

# Baruch COLLEGE

The City University of New York

# Researchers the Gender

by *Melissa Campbell*



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Catherine Good, Ph.D.,  
Baruch College

Longstanding stereotypes about women’s inferior ability to succeed in science, technology, engineering and math (STEM) fields have been difficult to eradicate. Indeed, much research in the realm of social psychology indicates that stereotypes are nearly impossible for people to relinquish. However, an ongoing study by Catherine Good, Ph.D., of Baruch College looks to circumvent the negative effects of these stereotypes through a construct she conceived called “sense of belonging.”

Supported by a \$500,000 grant from the National Science Foundation (NSF), the study builds on previous research, also supported by the NSF, that looked at ways that a learning environment and a student’s perspective can either heighten or ameliorate stereotype threat, which occurs when a person who belongs to a group that has a negative stereotype attached to it – e.g., women are not good in math – subconsciously conforms to the negative stereotype. The study revealed that a sense of belonging, characterized by to what degree a student felt a part of an academic community or how well they fit in or were accepted, or how much they were valued in that academic domain, played an important role in combating stereotype threat.

“A lot of women left STEM fields not because they couldn’t do well but because they didn’t feel like it was a good place for them, that they were not a real member of the community, they were not valued by peers,” explained Good. “Those feelings may be communicated subtly or overtly. And what does it feel like when you are sitting in an academic domain but not feeling like a member of the club? You may fade into background or leave altogether.”

The latter is exactly what happened to Good, who became interested in this topic based on her own personal path in academia.

“I was always good in math,” she said. “I went to graduate school with the intention of getting a Ph.D. in math, but after I completed my master’s degree, I hit a wall. I couldn’t really put my finger on what was happening, but I never felt like it was the place for me. Through a long path through graduate school, I landed in psychology and heard about the concept of stereotype threat. A light bulb went off in my head: That’s what happened to me! I instantly wanted to better understand this idea and focused my research around it.”

In the first NSF-funded study on sense of belonging, Good identified two factors that interacted to reduce a woman’s sense of belonging in a STEM domain and ultimately affected performance, i.e., grades, as well as a woman’s decision to leave the field. Stereotype threat and the degree to which a woman perceived stereotypes about women’s abilities in STEM

# Look at Ways to Bridge Gap in STEM Fields

fields to be prevalent in an academic domain were shown to erode a sense of belonging. The second factor that impacted a sense of belonging related to perceptions of the nature of intelligence, i.e., is intelligence fixed or does it develop over time. The prevailing belief is that it is fixed and that genetic makeup determines both intelligence and academic range.

“People assume that math is somehow linked to genes: either you are a math person or not,” commented Good. “The reality is that math is an ability and a skill set that can be nurtured and developed over time. In fact, studies have shown that an intervention as simple as leading students in a discussion about neuroscience and illustrating the way that neurons and dendrites and synapses are strengthened the more they are used helps to combat this idea that just because you are female you can’t do math.”

Perhaps the most infamous moment in the history of this topic came when Dr. Lawrence Summers, then president of Harvard University, delivered his damning speech on the inherent abilities of women versus men. Coincidentally, Good was present, scheduled to present her initial findings on stereotype threat and sense of belonging.

“That moment really epitomized the perfect storm of constructs that can undermine sense of belonging in the STEM domain,” remarked Good.

In the current study, which she is conducting with a Baruch College colleague, Jennifer Mangels, they are aiming to better understand the foundations of a sense of belonging, how sense of belonging can take root and how it affects not just achievement, but learning.

“As we discussed in our first study, learning leads to achievement. We know learning is disrupted by these stereotypes, so this study looks to see if learning can be fostered by a sense of belonging.”

Good and Mangels are exploring these concepts with two groups of students: seventh- and eighth-graders in Montclair, N.J., and first-year students at Baruch College in New York. They have identified three ways a sense of belonging can be manifested in the classroom.

The first is called “achievement-based sense of belonging.” Students feel as though they belong, are valued and accepted when they get good grades.

But when students falter, for example, when they get a C, or are when they are enrolled in a tough class that pushes their comfort level, and consequently they experience a dip in achievement, it affects their sense of belonging.

According to Good, “Students are now on shaky ground, questioning whether they fit in anymore. In this sense, achievement-based belonging is vulnerable when kids falter. But the reality in learning is that struggles hap-

pen to everyone, so an achievement-based sense of belonging may not be bulletproof in keeping women in the STEM domain.”

The second sense of belonging Good identified is social-based. Students feel a sense of belonging when they have strong connections in the classroom; they feel as though they fit in when their friends are with them, and when they pursue things with people like themselves whom they also like. Again, this type of belonging is compromised if a student’s friends aren’t in the same class or decide to pursue other areas of study. Once the social support system is gone, students don’t feel connected, and they too leave the STEM domain.

The third way a student can feel a sense of belonging is called effort-based belonging, which is based on the level of engagement and effort and striving. Good believes that this sense of belonging can carry students through the storms of struggling academically and can work to negate the impact of stereotypes.

As she puts it, “If a student starts to do poorly, he or she will still feel a sense of belonging through his or her participation, effort and engagement. If teachers instill the notion that struggles are a way to increasing intelligence, effort-based belonging will protect students when stereotypes rear their head or when they are dealing with a hard class or dealing with gender-based perceptions of talent or fixed math ability.”

By looking at longitudinal data as well as results from a series of experiments in which various psychological factors are manipulated to test which type of sense of belonging works best, Good hopes to prove her hypothesis that effort-based belonging is what should be fostered in classrooms.

The implications of this work lie in providing teachers with evidence-based research that clearly shows the benefits of promoting effort-based belonging to increase learning and achievement and how teachers should focus students around this sense of belonging.

“Are there star charts for good grades? That clearly says that the kids who matter are the ones who get good grades – which is not the best way to construct a domain. Personally, I prefer students who are really engaged in content, regardless of their grades. I wish I could fill all of my seats with students like that!”

“The bottom line is that we want to value participation because we know it will lead to achievement. But teachers can’t just say, ‘Ten percent of your grade is based on your level of participation.’ Teachers must actively and publicly show that they value participation and reinforce that in the classroom.”

