that immigrant-background female students may be less vulnerable to stereotype threat, especially in the male-dominated STEM domain. Stereotype threat theory predicts that when women are reminded of their gender, they tend to not perform to the best of their ability and may instead self-fulfill negative stereotypes about women's underperformance in math and science (Johns et al., 2005; Stout et al., 2011). On the contrary, we hypothesized that reminding female STEM students of their potential immigrant background might in fact strengthen their self-confidence and make them perceive their academic performance more positively. However, we found no significant effects of the identity salience manipulation. Thus, although female immigrant STEM students may be especially committed to the STEM field, they experience more stress and may not be especially protected against stereotype threat (although we interpret our null effects tentatively).

The present results leave open questions for future research. Some null effects in the present study were likely due to the sample size, which (though relatively large) was not sufficiently large to yield power to observe higher-order interaction effects, particularly effects of the identity salience manipulation. Thus, future research should recruit larger samples.

Moreover, although we attempted to collect objective data on students' academic performance in terms of their GPA, many students were not able to report this information. Furthermore, self-reports of GPA are known to be vulnerable to socially desirable responding. Future research would benefit greatly from securing access to official student records (e.g., degree audits) to assess GPA, and also competency in specific STEM-related courses and electives.

Furthermore, future research would benefit from understanding students' identities more holistically, through a more intersectional lens. For instance, many of our participants self-identified as both American and immigrant. Indeed, individuals can be both, and self-definitions and social identities are nuanced in important ways. It is likely that participants' idiosyncratic understandings of their own identities and social group memberships are more influential in terms of their academic self-image and performance, relative to identities imposed on them by others (e.g., researchers using a fixed instrument to measure identities). In addition, future studies might consider immigrant students' level of assimilation or acculturation as an additional influence on their academic performance. Similarly, assessing these effects in cultures in which diversity and multiculturalism are more strongly appreciated than in the U.S. (e.g., Canada) would be beneficial.

We also note the interesting trend observed in the present data of male immigrant students appearing somewhat more likely to use negative coping styles such as denial of and disengagement from stressful academic events. Men overall were more likely to use negative coping styles than were women. More research is needed in order to clarify whether and why immigrant men may be susceptible to specific negative coping strategies. Withdrawal from particular stressors may be based on specific cultural values. Future research in this area would

be especially beneficial in terms of allowing for interventions to target students' coping skills, which may help them perform better academically.

In conclusion, the present study suggests that female STEM students from immigrant backgrounds may have a distinctively high internal drive to be successful and pursue a career in their field of study. Although these students are also the most stressed group, they are determined to remain in STEM. This trend is encouraging insofar as it may help disconfirm negative stereotypes of women in STEM majors that exist due to underrepresentation. Female immigrant STEM students' academic preparation can in part be attributed to family values and beliefs regarding education, with these students' parents playing an active role in their academics. Thus, cultural and familial values may serve as an important predictor of academic success.

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Table 1. Sample sizes and dependent measure means and standard deviations (in parentheses) for each participant group.

Participant Group (total N=270)	Parental Values	Academic Preparedness	Intention to Stay in Major	Academic Stress	Everyday Stress	Active Coping	Interpersonal Support	Disengagement and Denial	Self-Blame
Female immigrant STEM majors (N=45)	6.60 (0.59)	6.11 (0.73)	6.30 (0.84)	3.05 (0.51)	3.12 (0.64)	3.16 (0.64)	2.61 (0.91)	1.57 (0.59)	2.37 (0.75)
Female native-born STEM majors (N=42)	6.50 (0.52)	6.08 (0.78)	6.12 (0.95)	2.95 (0.60)	3.01 (0.65)	3.09 (0.66)	2.94 (0.84)	1.63 (0.58)	2.43 (0.70)
Female immigrant non-STEM majors (N=30)	6.65 (0.41)	6.22 (0.67)	6.18 (0.94)	2.77 (0.51)	2.94 (0.62)	3.03 (0.66)	2.61 (0.85)	1.65 (0.61)	2.30 (0.72)
Female native-born non-STEM majors (N=48)	6.37 (0.68)	6.10 (0.82)	5.86 (1.05)	2.91 (0.60)	3.05 (0.68)	3.03 (0.59)	2.59 (0.83)	1.72 (0.57)	2.43 (0.75)
Male immigrant STEM majors (N=14)	6.67 (0.39)	6.00 (0.65)	5.96 (1.13)	2.81 (0.60)	3.01 (0.48)	2.96 (0.52)	2.34 (0.86)	1.94 (0.46)	2.21 (0.62)
Male native-born STEM majors (N=25)	6.37 (0.62)	5.82 (0.96)	5.68 (1.37)	2.72 (0.61)	2.77 (0.74)	3.21 (0.58)	2.82 (0.96)	1.70 (0.62)	2.58 (0.62)
Male immigrant non-STEM majors (N=28)	6.31 (0.70)	5.84 (0.82)	5.63 (1.37)	2.61 (0.53)	2.56 (0.50)	3.07 (0.52)	2.69 (0.78)	1.74 (0.46)	2.19 (0.44)
Male native-born non-STEM majors (N=38)	6.40 (0.56)	6.00 (1.07)	6.05 (1.03)	2.55 (0.45)	2.61 (0.56)	3.20 (0.46)	2.51 (0.72)	1.41 (0.44)	2.07 (0.51)

Table 2. Intercorrelations among all dependent measures across the full sample.

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Parental Values	--								
2. Academic Preparedness	.19**	--							
3. Intention to Stay in Major	.24***	.37***	--						
4. Academic Stress	.01	-.21***	-.08	--					
5. Everyday Stress	-.01	-.15*	-.00	.73***	--				
6. Active Coping	.11	.17**	.24***	-.23***	-.22***	--			
7. Interpersonal Support	.15*	.07	.04	-.04	-.09	.27***	--		
8. Disengagement and Denial	-.02	-.22***	-.10	.40***	.35***	-.32***	-.01	--	
9. Self-Blame	.02	-.11	-.08	.44***	.43***	-.31***	-.18**	.35***	--

*$p<.05$; **$p<.01$; ***$p<.001$