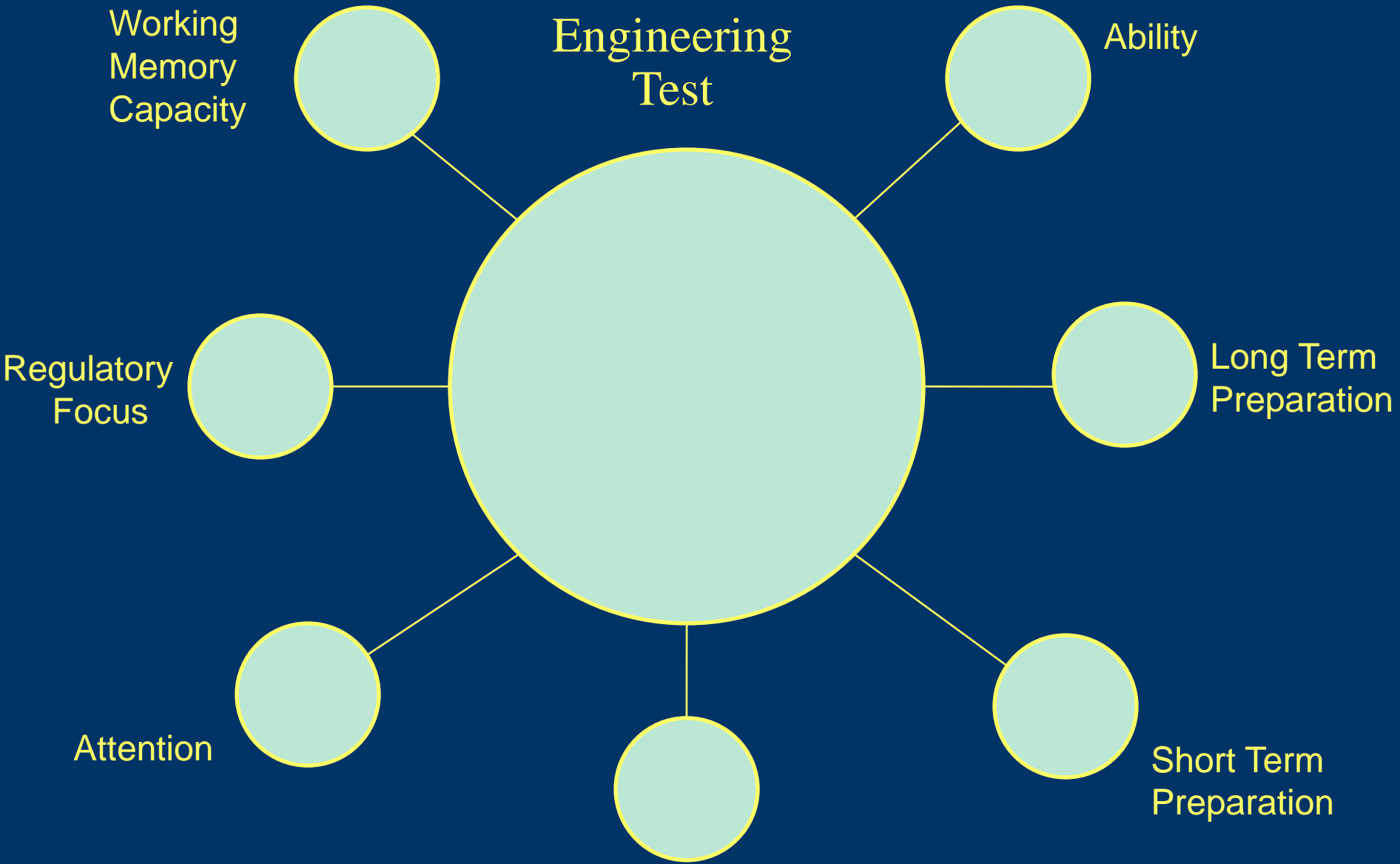


Engineering Teaching Development: Social Psychology's (Small) Contribution

Christine Logel, PhD
Assistant Professor
Social Development Studies

Today's Plan

Performance on an Engineering Test



Working
Memory
Capacity

Ability

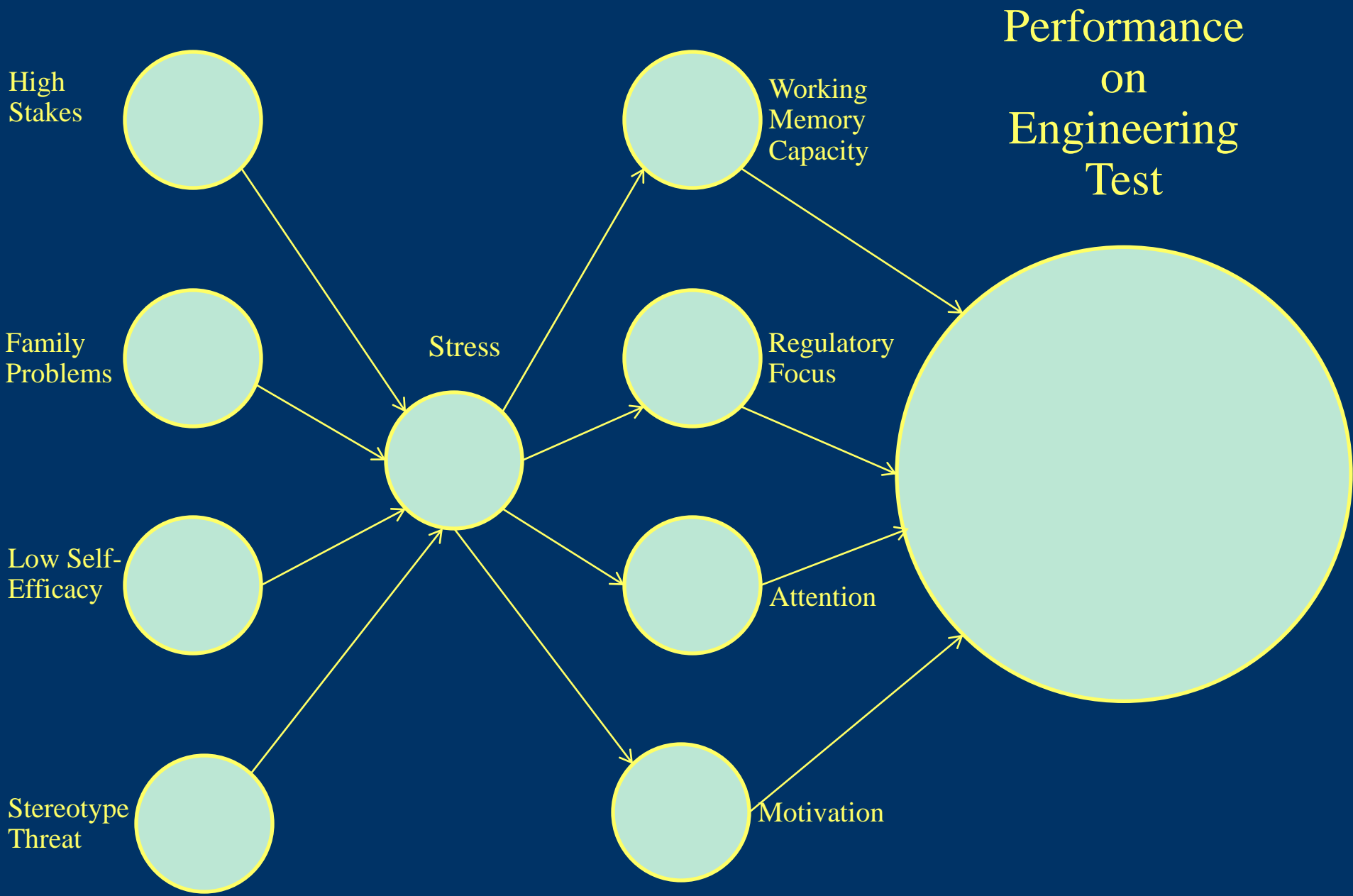
Long Term
Preparation

Short Term
Preparation

Motivation

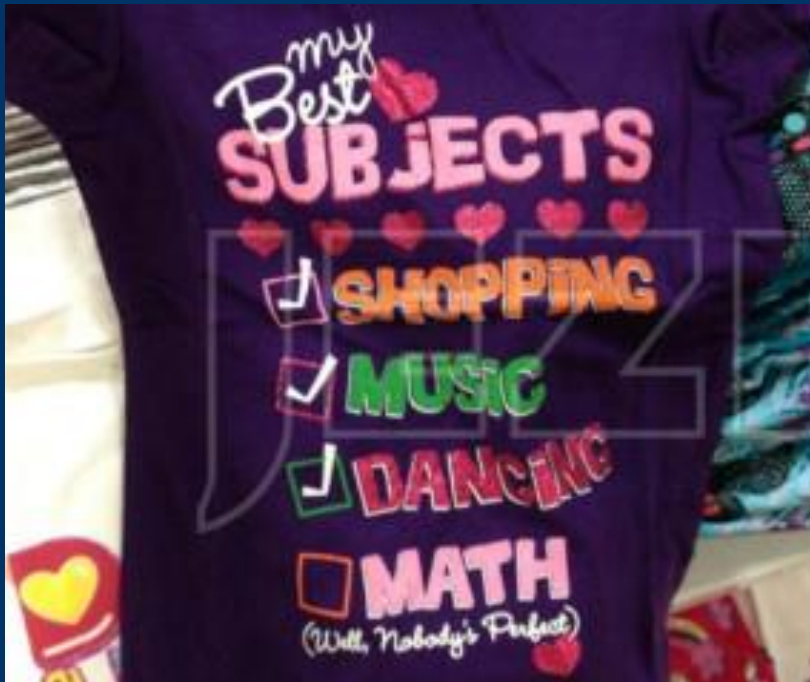
Attention

Regulatory
Focus



Stereotype Threat

- Steele, Spencer, & Aronson: The extra pressure stigmatized students feel when their performance is being judged in light of a negative stereotype

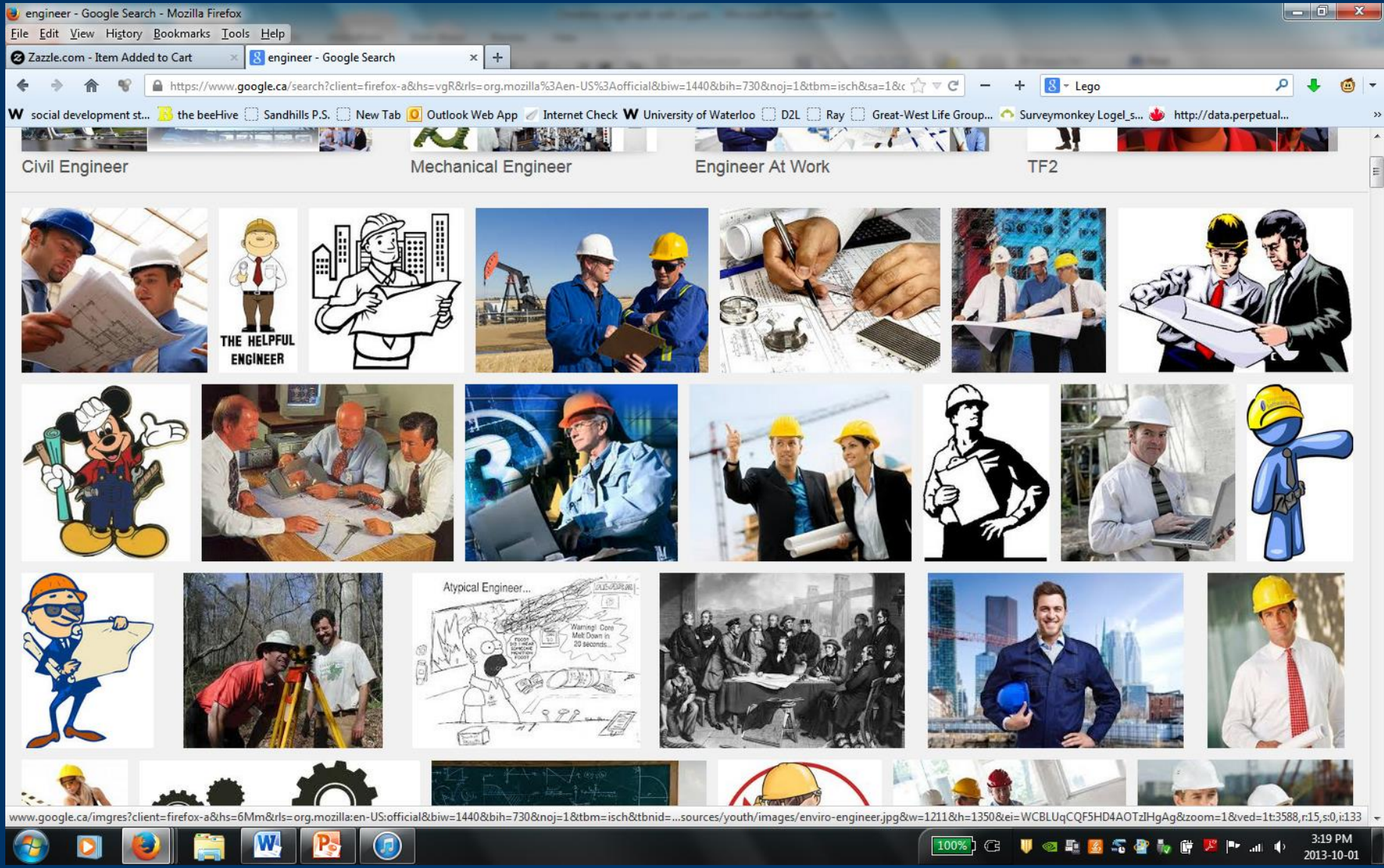


Jezebel

boys toys



Christine Logel



Christine Logel



Christine Logel

Stereotype Threat

- Women in engineering
- Black and Hispanic students in academics
- Any group that is stigmatized about their ability in certain domains
 - golf study

Negative Consequences of Stereotype Threat

- Undermines performance – how much?
- Causes dropping out
- Causes disengagement
- Triggers concerns about belonging
- Threatens health
- Can be subconscious but still have these effects

Clarifications

- Don't have to believe the stereotype to be affected
- Don't have to be consciously aware of it to be affected
- Effects the most motivated students the most
- Effects students more as they move up

Options

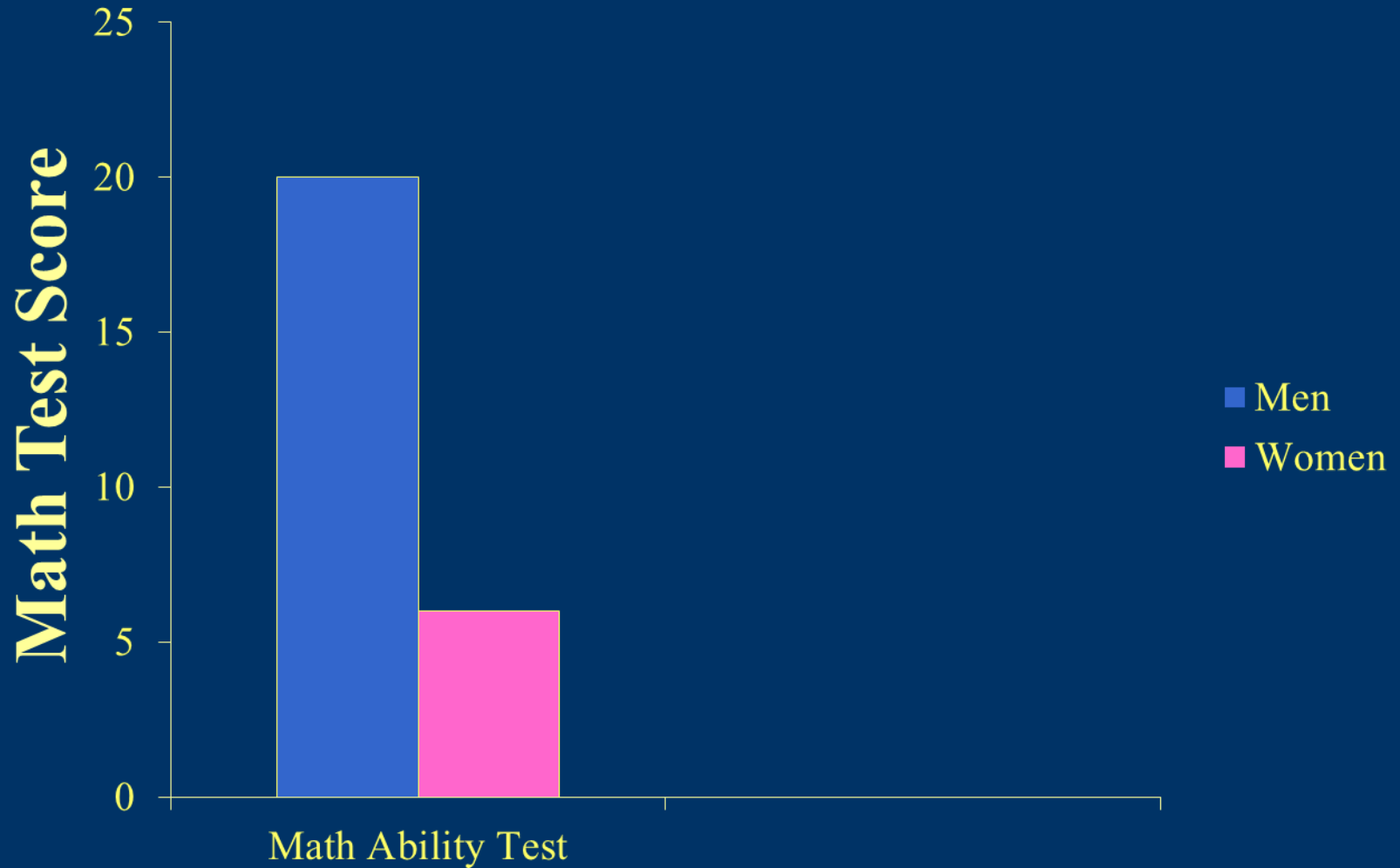
- Chat
- Typical stereotype threat study
- What individual faculty can do
- What the department to do
- What students already do
- What we have done

Stereotype Threat Evidence

- Hundreds of studies since 1995

This is a test of math ability

Stereotype Threat Evidence



Stereotype Threat Evidence

- Hundreds of studies since 1995

This is a test of math ability.

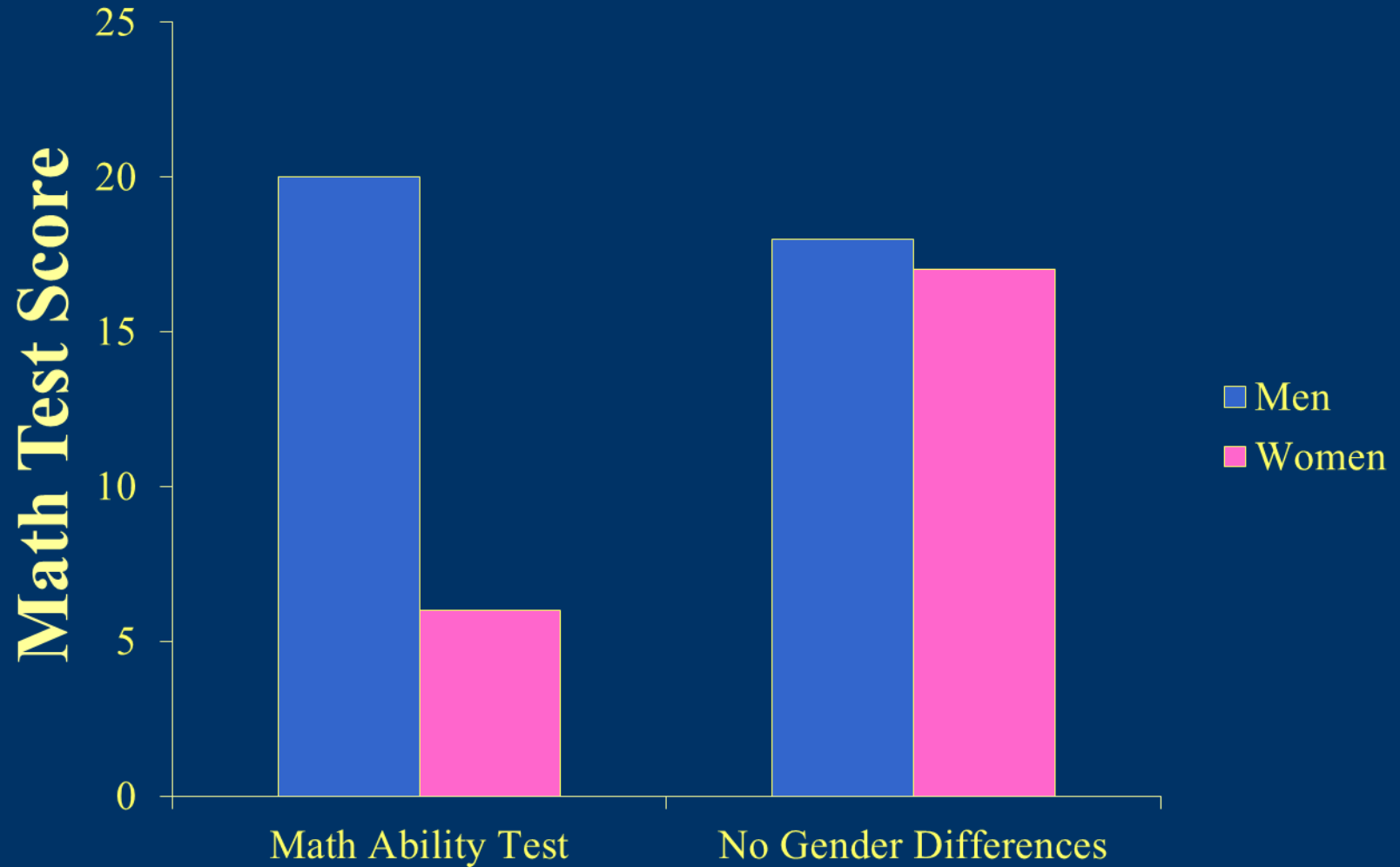
Past research shows there are no gender differences in performance on this test.

Stereotype Threat Evidence

- Hundreds of studies since 1995

This is a set of practice problems. It is not a test of math ability.

Stereotype Threat Evidence



Negative Consequences of Stereotype Threat

- Undermines performance
- Causes dropping out
- Causes disengagement
- Triggers concerns about belonging
- Threatens health
- Can be subconscious but still have these effects

What Can Individual Faculty Do?

- Don't do something major yet
- Address stress
- Subtle signs of inclusivity?
- Try not to make it about gender
- Just be there
- Normalize stress and belonging concerns?
- Be aware when evaluating candidates?

What Can the Department Do?

- Don't do anything major yet
- Address Stress
- Theory-driven, evidence-based interventions
 - PERT

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What Do Students Already Do?

- Overprepare
- Strive to prove themselves
- Disidentify with gender
 - Bifurcate their identity
- Develop coping strategies

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Stereotype Threat Intervention

- Greg Walton, Jennifer Peach, Steve Spencer, Mark Zanna
- Participants
 - 228 first year engineering students (92 women) – 89% average
 - 11 majors
 - Half with $> 20\%$ women
 - Half with $< 20\%$ women
 - In groups in engineering classrooms

Stereotype Threat Intervention

- Randomly assigned to a control condition or one of two treatments
 - Control: just fill out surveys or learn about study skills
 - Treatments: watched a presentation of upper year students

Affirmation Training Treatment

- Upper-year students talk about
 - learning to affirm personally important values at times of stress
 - building value-affirming activities into their daily lives



STEP Program



In first year I was just so completely caught up with life at Waterloo. It was hard at first and it was stressful.

But then I realized that, well there are things outside of engineering that I care about.

I decided to get involved with an environmental group here on campus.

Mahesh
3B Environmental

Social-Belonging Treatment

- Upper-year students talk about doubting their belonging in engineering but, over time, coming to feel that they fit in (Walton & Cohen, 2007)
- Designed to reconstrue their experiences
 - See doubts about belonging, and negative experiences, as non-diagnostic of lack of belonging



Raymond
4th year
Electrical

When I first got to Waterloo, I worried that I was different from the other students.

Sometime after my first year, I came to realize that almost everyone feels uncertain at first about whether they fit in.

It's something everyone goes through.

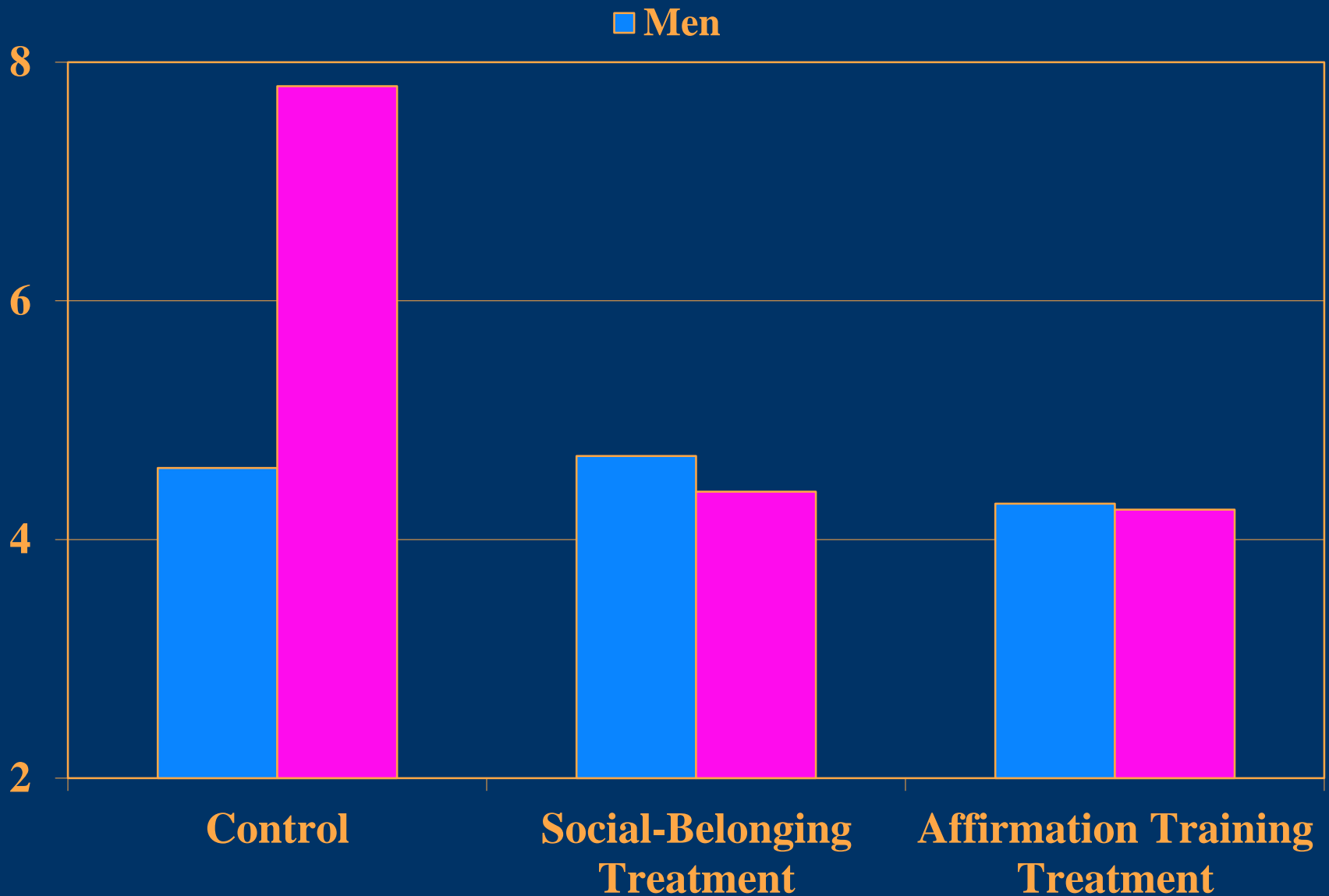
**Belonging Reconstrual
Treatment**

Outcomes

- Moderated by percentage of women in major
- Women in majors with >20% women
 - Didn't have negative experiences or underperform relative to men
 - No effect of treatment

Perceived Importance of Daily Negative Events

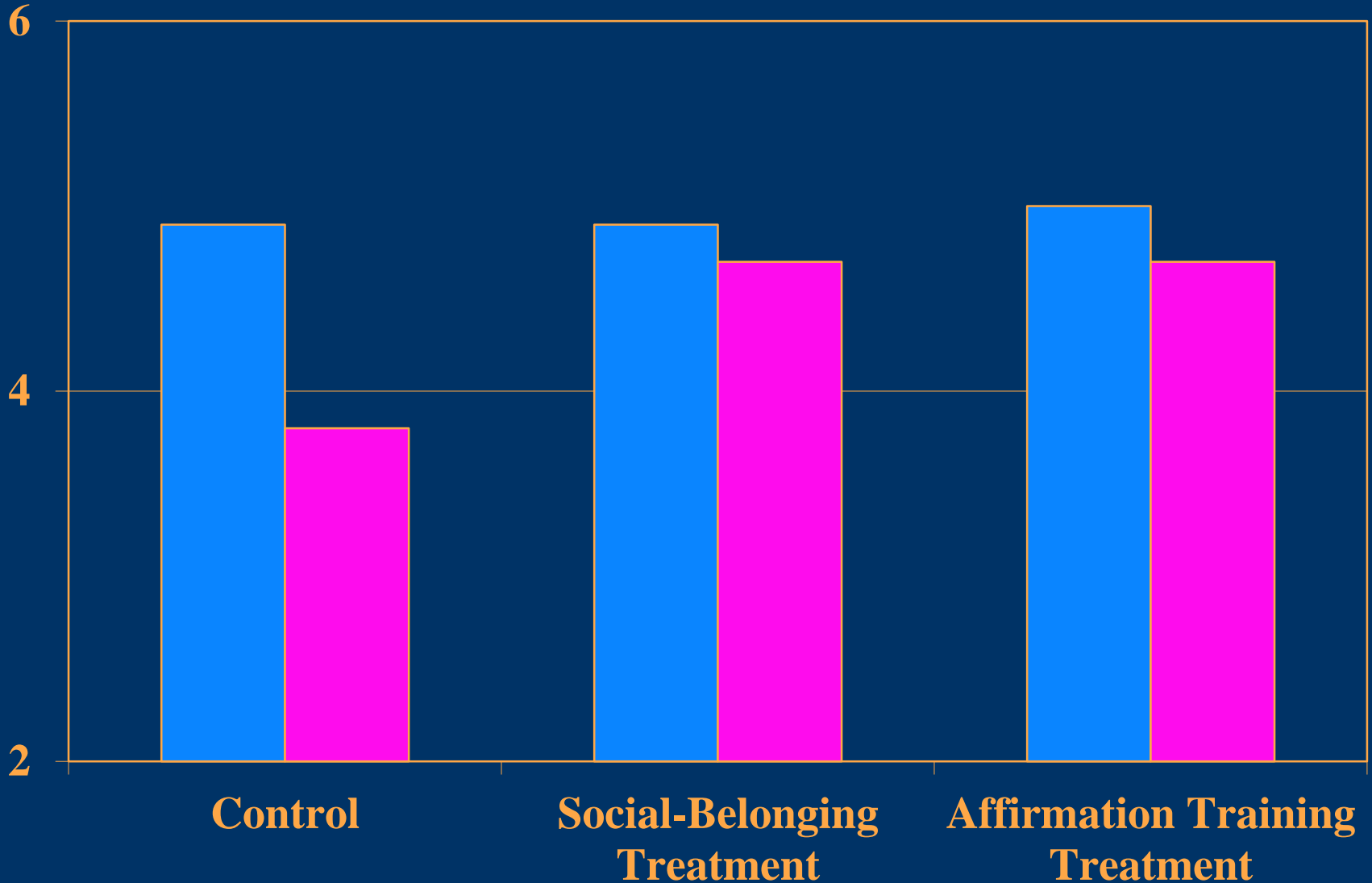
(The week after the treatment)



Self-Perceived Ability to Handle Daily School Stressors

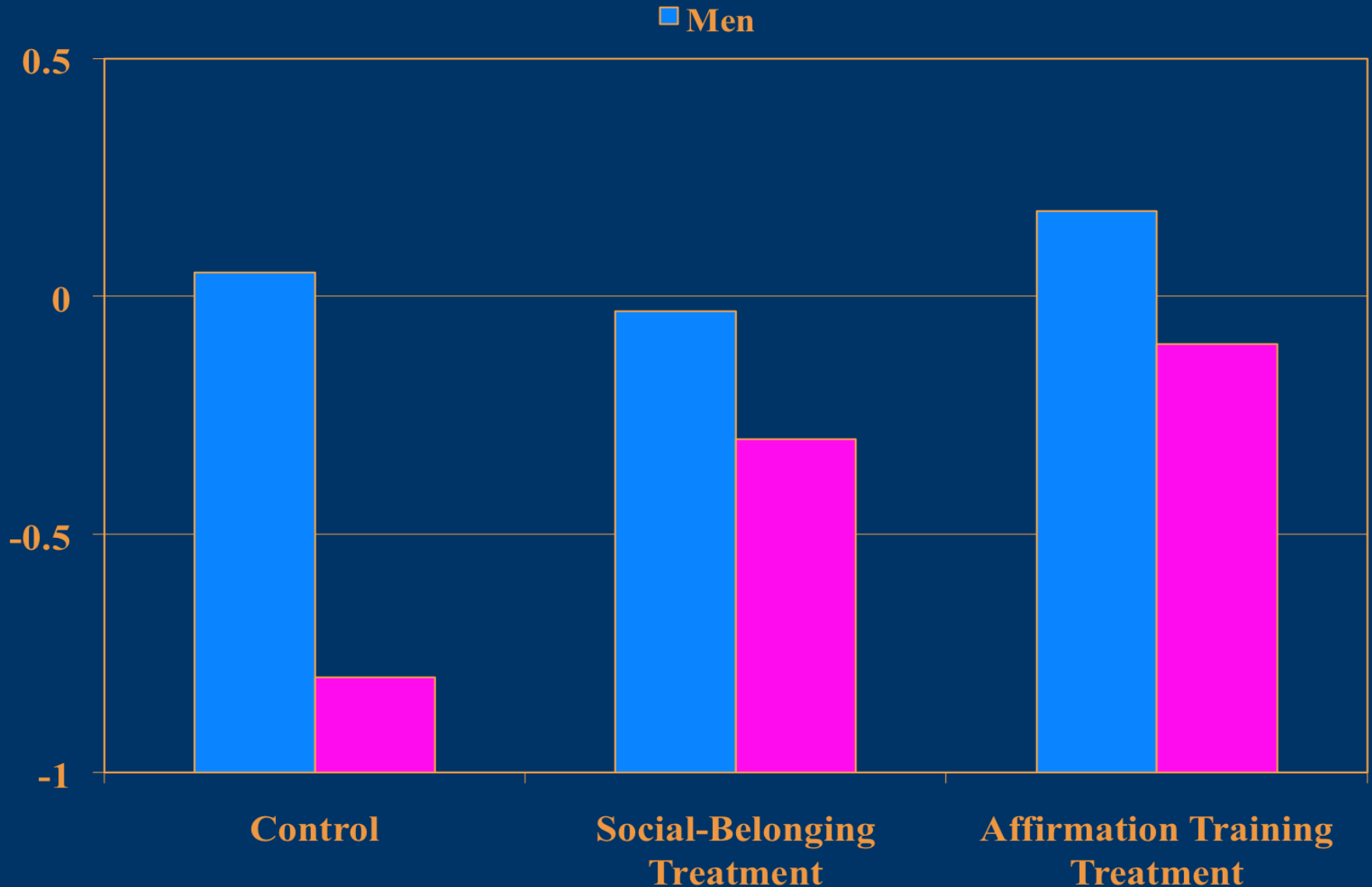
(The week after the treatment)

■ Men



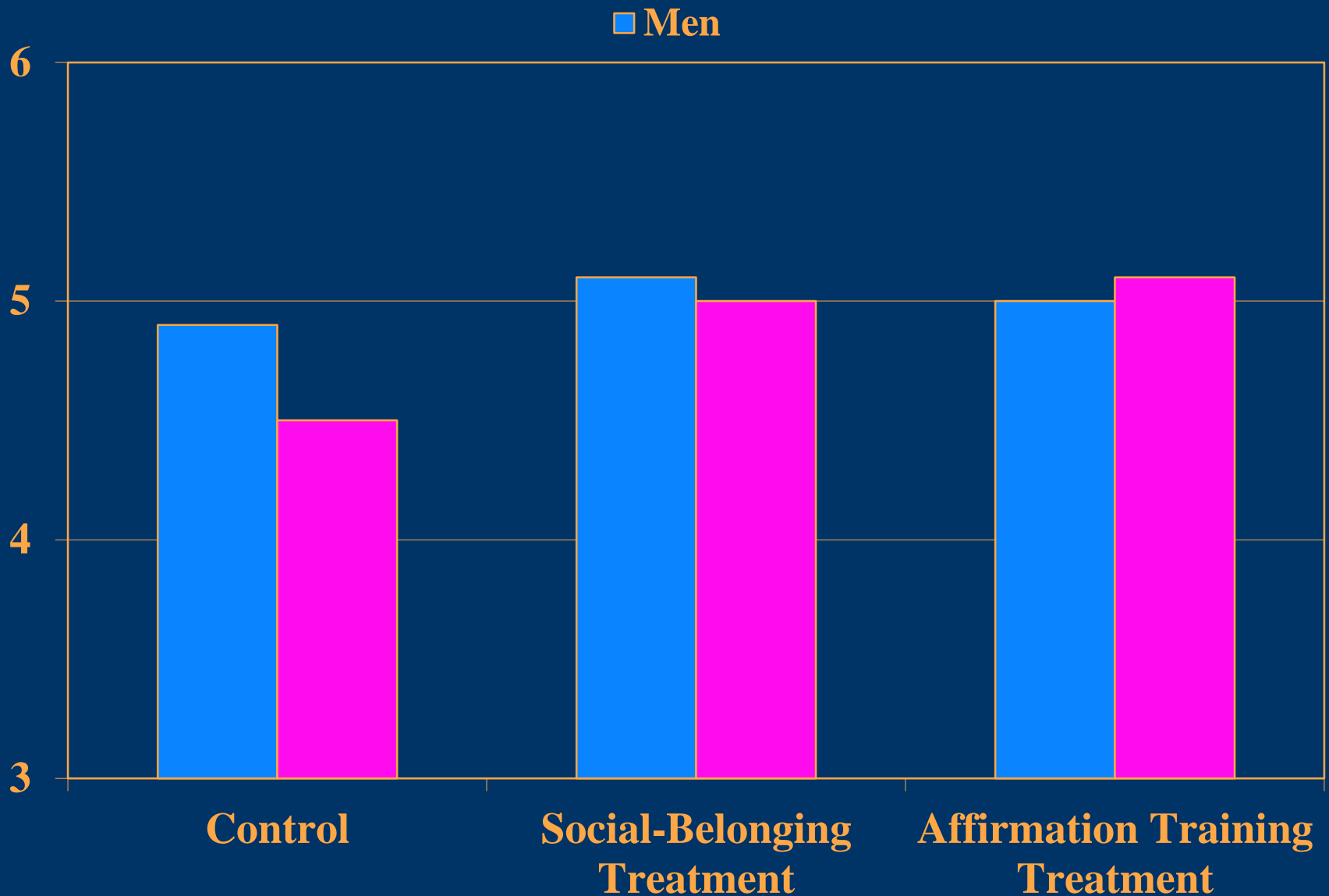
Perceived Prospects for Success in Engineering

(Approx. Six Months Post-Treatment)



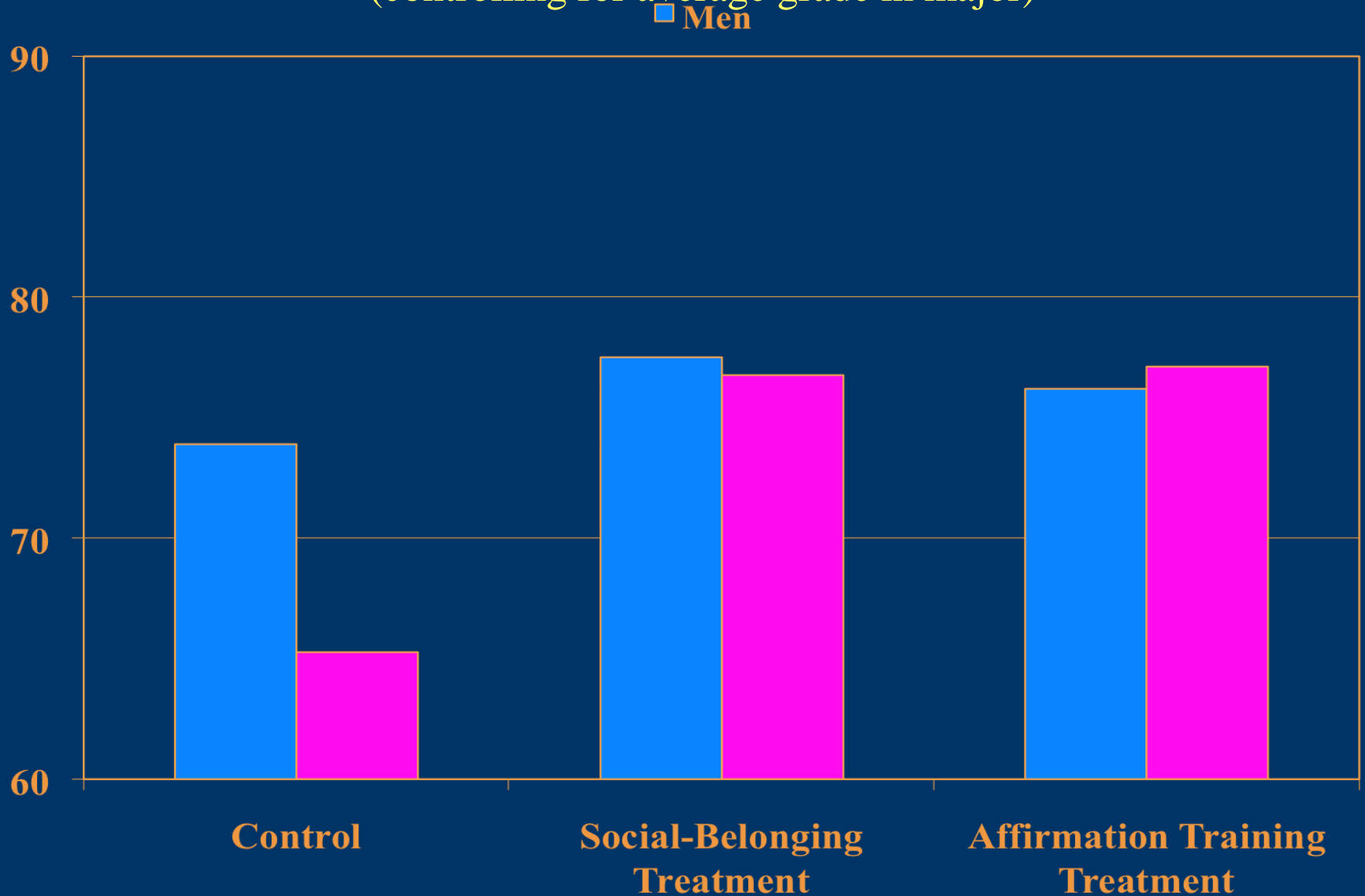
Quality of Current Experience in Engineering

(Approx. Six Months Post-Treatment)



First Year Grades

(controlling for average grade in major)



Stability of Daily Self-Esteem

(The week after the treatment)

