

Objectives

These two brief interventions build on research to help female students cope with the chilly climate of STEM. Female STEM students often express concerns about (1) being taken seriously and treated with respect, and (2) fitting into a male peer culture. These are issues of concern among both male and female students in many STEM disciplines, and commonly leading to students leaving the discipline. These interventions are designed to address psychological factors in threatening situations.

Activities

Two different interventions were used:

Social Belonging Intervention

This activity gives students a narrative for interpreting negative events like feeling excluded or not being taken seriously, by showing that challenges and worries about belonging are normal and dissipate with time. Quotes shown from students highlighted that both men and women worry about being treated with respect in engineering, but that this improves over time.

Affirmation training. This activity encourages students to incorporate key self-identities and personal values, to remind them of their self-defining values and provide an important resource in times of stress or threat. Quotes shown from students emphasized a broad sense of identity, and managing stress and finding balance.

The structure of each intervention followed the same format?

1. **Cover story.** The study was represented as an opportunity for students to learn about students' experiences entering engineering and to share their experiences with future students to improve their transition.
2. **Survey of upper-year students.** Students read summary statistics and quotations from senior engineering students describing their transition to engineering.
3. **"Saying is believing" exercise.** Students wrote a brief essay about "why people's experience in university develops in the way the senior students described" illustrating their essays "with examples from your own experience" and a personal letter to a future student describing "what you've experienced, and what you've learned." Students were encouraged to try to write a letter that would be meaningful for future students, and those letters were delivered to new first-year students.
4. **Keychain.** Students received either a keychain depicting University of Waterloo insignia (social-belonging), one comprising opaque plastic containing a slip of paper on which students wrote a word or phrase to remind them of an important value (affirmation-training). The physical object was intended to serve as a reminder cue of the intervention.

Author

From Walton, Logel, Peach, Spencer and Zanna (2015), "Two brief interventions to mitigate a 'chilly climate' transform women's experience, relationships, and achievement in engineering." *J. Educational Psychology*, 107 (2), 468-485.

Materials & Resources

Sample quotes from students
(last page)

Classroom Context

Introductory Engineering

Time Requirement

10 minutes

About this Project

This is one of a set of materials compiled for instructors to draw upon in order to frame non-traditional modes of classroom teaching for their students. Our hope is that these materials can help reduce any student resistance to such techniques.

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Other materials available online at www.colorado.edu/sei/fac-resources

Effectiveness

Each intervention led to positive outcomes, including increasing women’s grades to be on par with men’s, helping women view adversities and stressors as manageable challenges, and reporting more confidence and positive experience in the field.

Example Quotations from Upper-Year Engineering Students

Social-Belonging Condition

When I first got to Waterloo, I worried that I was different from the other students. Everyone else seemed so certain it was the right place for them and were so happy to be here. But I wasn’t sure I fit in – if I would make friends, if people would respect me. Sometime after my first year, I came to realize that almost everyone comes to Waterloo and feels uncertain at first about whether they fit in. It’s something everyone goes through. Now it seems ironic – everybody feels different first year, when really we’re all going through the same things.

- “Karen,” 4A Electrical

I didn’t go to a very good high school, and I worried that my high school courses had not prepared me well for university. Honestly, when I got here, I thought professors were scary. I thought they were critical and hard in their grading, and I worried about whether other students would respect me. I was nervous about speaking in class and I didn’t want to ask people for help with assignments. After some time, I began to feel more comfortable – I made some close friends, and I started enjoying my classes more. I also became more comfortable asking for help when I had trouble with an assignment. And I saw that even when professors are critical or their grading harsh, it didn’t mean they looked down on me. It was just their way of pushing us. Since I realized that, I have been quite happy at Waterloo. It took time, but now I really feel like I belong in the intellectual community here. And to be honest, I’m glad I have been challenged. It’s made me a better engineer.

- “Tom,” 3B Chemical

Initially my transition to university wasn’t bad. I enjoyed most of my classes. But it took a while to get to know my classmates. I remember once in my first term having lunch with some other civil engineers. They spent 90% of the time talking about hockey, about which I know next to nothing. I felt like I didn’t belong. It was discouraging. But over time I got to know my classmates better, individually and as a group. Once I remember talking about the TV show *Monster Machines*, which I have to admit I love. We had a great time sharing stories about the different episodes. Even though I don’t share their love of hockey, I realized that we do have a lot in common – an interest in how things work – and that’s why we’re all engineers. My major has turned out to be a lot of fun. I have made good friends with a number of my classmates, and I feel like I really belong here at UW.

- “Fatima,” 4A Civil

Affirmation-Training Condition

When I first got to Waterloo, I worried that I was different from the other engineers. Everyone else seemed so excited and happy to be here but I just felt stressed and overwhelmed. There were so many new people, my classes were harder, it was a totally new environment. Sometime after my first year, I realized that almost everyone feels overwhelmed at times in the transition to university. It’s just a process that everyone goes through. It takes time to find your own way of keeping things in balance in a new place. Now it seems ironic – everyone feels different first year, when really we’re all experiencing the same things.

- “Karen,” 4A Electrical

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My first year was tough. I didn't know many people, and my classes were a ton of work. There was one particular stretch – I had a bunch of midterms and some nasty assignments, all at the same time. I was stressed. One night, I remember, I was trying to finish up an assignment and I had to study for a test later. It was going to be a long night. But I took a break and called home. I talked to my mom. It was just a 5-minute phone call, but when we hung up and I went back to studying I felt so much better. I understand now the value of taking a time-out. Sometimes when I'm about to take a test, I take a mental break – and think about getting together with friends later or talking to my parents. There is so much going on, sometimes you have to take time to chill out.

- “Mike,” 4A Mechatronics

In first year I sometimes felt like I had tunnel vision – that I was just so completely caught up with life at Waterloo – with classes, with people I was meeting, the whole thing really – and I hardly thought of anything else and, it was hard at first and it was stressful. But then I realized that, well there are things outside of engineering that I do care about. I remembered that I had done volunteering in high school, and so I decided to get involved with an environmental group here on campus. And even though, objectively, I had less time with, volunteering on top of schoolwork, I found I felt really refreshed and I could concentrate a lot better. I also met a lot of people while I was volunteering, and most of them shared similar interests as me, and we all became really good friends. I find that the longer I spend in Waterloo, the more I find things to do that are just broadening my life away from schoolwork and it's really good. It took me time to find those activities, but they've made a really big difference in my experience. And, I guess the one thing I had to learn was that it isn't the best thing for me to just study non-stop.

- “Mahesh,” 3B Environmental