

# THE FIRST YEAR OF COLLEGE

*Research, Theory, and Practice on Improving the  
Student Experience and Increasing Retention*

EDITED BY

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## CHAPTER II

## *Stereotype Threat and Stereotype Inoculation for Underrepresented Students in the First Year of College*

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The number of students entering college in the United States has risen over the past 25 years and is projected to continue increasing (Snyder, de Brey, & Dillow, 2016). Yet most four-year colleges and universities only graduate 59% of each entering class, and nearly 20% of first-year students drop out of college before the start of their second year (Snyder et al., 2016). These numbers are even grimmer for racial/ethnic minority students and first-generation college students (DeAngelo, Franke, Hurtado, Pryor, & Tran, 2011; Snyder et al., 2016). The statistics for women who arrive in college contemplating majors in science, technology, engineering, and mathematics (STEM) are also concerning: These women are at higher risk of switching out of STEM majors compared to their male peers, even though they may not drop out of college altogether (Chen, 2013). Why are some groups more vulnerable to attrition? Drawing from social psychological research and theory (e.g., Cohen & Garcia, 2008; Dasgupta, 2011; Steele, Spencer, & Aronson, 2002), we propose that the first year of college is a time of unique vulnerability for students who have to contend with negative stereotypes that cast doubt on their ability and intelligence while they simultaneously navigate the typical academic and social challenges faced by all first-year college students. The extra burden of negative expectations increases *stereotype threat*, a phenomenon in which students' worries about confirming others' negative expectations lead them to underperform relative to their actual potential, thus creating a self-fulfilling prophecy (Steele & Aronson, 1995).

Not only does stereotype threat impact students' performance on challenging academic tests in a given situation, it also has ripple effects over time. Repeated instances of stereotype threat may decrease students' feelings of belonging in academic environments, confidence in their ability (self-efficacy), motivation, and future aspirations, all of which contribute

to lower persistence and higher attrition among students from these groups (Dasgupta, 2011; Woodcock, Hernandez, Estrada, & Schultz, 2012). We start this chapter by first identifying psychological reasons why the first year of college heightens vulnerable students' susceptibility to stereotype threat. Next, we unpack the experience of stereotype threat for three groups of students – racial/ethnic minority students; women in STEM; and first-generation college students – pointing to similarities and differences across these groups. And finally, we discuss a series of evidence-based interventions demonstrated to successfully inoculate students against stereotype threat.

### Academic and Social Challenges during the Transition to College

The transition from adolescence into emerging adulthood is a key developmental period, when young people have to contend with new roles, challenges, increased responsibilities, and independent decision-making in academic and social domains (Arnett & Tanner, 2006; Conley, Kirsch, Dickson, & Bryant, 2014). Individuals who transition to college during this period of emerging adulthood have to simultaneously learn to navigate a new environment away from home, forge new social networks with peers and professors in college, and balance new academic and economic responsibilities (Aquilino, 2006). How easily young people adjust to college during their first year depends on how well their institutional context (academic culture and support system) and individual characteristics (personality, self-regulation abilities) promote academic self-efficacy and social belonging.

#### *Academic Self-Efficacy*

Academic self-efficacy is confidence in one's academic ability and the belief that one can set and achieve desired academic goals (Bandura, 1977). It is both a stable individual trait and also responsive to academic contexts and feedback (Bong & Skaalvik, 2003). Many studies have shown that high academic self-efficacy at the beginning of college is correlated with better performance, adjustment to the college environment, and longer term retention in college (Allen, Robbins, Casillas, & Oh, 2008; Chemers, Hu, & Garcia, 2001; Robbins et al., 2004; Zajacova, Lynch, & Espenshade, 2005). Thus, low self-efficacy may serve as an important signal of disengagement from an academic field, which in turn portends subsequent attrition.

The transition to college is often marked by decreased self-efficacy, as well as lower mastery of course content and poorer self-worth relative to high school (Cooke, Bewick, Barkham, Bradley, & Audin, 2006; Park, Edmondson, & Lee, 2012). This may occur because students face difficulty adapting to college-level coursework in the absence of close guidance from instructors (Conley et al., 2014). They may lack the skills to balance their course load with paid work responsibilities (Macan, Shahani, Dipboye, & Phillips, 1990; Trueman & Hartley, 1996), or they may not know how to go about choosing a major (Mellor, Brooks, Gray, & Jordan, 2015). These issues are exacerbated for racial/ethnic minority students, first-generation college students, and female students in STEM, who sometimes feel reticent about seeking advice and support from their peers and professors because of worries about confirming negative stereotypes about their group's academic ability. First-generation college students whose parents did not attend college face the additional burden of not being able to seek advice from parents who have experience navigating college contexts (Collier & Morgan, 2008).

An important aspect of succeeding in college coursework is learning how to maintain academic self-efficacy in the face of poor performance or failure (Mellor et al., 2015). Whether students fail a class or get that first C on a test, failure can shake their self-efficacy. One way to successfully maintain high self-efficacy in the face of failure is by adopting learning and mastery goals (having a focus on improving over time) as opposed to performance goals (having a focus on proving one's ability by performing well each and every time; Dweck & Leggett, 1988). Mastery goals are associated with a growth mindset – the belief that intellectual ability grows with effort and persistence (Dweck, 2006; Mueller & Dweck, 1998). Viewing failure as an opportunity to learn or a challenge to overcome can be a powerful protective factor against the inevitable academic stressors of the first year of college. Conversely, performance goals are associated with a fixed or “entity” mindset – the belief that intellectual ability is fixed and cannot be changed (Dweck, 2006; Mueller & Dweck, 1998). An entity mindset gives transient instances of failure (e.g., a poor quiz grade) predictive power for future successes. After all, why work hard to improve your math grade if you are “bad at math”? This type of fixed-ability belief is particularly pernicious when combined with negative group stereotypes – such as stereotypes that women's math ability is inferior to men's or that African American students are not as smart as White students – because students can internalize the notion that their group's alleged ability reflects their personal ability, which they believe

is both innate and unchangeable (e.g., Aronson, Fried, & Good, 2002; Ben-Zeev, Fein, & Inzlicht, 2005; Dweck, 2006).

### *Social Belonging*

Another key task for the first-year college student is to integrate into the social environment and develop a sense of belonging in the campus community. All people share the fundamental human need to belong and to be accepted by others (Baumeister & Leary, 1995; MacDonald & Leary, 2005), particularly in times of stress (Rofé, 1984; Walton & Cohen, 2007). For college students, especially first-years, social support from friends (more than from family) has been associated with better college adjustment (Friedlander, Reid, Shupak, & Cribbie, 2007). Greater social support is also associated with higher life satisfaction (Coffman & Gilligan, 2002). Developing new social networks in college that complement students' pre-existing networks at home and in high school help to bolster belonging and psychological resilience in first-year students (Walker, Matthew, & Black, 2004).

Social belonging is critical for first-year college students because it influences college persistence and retention (Hausmann, Ye, Schofield, & Woods, 2009) not just in the first year, but throughout college (Allen et al., 2008). Belonging also predicts college students' academic competence, grades, and psychological adjustment (Pittman & Richmond, 2008). Moreover, increased social belonging is associated with more restorative sleep and better physical health among college students (Hale, Hannum, & Espelage, 2005; Sladek & Doane, 2015). Research on first-year students' sleep patterns show that feelings of belonging in college during the day have an immediate impact by promoting restorative sleep the following night, whereas social stressors do the opposite: they activate threat and disturb sleep (Sladek & Doane, 2015).

Belonging (or lack thereof) is also an important point of vulnerability for underrepresented first-year college students. In one national sample of 2,967 first-year students, African American, Latino, and Asian students reported lower belonging in their campus environments than White students reported (Johnson et al., 2007). Belonging uncertainty – students' doubts over whether they will be accepted by important others in the social environment – is exacerbated if they attribute negative experiences on campus such as social rejection to stereotypes associated with their social group (Cohen & Garcia, 2008; Mendoza-Denton, Downey, Purdie, Davis, & Pietrzak, 2002; Walton & Cohen, 2007). Situational cues that

activate belonging uncertainty may signal the risk of impending negative judgments, stereotypes, or discriminatory acts in the minds of underrepresented first-year students (Purdie-Vaughns, Steele, Davies, Dittmann, & Crosby, 2008).

### **Stereotype Threat among Underrepresented Students**

The stress of transitioning from high school to college can evoke worries and anxieties among students from any background. But these worries and anxieties are particularly salient for students who are underrepresented in institutions of higher education and belong to groups that have to contend with negative stereotypes related to academic ability, such as racial/ethnic minorities, first-generation college students, and women in male-dominated math and science fields (Croizet, Désert, Dutrevis, & Leyens, 2001; Dasgupta, 2011; Martinez, Sher, Krull, & Wood, 2009; Shapiro & Neuberg, 2007; Stephens, Fryberg, Markus, Johnson, & Covarrubias, 2012). For these students, even subtle reminders of stereotypes or of their group identity can hurt performance in stereotype-relevant academic domains (Croizet & Claire, 1998; Schmader & Johns, 2003; Steele & Aronson, 1995). Concerns about belonging or fitting in and repeated experiences of stereotype threat over the course of college, especially in the first year, also hurt well-being and increase attrition (Woodcock et al., 2012).

Students may experience stereotype threat for a couple of different reasons. Some may fear confirming that a group stereotype is true of *them*; these students may experience stereotype threat as a threat to their self-concept or to their ability to create a positive impression. Other students may fear confirming that a stereotype is true of their *group* and may experience stereotype threat as a concern about their group's reputation (Shapiro, 2011; Shapiro & Neuberg, 2007). Students can also experience multiple threats simultaneously. For example, a woman may be concerned about doing poorly on a math test because it will confirm in the minds of others that the stereotype that women are bad at math is true and/or that the stereotype applies to her. This is especially likely if a student is the only woman (or one of a few) in a classroom of mostly men. The same woman may also have doubts in her own mind about her math abilities and fear that the stereotype is actually true of her. Such doubts could cause her to engage in self-handicapping behavior or to disidentify with math altogether (Shapiro & Neuberg, 2007). These different experiences of stereotype threat have different implications. For example, students will only experience threat to their group if they feel strongly identified with their

group. In contrast, threats to the self can occur regardless of group identification (Wout, Danso, Jackson, & Spencer, 2008), provided the student has accepted (even implicitly) that the stereotype is true (Shapiro, 2011; Shapiro & Neuberg, 2007).

### *The Experience of Racial and Ethnic Minority Students*

For racial and ethnic minority students who are underrepresented in higher education (e.g., African Americans, Latinos, and Native Americans), stereotypes impugning their group's intelligence and academic ability loom large. Although all college students might have periodic concerns about their performance, especially in their first year, racial minority students not only risk failure and embarrassment, but also risk confirming negative stereotypes if they perform poorly or fail. This additional stress can impair their academic performance. For example, Steele and Aronson (1995) found that Black college first-years and sophomores performed worse relative to White students on a difficult verbal test when the test was described as diagnostic of students' intellectual ability. But when the same test was described as not measuring intellect, Black students performed as well as their White peers. Numerous subsequent studies have replicated and extended these findings by showing that Black and Latino students perform worse on verbal, mathematical, cognitive, and other types of tests when those tests are described as diagnostic of ability, but perform as well as White students when the exact same tests are administered without mentioning intellectual ability (e.g., Ployhart, Ziegert, & McFarland, 2003; Schmader & Johns, 2003).

Stereotype threat not only lowers minority students' performance on tests administered in a given moment, but also lowers students' expectations of their future performance (Cadinu, Maass, Frigerio, Impagliazzo, & Latinotti, 2003), reduces their working memory capacity (Schmader & Johns, 2003), and increases anxiety (Osborne, 2001). Similar findings emerge when students' racial or ethnic identity is made salient prior to a difficult academic test. As a case in point, in one study Steele and Aronson (1995) simply asked students to indicate their race before, rather than after, taking the test. Black students performed worse relative to White students if asked about their race before the test, but performed on par with Whites when asked about their race after the test. Thus, merely reminding students of their racial identity activated negative stereotypes that interfered with test performance. Past research points to two underlying psychological reasons why stereotype activation led to a drop in performance among

racial/ethnic minority students: increased anxiety (Cadinu et al., 2003; Osborne, 2001) and reduced working memory due to worry and distraction (Schmader & Johns, 2003).

Concerns about academic performance may also lead minority students to adopt maladaptive behaviors. For example, first-year ethnic minority students in one study reported being motivated to avoid negative performance (e.g., avoid failure and negative judgments; Cole, Matheson, & Anisman, 2007) rather than to approach positive performance (e.g., demonstrate competence and strive for success; Elliot & Church, 1997). Compared to approach goals, avoidance goals are maladaptive because they are associated with avoiding critical feedback, lowering intrinsic motivation, and increasing procrastination (Elliot & Church, 1997; Payne, Youngcourt, & Beaubien, 2007).

Experiences of stereotype threat in college also impact health and well-being (Cole et al., 2007; Walton & Cohen, 2011). Cole et al. (2007) followed White and ethnic minority students through their first year at a predominantly White university and found that racial/ethnic minority students experienced greater anxiety and depression across the first year compared to White students. Such psychological distress, in turn, predicted lower grades at the end of the year. Although White and minority students reported similar social support from other individuals, minority students perceived less institutional support than White students did. This disparity in perceived institutional support may be attributable to both a biased system that is less attentive to the needs of minority students as well as to minority students' own reluctance to seek such support because of concerns that doing so would confirm negative stereotypes.

### *The Experience of Working-Class and First-Generation College Students*

Similar to ethnic minority students, working-class students and students whose parents did not attend college are underrepresented in university environments and are particularly vulnerable to stereotype threat during the college transition. These two groups often overlap; working-class students often come from families where neither parent has a college degree, thus, we consider these two groups together. Research shows that first-generation students tend to feel less confident about their academic ability, perform worse in college, and are at greater risk of attrition compared to continuing-generation students (Martinez et al., 2009). Several factors contribute to their vulnerability to stereotype threat, especially during the first year of college.

First, negative stereotypes associated with lower social class may harm the academic performance of first-generation college students and other working-class students. As happens with racial/ethnic minority students, working-class students underperform on verbal and problem-solving tests when they are presented as tests of intellectual ability or when students are reminded of their social class before the test (Croizet & Claire, 1998; Spencer & Castano, 2007). Along the same lines, first-generation college students, especially those who are high achieving, are more motivated to avoid failure and negative performance evaluations than are continuing-generation students and first-generation students, who are less achievement-oriented (Jury, Smeding, Court, & Darnon, 2015). This might occur because high-achieving first-generation students are closer to upward mobility compared with their low-achieving counterparts and may therefore be particularly concerned about falling short. As a result, this group may avoid negative feedback about their academic performance for fear of confirming negative stereotypes about their abilities, which could jeopardize their class mobility (Jury, Smeding, Court, & Darnon, 2015).

In addition, first-generation college students may generally feel like they do not belong or fit in the college culture. This seems to be especially likely when universities emphasize performance goals more than learning goals. Extant research suggests that universities serve dual functions in society: they function not only to enhance students' learning (focusing on learning and mastery goals) but also to compare and sort students in order to orient them towards different positions in society (focusing on performance goals). An emphasis on performance goals undermines the performance of first-generation and working-class students relative to middle and upper middle-class students, whereas an emphasis on learning and mastery goals allows first-generation and working-class students to perform at the same level as their economically advantaged peers (Jury, Smeding, & Darnon, 2015; Smeding, Darnon, Souchal, Toczek-Capelle, & Butera, 2013).

A third factor that can make the first year of college particularly difficult to navigate for first-generation students is a lack of effective social support. For all students, the transition to college involves identity change, which can require significant social support to mitigate potential costs to one's well-being (Amiot, Terry, Wirawan, & Grice, 2010). Students who are the first in their families to go to college are less able to seek guidance from their parents in navigating this process compared to students whose parents attended college. Compounding this discrepancy, first generation students may have an even greater need for social support, as they are more

likely to struggle with stress, depression, and poor life satisfaction than are continuing-generation students (Jenkins, Belanger, Connally, Boals, & Durón, 2013).

Finally, first-generation college students have to contend with the conflicting norms of two environments: working-class families typically emphasize interdependence, but universities and American higher education more generally emphasize independence (Stephens, Fryberg, & Markus, 2011). Whereas continuing-generation students typically have more independent motives for attending college (e.g., thinking independently, exploring new interests), first-generation students tend to have more interdependent motives (e.g., helping family, giving back to community; Stephens et al., 2012). The mismatch between first-generation students' interdependent motives and the culture of independence they encounter at university can cause stress and undermine academic performance (Harackiewicz et al., 2014; Stephens et al., 2012). This cultural mismatch can persist through graduation (Phillips, Stephens, & Townsend, 2016). First-generation students are not alone in this difficulty; students from other interdependent cultures, such as Asian Americans and Native Americans, likely face similar difficulties adapting to the university setting (Fryberg & Markus, 2007).

#### *The Experiences of Women in STEM*

Beginning in middle school, girls underperform relative to boys on standardized tests in math and science and express less confidence and interest in these fields (Ceci & Williams, 2011; Else-Quest, Hyde, & Linn, 2010; Stout, Dasgupta, Hunsinger, & McManus, 2011). Similar to the impact of stereotypes on racial/ethnic minority students and on working-class students' academic performance, reminders of gender-math stereotypes contribute to poorer test performance in mathematics for women in STEM. For example, female students underperform on difficult math tests relative to male students when these tests are described as diagnostic of math intelligence or as typically revealing gender differences, but they perform equally to men when the same tests are not described as measures of math intelligence or are described as not producing gender differences (Cadinu et al., 2003; Schmader & Johns, 2003; Spencer, Steele, & Quinn, 1999).

The underlying psychological reasons for why activating gender stereotypes produces a drop in performance among women are the same as those described earlier for racial/ethnic minority groups: (1) increased anxiety and negative thinking (Cadinu, Maass, Rosabianca, & Kiesner,

2005; Osborne, 2001); (2) depletion in working memory due to worry and distraction (Schmader & Johns, 2003) and the resulting difficulty of generating problem-solving strategies (Quinn & Spencer, 2001); and (3) attributing failure to oneself rather than to the situation (Koch, Müller, & Sieverding, 2008). Some women may be more likely to experience stereotype threat than others. A meta-analysis of many studies showed that women who are moderately identified with math tend to be more severely affected by stereotype threat than women who are highly identified, while low math-identified women tend to be the least affected by stereotype threat (Nguyen & Ryan, 2008).

Beyond test-taking situations, other academic and professional situations may also activate stereotype threat and undermine the recruitment or retention of women in STEM. For example, the scarcity of female peers and experts in science and engineering classrooms, work teams, and conferences can decrease women's interest in entering those situations, as well as undermine their self-confidence, interest in pursuing STEM careers, and retention in these fields (Dasgupta, McManus Scircle, & Hunsinger, 2015; Murphy, Steele, & Gross, 2007; Stout et al., 2011). For example, in a recent study, female engineering students were randomly assigned to four-person work teams that varied in gender composition: female-minority teams, with 1 woman and 3 men; gender parity teams, with 2 women and 2 men; and female-majority teams, with 3 women and 1 man (Dasgupta et al., 2015). Women in female-minority teams experienced the most worry and anxiety; they felt least confident, were less likely to speak up, and were less interested in pursuing engineering careers despite their major than women assigned to teams with gender parity or a female majority. Moreover, worries and anxieties were most potent for first-year women in female-minority work teams compared to more advanced female students. A different study on women's interest in attending STEM conferences showed converging results (Murphy et al., 2007). Female STEM majors watched a video advertising an upcoming conference in their field that depicted either an imbalanced gender ratio of conference attendees (more men than women) or a balanced ratio of men and women. When women viewed the male-dominated conference video, they reported less desire to participate in the conference than when they saw the video with equal numbers of men and women. Other studies have found that exposure to all-male experts in mathematics and engineering (e.g., professors teaching first-year courses or media stories about male engineers) also reduces women's self-confidence in STEM, their positive attitudes and

identification with STEM, and their career aspirations, compared to seeing female experts in the same fields (Stout et al., 2011).

Besides peers and professors, other situational cues in the classroom also elicit stereotype threat and deter women from pursuing courses in STEM, thereby harming recruitment efforts (Cheryan, Plaut, Davies, & Steele, 2009). In several related studies, female undergraduates expressed less interest than male undergraduates in educational and employment opportunities in computer science when exposed to a computer science classroom filled with stereotypically masculine paraphernalia (e.g., comic books, science fiction posters, junk food) compared to the same classroom with nongendered paraphernalia (e.g., general interest magazines, nature posters, healthy snacks). The exclusive presence of stereotypically masculine objects in classrooms signaled to women that they did not belong there, which led them to express less interest in taking computer sciences, compared to students who viewed nongendered objects (Cheryan et al., 2009).

Taken together, these findings have important implications for the recruitment of women into STEM majors (Cheryan et al., 2009; Dasgupta et al., 2015; Stout et al., 2011). They suggest that in the first year of college, when many students have not yet decided on their major, situational cues in classrooms and labs, such as the presence or absence of female peers and professors and objects that signal students' hobbies and interests, heavily influence whether women will choose STEM courses and – later – STEM majors. We suspect that students may not be consciously aware of how much these situational cues (people, décor) shape their academic interests and choices.

#### *Multiple Identities and Intersecting Identities*

Negatively stereotyped identities are not necessarily mutually exclusive. People have multiple identities, some or all of which may be associated with negative stereotypes, creating the potential for multiple experiences of threat. For example, as discussed earlier, there is considerable overlap between social class and first-generation college student status. These social groups are also strongly associated with racial minority groups in the sense that economic and educational disadvantage is more heavily concentrated among racial/ethnic minorities relative to Whites (National Center for Education Statistics [NCES], 2002, 2007). Thus, a student may easily have multiple stereotyped identities. For instance, if a first-generation African American college student also comes from a working-class family, he would hold three identities that are negatively stereotyped in

academic environments. Students may also possess negatively stereotyped identities that are invisible or are based on membership in nonascribed categories (e.g., a history of mental illness, a religious affiliation) that may evoke stereotype threat and interact with other identities (Quinn, Kahng, & Crocker, 2004; Rios, Cheng, Totton, & Shariff, 2015). Some research shows that women who have intersecting identities that are negatively stereotyped experience compounding stereotype threat in male-dominated fields like STEM (Gonzales, Blanton, & Williams, 2002). For example, Gonzales and colleagues (2002) found that Latina women performed worse than both Latino men and White women on a test of mathematical and spatial abilities that was described as diagnostic of intellectual ability, whereas these gender and race differences in performance were erased when the test was not described as reflecting STEM intellectual ability. Likewise, another study found that female first-generation students fared worse in terms of depressive symptoms and life satisfaction than male first-generation students and continuing-generation students of both genders (Jenkins et al., 2013). Taken together, both these studies provide some evidence for a “double minority” effect among targets of stereotypes.

At the same time, the content and scope of achievement stereotypes may vary depending on students’ other intersecting identities. For example, first-year African American college women are more likely than first-year White American college women to indicate interest in a STEM major, which can be explained, in part, by the fact that African American students hold weaker gender stereotypes about STEM than do White students (O’Brien, Blodorn, Adams, Garcia, & Hammer, 2015).

### Interventions to Mitigate Stereotype Threat

Given the vulnerabilities faced by underrepresented students pursuing higher education, especially during their first year in college, it is imperative to utilize theory-driven interventions that have been rigorously tested using scientific studies. We now turn our attention to this topic. Several evidence-based interventions have been proffered to reduce stereotype threat. These interventions fall into two categories: (1) interventions that change individuals’ self-perceptions or ability perceptions and (2) interventions that change academic environments.

#### *Changing Individuals’ Perceptions: Altering Self-Construct*

One class of interventions to mitigate stereotype threat involves changing how students view their own abilities, experiences, and identities. These

interventions are designed to change unproductive narratives of success and failure by reframing performance- and domain-related thoughts, thereby protecting students’ academic identities.

#### *Reappraising Ability*

There is considerable variation in people’s lay theories about the innateness versus malleability of human characteristics such as intelligence and ability. Individuals who view intellectual potential as malleable tend to pursue and persist in more-demanding academic majors and careers, as compared to others who believe that intellectual potential is fixed (Dweck, 2006). A growing body of research shows that students can be taught to adopt the mindset that intelligence and ability are malleable (rather than fixed), and that these abilities grow with effort, analogous to a muscle that is strengthened through exercise (Aronson et al., 2002; Blackwell, Trzesniewski, & Dweck, 2007). Targeting students’ lay beliefs is particularly important, given recent evidence that American faculty and graduate students in some disciplines (e.g., mathematics, engineering, physics, computer science, philosophy, music composition, and economics) believe that success in their discipline requires special innate brilliance that cannot be achieved through effective teaching and effort alone. The prevalence of these beliefs in a given discipline is strongly negatively correlated with the proportion of women and African American doctoral students in that discipline (Leslie, Cimpian, Meyer, & Freeland, 2015; Storage, Horne, Cimpian, & Leslie, 2016). In other words, women and African Americans are less likely to pursue PhDs in fields where practitioners believe that success requires innate talent. Changing students’ mindset about the origin and malleability of intellectual ability can help shift students’ focus toward learning and mastery rather than performance (Dweck & Leggett, 1988) and thus reduce their susceptibility to stereotype threat (e.g., Dweck, 2006; Froehlich, Martiny, Deaux, Goetz, & Mok, 2016).

Evidence of such mindset change comes from several studies. In one representative study, African American and White college students received a letter that was ostensibly from a middle school student who was experiencing academic difficulty (Aronson et al., 2002). Some of the college student participants were asked to write a letter back to this middle school student, using information they learned from watching a brief video on the nature of intelligence. Half these participants were asked to convey to their pen pal that intelligence was malleable and can be improved with effort (intervention condition), while the other half were asked to convey that intelligence is multifaceted (control condition). A third group of students was not assigned to correspond with pen pals (second control condition). Several



weeks later, all college students in the study completed surveys about their academic experiences. African American students who had written letters describing how intelligence can be improved reported greater academic motivation and had higher GPAs at the end of the following academic term compared to African American students in the two control conditions. White students who had written letters describing intelligence as malleable also benefited from the intervention, although the effect was not as strong. This type of growth-mindset intervention has been scaled up to impact large numbers of students. As a case in point, Paunesku and his colleagues (2015) administered a web-based growth-mindset intervention to 1,594 students at 13 high schools, one-third of whom were at risk of dropping out of high school. Some students were randomly assigned to read an article on the brain, which focused on neural plasticity, explaining how it can “grow” and adapt based on hard work and effort (growth-mindset intervention). The article also emphasized that academic difficulties are not diagnostic of potential, but rather that they are opportunities for growth. Students who had completed the growth-mindset intervention had significantly higher grade point averages (GPAs) in the following semester relative to their baseline GPA, compared to other students who had read a control article on brain structure, but not on brain plasticity.

Another way in which growth mindsets can be effectively used is by changing students' academic goals by teaching them to reappraise a difficult upcoming task as an opportunity to learn and grow (mastery goal orientation) rather than as an opportunity to demonstrate perfect performance (performance goal orientation). Demonstrating the effectiveness of mastery goals, in a series of experiments, Stout and Dasgupta (2013) primed female students with either mastery goals or performance goals (or no goals in the control condition) before they underwent a mock job interview. Prior to the job interview, women were put under social identity threat or no threat by having the interviewer use subtly sexist or neutral language. Inducing mastery goals prior to this interview reduced threat, increased women's intentions to behave assertively during the interview, and enhanced their actual behavior during the job interview relative to the induction of performance goals and no goals. Trained coders rated women's behavior in the interviews for nonverbal emotional expressions and hireability; women with mastery goals were seen as behaving more positively and were also rated as more hireable than women with performance goals or no goals. Thus, growth mindsets not only enhance test taking, but also enhance other types of professional performance.

#### *Reappraising Feelings of Uncertainty*

Another intervention that also involves changing students' mindset focuses on teaching students to reappraise the experience of difficulty during the transition to college as *normal*. In a recent paper, Yeager and colleagues (2016) describe three experiments (with greater than 9,500 students in total) in which both advantaged and disadvantaged first-generation college students and negatively stereotyped racial minority students completed an online informational training prior to beginning their first year of college. All students were told that they would be learning about different aspects of other students' experiences with the college transition. As part of the online training, students, who were randomly assigned either to the intervention condition or control condition, read stories allegedly written by upper-year college students. Stories in the intervention condition emphasized that experiences of difficulty and worries about belonging are normal and occur among students of all backgrounds. Stories in the control condition focused on students' experiences of moving to college and adapting to the physical environment, with no mention of uncertainty or self-doubt.

Although students in both conditions felt that the information they had read was useful, disadvantaged students in the intervention condition (vs. the control condition) had better outcomes across the board: greater full-time enrollment in the first year of college, higher GPAs, and more social and academic involvement on campus. There was no benefit from the intervention for advantaged students; this group generally had better outcomes than disadvantaged students in both the intervention and in the control condition. However, the intervention narrowed the outcome gap between advantaged and disadvantaged students. Notably, in one of the experiments (Experiment 3; Yeager et al., 2016), disadvantaged students in the intervention condition were more likely to have developed close relationships, become involved in extracurricular activities, and to have used academic support services than disadvantaged students in the control condition. These findings suggest that normalizing the experiences of difficulty and concerns about belonging by teaching incoming first-year students to reappraise the meaning of these worries dramatically changed disadvantaged students' overall experience of college in the first year.

#### *Reappraising Academic Anxiety*

Another intervention to mitigate the negative impact of stereotype threat on performance involves changing test-takers' appraisals of their physiological states and test-taking experiences. This intervention highlights the effectiveness of teaching students to attribute their test-related anxiety and

arousal to stereotype threat (Johns, Schmader, & Martens, 2005) or to reappraise such anxiety as beneficial to their future performance (Jamieson, Mendes, Blackstock, & Schmader, 2010). For example, inducing students to frame a test as a growth opportunity (positive challenge) rather than as a negative judgment (a threat) eliminated performance deficits among racial minority students in elementary school and among college students who were underrepresented at a prestigious university (Alter, Aronson, Darley, Rodriguez, & Ruble, 2010). These results suggest that teaching students to reevaluate threatening testing situations as positively challenging can mitigate stereotype threat.

Other studies demonstrate the effectiveness of another reappraisal intervention: reinterpreting the physiological experience of anxiety as benign and helpful (e.g., Brooks, 2014; Jamieson et al., 2010). In one such study, Jamieson and colleagues (2010) recruited students who were planning to take the Graduate Record Exam (GRE). Half the students, randomly assigned to the intervention condition, were told that recent research has shown that anxiety and arousal may actually boost performance, not harm it (the reappraisal intervention) while the other half were not told anything. The researchers measured students' physiological arousal as well as performance using a practice GRE test. They found that students who completed the reappraisal intervention performed significantly better on the practice test, a finding replicated in students' subsequent performance on the actual math GRE. Moreover, physiological arousal predicted better performance for students in the intervention condition but not in the control condition. This finding suggests that reappraising the experience of anxiety as helpful for performance can become a self-fulfilling prophecy in stressful testing situations.

#### *Affirming One's Personal Identity*

A number of successful interventions to combat stereotype threat encourage students from stereotyped groups to focus on positive individuating aspects of their identity (Ambady, Paik, Steele, Owen-Smith, & Mitchell, 2004; Logel, Iserman, Davies, Quian, & Spencer, 2009) or to affirm their personal values (Cohen, Garcia, Apfel, & Master, 2006; Cohen, Garcia, Purdie-Vaughns, Apfel, & Brzustoski, 2009; Miyake et al., 2010) as a way of protecting the self against negative stereotypes. Some studies have had students focus on a positively stereotyped identity, showing that students who affirm an identity that is positively stereotyped in achievement contexts experience less stereotype threat and better performance. For example, Asian American women who focused on their ethnic identity (which

is positively stereotyped in STEM) prior to taking a math test performed significantly better than those who focused on their gender identity, which is negatively stereotyped in STEM (Shih, Pittinsky, & Ambady, 1999). However, not all students are able to recruit positive group-based identities in an achievement context, e.g., Latina women in math (Gonzales et al., 2002). Moreover, even if students are members of a positively stereotyped group (e.g., college students), they may identify more strongly with a subgroup (e.g., Black college students) that does not provide the same protective effects.

One way to avoid the potential pitfalls of having students focus on a positively stereotyped identity is to have them focus on a personal value or identity. One study found that female students who were instructed to think about an important personal identity whenever they experienced thoughts related to test anxiety performed better on a math test and experienced less gender stereotype activation relative to no-intervention participants (Logel, Iserman et al., 2009). Similarly, having students affirm their personal values can help to close the racial achievement gap (Cohen et al., 2006). In one such study, researchers recruited African American and White American middle school students and randomly assigned them to write about their most important values (the intervention condition) or their least important values (the control condition). The findings were dramatic: This brief writing intervention – administered at the beginning of the semester – improved the GPA of African American students by one-third of a grade point and reduced the achievement gap between Black and White students by 40%. The benefits of this brief self-affirmation persisted over time, with African American students showing GPA benefits two years later (Cohen et al., 2009). The protective benefits of this self-affirmation intervention were replicated with college women who were taking an introductory physics class (Miyake et al., 2010). Female and male college students completed the same writing exercise twice at the beginning of a semester. The self-affirmation intervention reduced the gender gap in physics grades, improving women's average grade from a C to a B.

One limitation of the interventions described above is that they place the onus for change on stigmatized individuals, who have to reappraise their self-concept, reappraise their ability, or affirm personal values, all of which are extra demands for students who are chronically cognitively depleted. This concern highlights the need for additional interventions that move the responsibility for change from the shoulders of stereotyped students to academic leaders and faculty who create the institution and its teaching and learning environments. Changing the structure, organization, and

composition of people in learning environments all serve as alternative routes to prevent stereotype threat.

### *Changing Learning Environments in College*

One way to inoculate women and underrepresented students in college against stereotype threat is by increasing exposure to in-group experts (successful professors, teachers, and other professional role models), especially during the first year of college, when students are most vulnerable to self-doubt and uncertain about their academic belonging (Dasgupta, 2011; Dasgupta & Stout, 2014). In addition, contact with in-group peers in classes, work teams, and mentoring relationships plays a key role in inoculating students' sense of self against stereotype threat. Analogous to biomedical vaccines that protect and inoculate one's physical body against noxious bacteria and viruses, so too exposure to successful own-group experts and peers protects and inoculates one's mind against noxious stereotypes, according to the *Stereotype Inoculation Model* (Dasgupta, 2011).

### *Stereotype Inoculation via Exposure to In-Group Experts*

High-achieving learning environments in college can become less threatening when students (especially racial minority students, women in STEM, and working-class students) see individuals from their group who are successful experts in those environments. Such experts may be own-group teachers and professors with whom students have face-to-face contact (Carrell, Page, & West, 2010; Stout et al., 2011) or individuals whose biographical stories students learn about via media exposure (Marx & Goff, 2005; Stout et al., 2011). One study of first-year college students hoping to major in STEM found that, when taking introductory courses in calculus, female students felt more confident about their mathematics ability and exhibited more positive implicit attitudes and stronger identification with math if their professor was female rather than male. Male students' responses were unaffected by the gender of their professor (Stout et al., 2011). Moreover, the more female students felt a sense of connection with their female professors, the greater was their self-confidence in their own math ability. Equivalent feelings of connection with male professors did not predict female students' self-confidence.

A subsequent experiment showed that even in the absence of face-to-face contact over time, biographical stories of successful female engineers had a similar positive impact on female students in engineering majors, while similar stories about male engineers or about engineering

innovations with no mention of gender did not have that impact. The more women identified with these female engineers, the greater their own confidence, which in turn predicted more aspirations to pursue engineering careers after college. Other studies have revealed similar benefits to women after reading biographical stories of successful own-group experts (e.g., Asgari, Dasgupta, & Stout, 2012; Marx & Goff, 2005; Richman, vanDellen, & Wood, 2011; Young, Rudman, Buettner, & McLean, 2013) and underrepresented minorities (e.g., Marx & Goff, 2005; Marx, Ko, & Friedman, 2009).

Although exposure to own-group experts has clear benefits for students from negatively stereotyped groups, there are also limits. Role models are successful only when students identify with them, see them as defying stereotypes (Hoyt & Simon, 2011), and view their success as attainable (Lockwood & Kunda, 1997) and deserved (Taylor, Lord, McIntyre, & Paulson, 2011). They are less effective if those experts are portrayed as superstars whose achievements are hard to match, or if students view the experts as undeserving of success (Taylor et al., 2011) or as dissimilar to themselves (Asgari et al., 2012). In sum, the power of in-group role models depends not only on their objective credentials, but also on their subjective meaning to the person perceiving them and on how their stories are framed (see Taylor et al., 2011).

### *Stereotype Inoculation via Exposure to Own-Group Peers*

Successful professors and other experts from one's group are clearly much more advanced in their fields than first-year college students and thus may sometimes be difficult to relate to. This is when contact with own-group peers serves as an important social vaccine for underrepresented students in college: racial/ethnic minority students, working-class and first-generation college students, and women students in STEM majors. When and how do own-group peers inoculate disadvantaged individuals against stereotypes? And what proportion of own-group peers is most beneficial? One effective intervention for underrepresented students is to give them opportunities to work in small groups with a critical mass of similar peers, as was revealed in a study of women in engineering, who are typically a tiny minority relative to their male peers (Dasgupta et al., 2015). In this study, female engineering students were randomly assigned to 1 of 3 engineering groups of varying gender composition: 75% women, 50% women, or 25% women. For first-year students, group composition had a big psychological impact on anxiety: first-year women in female-majority and gender-parity groups felt less anxious than first-year women in female-minority groups.

But among advanced students, gender composition had no effect on anxiety. However, group gender composition influenced women students' verbal participation regardless of their academic seniority: women participated more proactively in female-majority groups than in gender-parity or female-minority groups. In addition, after working in female-minority groups, women who harbored implicit masculine stereotypes about engineering reported having less confidence and weaker engineering career aspirations. However, after working in gender-parity or female-majority groups, women's confidence and career aspirations remained high regardless of implicit stereotypes. These data suggest that creating small groups with high proportions of women in otherwise male-dominated fields is one way to keep women engaged and aspiring toward engineering careers. Although gender parity sometimes works, it is insufficient to boost women's verbal participation in team-based or group-based work, which can impact learning and mastery (Smith et al., 2009).

Related research shows that when it comes to test performance, both African American students and women students perform significantly better when they are in same-race or same-gender groups respectively as compared to when they are the only African American student among all White students or the only woman among all-men (Inzlicht & Ben-Zeev, 2000; Sekaquaptewa & Thompson, 2003). Similarly, other work shows that women who attended an all-women's college were more resilient to the negative effect of stereotype threat on math performance than were women who attended a similar coed college, even though all students were tested at a neutral third location (Ben-Zeev & Kirtman, 2012). Related research by Moore and Dasgupta (2017) found that women in calculus classes at an all-women's college were more confident about their math abilities, had more positive attitudes toward math, and showed greater interest in continuing advanced degrees or careers in STEM than women at a similar coeducational college, even after controlling for individual differences in prior academic skills. More generally, increasing the numerical representation and visibility of fellow own-group members who are negatively stereotyped in an achievement domain enhances individuals' feelings of belonging in those settings and increases their motivation to enter those settings, thereby increasing diversity through the recruitment of applicants to college and the workforce (Murphy et al., 2007; Purdie-Vaughns et al., 2008).

Besides increasing the critical mass of underrepresented students and giving them opportunities to work together to prevent isolation, another effective intervention is to provide students with a peer mentor during

the first year of college, when they are especially vulnerable to self-doubt and attrition. In a recent study, Dennehy and Dasgupta (2017) examined whether having female versus male peer mentors would protect first-year engineering women's feelings of confidence and belonging in engineering, their motivations to stay in (vs. drop) their major, and their postcollege career aspirations over the course of their first year of college, relative to a nonmentored control group. We found that having female mentors protected women's feelings of belonging in engineering across the first year of college, whereas having male mentors or no mentor resulted in a significant decline in social belonging in engineering across the same time period. In addition, having female mentors protected women's confidence in their engineering ability and prevented their anxiety from increasing over the course of the academic year. In contrast, women without mentors and others with male mentors exhibited a significant decline in confidence and a simultaneous increase in anxiety during the same time period. Furthermore, 100% of women with female mentors persisted in engineering majors through the first year of college compared to 89% in the control group and 82% of those with male mentors. Looking ahead to postcollege aspirations, having female mentors protected women's postgraduate and career aspirations in engineering, whereas having no mentors resulted in a decline in their postgraduate engineering plans. Women with male mentors were statistically equivalent to women in the no mentor group. What was key psychological ingredient to the benefits of having a female mentor? Increased social belonging in engineering. For women with female mentors (compared to the other two groups), increased feelings of belonging over time protected postgraduate aspirations in engineering and intentions to stay in the major. By the end of women's sophomore year, one year after their mentoring relationships had ended, the protective benefits of female mentors were still clearly evident.

#### *Changing Classroom Teaching Styles*

Professors can play a role in reducing threat among negatively stereotyped groups by changing teaching styles to better support these students. Research shows that ideal learning occurs when students perceive course material as meaningful and relevant to their future goals (Hidi & Harackiewicz, 2000; Moore & Dasgupta, 2017). Simply asking students to write how a lesson related to their lives increased their interest in the subject, particularly for low-performing students (Hulleman, Godes, Hendricks, & Harackiewicz, 2010). Similarly, professors who taught calculus by connecting abstract concepts in calculus to real-world applications in everyday life elicited greater

interest, more positive attitudes toward mathematics, and more interest in pursuing math-intensive careers among female students than did other professors who taught the same subject without connecting it to real-world applications (Moore & Dasgupta, 2017). Furthermore, for female students in STEM, emphasizing how math and science relate to communal goals (e.g., helping and working with others) is a particularly beneficial strategy. Studies show that female students value communal goals more than male students value them, and that framing science careers as being more communal increases female students' interests in these fields (Diekman, Clark, Johnston, Brown, & Steinberg, 2011). Taken together, these findings suggest that linking college-level learning to students' everyday lives, as well as to their future and communal goals, is a way to increase the academic engagement of STEM women, racial/ethnic minority students, and students from disadvantaged backgrounds.

#### *Changing Ambient Cues in Learning Environments*

One easy yet impactful way that teachers, professors, and college administrators can help to mitigate social identity threat is by actively removing cues in classrooms, labs, and student work spaces that emphasize narrow stereotypes about who is successful in that achievement context (see Cheryan et al., 2009). For instance, if classes and labs display graphics or images of successful people in a given discipline, those individuals should represent gender and race diversity, and should not be limited to White men. If student labs and lounges have paraphernalia that are heavily gender- or race-stereotypic (e.g., science fiction posters, war-oriented video games, junk food) those should be diversified to include paraphernalia used by other groups. Creating identity-balanced environments may allow all students to feel they belong and fit into those learning environments.

#### *Harnessing the Power of Positive Cross-Group Relationships*

Another straightforward way to increase feelings of belonging and improve performance among negatively stereotyped students is to reduce biased behaviors from advantaged others. Research finds that even subtly biased behaviors can lead to stereotype threat. For instance, Logel, Walton and their colleagues (2009) found that women (compared to men) performed worse on an engineering test after interacting with a man who behaved in a subtly sexist manner, whereas women performed just as well as men after interacting with a man who behaved in a nonsexist manner.

Emphasizing similarities between groups also decreases threat. One study found that reminding women of similarities between men and women

improved their math performance and decreased their preference for gender-stereotypic careers (Rosenthal & Crisp, 2006). Similarly, increasing collaboration and building cross-group friendships may be particularly important for students who are not part of the majority group, e.g., racial/ethnic minority or first-generation students, or women in STEM courses (Cohen, 1994). Building friendships with members of other groups helps reduce anxiety about future cross-group interactions and increases feelings of belonging (Mendoza-Denton & Page-Gould, 2008).

### **Conclusion**

For many people, entering college marks an important step into young adulthood. College provides students with opportunities for identity growth and independence, but also comes with challenges as students are faced with new responsibilities and must learn to navigate a new setting and form new social ties. Racial/ethnic minority students, first-generation college students, and women considering STEM majors face the added burden of stereotype threat due to negative stereotypes about their abilities. The impact of stereotype threat is not limited to one time test-taking. It has longer term ripple effects that negatively affect students' confidence, performance, and social belonging. This has implications for whether or not underrepresented students decide to enroll in college, what majors they choose, their persistence in these majors, and their retention in college. This chapter provided a comprehensive review of current research on stereotype threat, focusing on the first year of college. We discussed both the unique and shared obstacles that racial/ethnic minorities, first-generation college students, and women in STEM fields face during the first year of college and beyond. We then described evidence-based interventions that help mitigate the negative effects of stereotype threat and thereby increase recruitment and retention of students in college. Some of these interventions focused on changing individuals' perceptions; others focused on changing learning environments. Leveraging individual, situational, and structural interventions all together is imperative, because multiple approaches are needed to make a dent in this intractable problem.

#### *Recommendations for Researchers*

This chapter reviewed promising interventions aimed at protecting at-risk students from the negative effects of stereotype threat. One task for

future research is to apply the lessons learned from lab experiments to naturally existing field settings such as real college classrooms in order to determine whether the results obtained in tightly controlled lab experiments generalize to real-world college settings. For example, experimental research shows that women in STEM subjects benefit more when grouped in majority-female teams (Dasgupta et al., 2015), but it is unknown if these findings will generalize to female students working in teams in real college classes. Inspired by this unanswered question, one ongoing field experiment is being conducted with multiple cohorts of students in a real college science class, which is a team-based learning course where students are assigned to work in three-person teams (Smith, Moore, & Dasgupta, 2017). We systematically varied the gender composition of these teams in order to examine how semester-long collaboration in teams that vary in gender composition affects men's and women's attitudes toward science, social belonging in their teams, course performance, and future aspirations in science. Field experiments like this are ideal, because they combine the scientific rigor of experiments with the natural setting of real college classrooms.

A second task that deserves researchers' attention is to identify whether successful interventions enhance students' outcomes beyond their test performance, which has been the focus of the bulk of stereotype threat research. This is particularly important, because students may perform well on tests and receive high course grades but still feel like impostors, increasing their risk of attrition (e.g., Dennehy & Dasgupta, 2017; Stout et al., 2011). Optimal interventions are ones that not only enhance at-risk students' performance in college, but also increase their social belonging, confidence, persistence, and future aspirations.

A third and final task, which is ripe for future research, is to determine whether the short-term benefits emerging from intervention studies endure beyond the first year of college through graduation. Future research should identify which interventions work best if implemented during specific periods of development (such as in the first year of college) and which others are effective regardless of students' year in college. Many of these "next-generation" research questions will require researchers and practitioners to collaborate in their efforts to improve underrepresented college students' success, both in the first year and beyond, by bringing evidence-based interventions into more college classrooms and other naturally existing academic environments. We see such collaborations as fertile spaces for developing future innovations to diversify higher education.

### *Recommendations for Practitioners and Academic Administrators*

In deciding which interventions to implement on their campus, educators and academic administrators might ask themselves a few guiding questions:

1. What are the target populations for the chosen interventions: all incoming first-year students, first-years from specific vulnerable groups, first-years in specific majors, first-year students in specific courses, or some other group?
2. What is the acceptable timeline within which to measure success?
3. Have the metrics of success been articulated?
4. What resources will the institution make available to test the efficacy of chosen interventions on campus?

Once the abovementioned questions have been answered, we offer a smaller set of four interventions (culled from the larger list described earlier in this chapter) as a starting point for educators and administrators to try out on their campus. We selected these four because they have been field-tested in naturally existing college environments and found to be successful. Two focus on changing first-year students' mindset (see the section "Reappraising Ability"). First, educators can foster a growth mindset by encouraging students to think of academic ability and success as skills that individuals master over time with effort and practice, rather than as fixed assets one is born with (Dweck, 2006; Paunesku et al., 2015). This is something that professors and academic staff can put into practice through their teaching and advising during the first year of college. This may involve, for example, professors adjusting their grading system in classes by rewarding students' effort and improvement across assignments, or providing opportunities for students to revise and resubmit their papers to improve their originally assigned grade, or providing them with the option to substitute a poor grade on an exam by taking a subsequent exam. All of these strategies emphasize learning and mastery over time rather than one-time performance on an exam or paper.

A second mindset-oriented intervention normalizes the experience of difficulty during the transition to college as something common that happens to students of all backgrounds, which has been shown to increase GPAs during the first year of college and enhance students' social and academic involvement on campus (Yeager et al., 2016). This type of intervention could easily be implemented during first-year orientation by introducing incoming students to successful juniors and seniors of all

backgrounds who describe their experience of adjusting to college, emphasizing along the way that their early experiences of difficulty and self-doubt were normal and common among their peers. These personal stories signal to incoming first-year students to rethink the meaning of their own difficulties and self-doubts and view them as normal experiences of transitioning to college.

We also highlight two other interventions that have a different focus—changing some aspect of the learning environment (see section on “Changing Learning Environments in College”). Specifically, we recommend increasing students’ exposure to successful role models from their group in college. These may be professors, other professionals, or visitors to campus. Such exposure to own-group role models may involve direct face-to-face interaction or involve learning their stories and professional discoveries in class through textbooks and websites. One way to put this intervention into action in STEM majors, where the numbers of women and racial/ethnic minorities are very low, is to encourage professors teaching introductory classes to showcase successful women and racial/ethnic minority scientists and engineers in other ways: (a) by introducing brief stories of their research discoveries as they relate to course material; (b) by inviting guest speakers from underrepresented groups to discuss a course-relevant topic in class; or (c) by inviting colloquium speakers from underrepresented groups for department-wide presentations. For first-year students who are vulnerable to self-doubt because of negative stereotypes, encountering successful members of their group can go a long way toward alleviating anxiety and increasing confidence, belonging, persistence, and career aspirations (Dasgupta, 2011; Dasgupta & Stout, 2014; Stout et al., 2011).

Finally, we emphasize the importance of promoting contact with own-group peers for underrepresented college students from negatively stereotyped groups. Because successful professors and other experts from their group are so much more advanced in their fields, first-year college students may sometimes have difficulty relating to them. This is when contact with own-group peers can serve as an important intervention. We encourage educators and academic administrators to foster mentoring relationships between incoming first-year students from underrepresented groups and their more advanced own-group peers, especially in difficult majors where student attrition is high. We also encourage professors teaching courses that involve teamwork to pay attention to the demographic composition of student teams and avoid creating teams where an underrepresented student is the only one of his or her demographic group. Give

underrepresented students opportunities to work in small groups with a critical mass of similar peers, which can reduce alienation and increase persistence (Dasgupta et al., 2015).

It goes without saying that the above-described interventions to increase college success rest on the assumption that students’ extracurricular needs have been met. Students who face a great deal of stress at home (e.g., caring for children or dependent family members, working a full-time job) are particularly susceptible to feeling isolated and like they do not belong. These students will require support targeting their needs (e.g., low-cost childcare, required courses offered in the evenings or online, housing and food assistance) to help them achieve their full potential. Furthermore, given that membership in negatively stereotyped groups often covaries with economic and family stressors like the ones just described, academic interventions will be most effective when students’ economic and caregiving needs have been addressed.

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