(Stop) Thinking like an Engineer:
The Role of Communal Values in Motivating Electrical Engineering Students

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RESEARCH QUESTION

What helps sustain the motivation of socially conscious engineers?
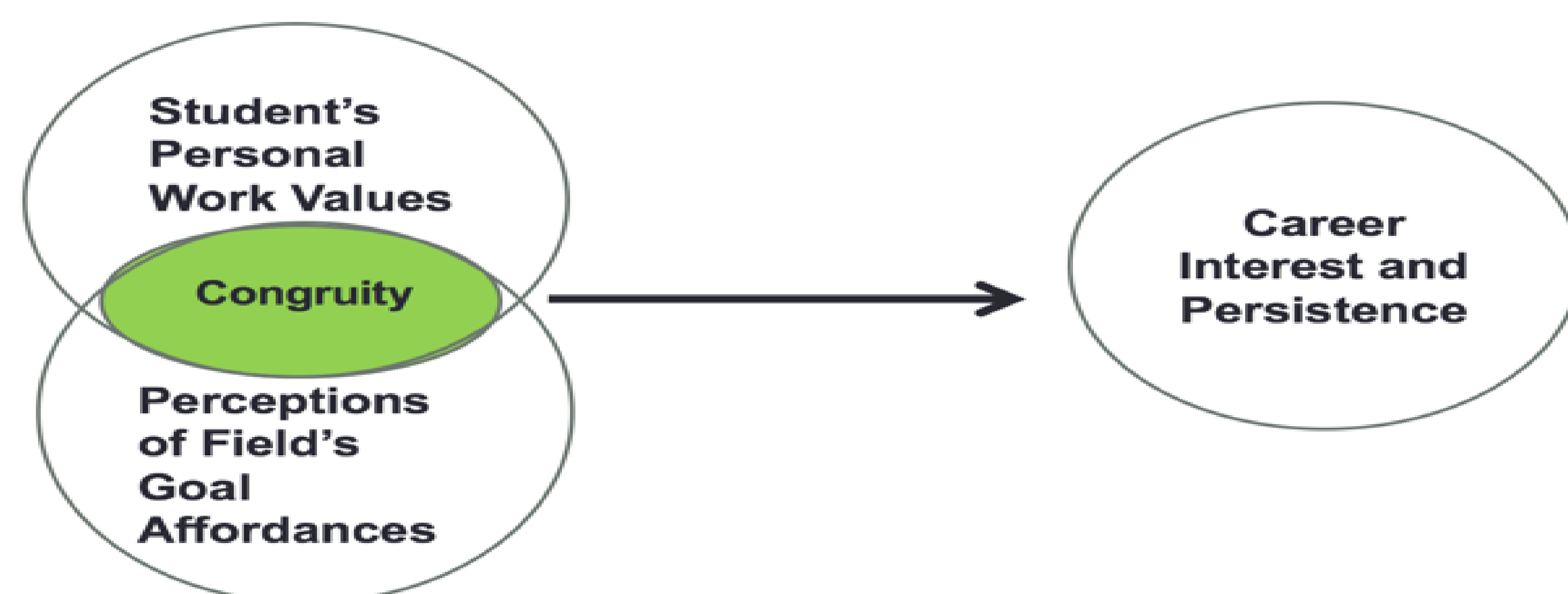
INTRODUCTION

The overall aim of this project was to initiate boundary-spanning research on how a culture of disengagement hinders the professional formation of engineers. This research aimed to understand why engineering students show less and less concern overtime for how engineering contributes to public welfare.

This preliminary research draws from goal-congruency and expectancy-value theories in order to test the communal values hypothesis

Motivation both propels students learning and also describes the willingness of students to persist through the long process of engaging in the field (Harackiewicz, Smith & Priniski, 2016). Using the Expectancy-Value Theory of Motivation (Eccles, 1983), motivation can be broken down into two components, expectancy and subjective task value. By focusing on the value component of motivation, we can look to predict students motivation to persist in the field.

Using Goal-Congruity Theory (Diekman, et al., 2010), we can look to understand what values do students personally hold dear? And what opportunities do students belie a given job provides for? Being that the engineering profession is often misperceived as not affording prosocial values. This inaccurate stereotype is concerning being that research shows that a majority of people pursue careers that afford prosocial values. Therefore, there perceptions of the engineering workforce makes it unappealing to certain students (Bourcher, et al., 2017).

Using this framework we seek to measure the prosocial beliefs and prosocial trait endorsements of students in an electrical engineering program at Montana State University. We seek determine if diminished prosocial trait endorsement replicates within electrical engineering and collect new data on the prosocial affordance beliefs that students have about the electrical engineering profession.

Student's Personal Work Values — Congruity — Perceptions of Field's Goal Affordances → Career Interest and Persistence

METHODS

Participants
➢ 138 Engineering Students
- Recruited through their enrollment in freshman levely (n=79) and senior level (n=51) Electrical Engineering courses
- Mountain West University
➢ 14-15% female,
➢ Majority White
➢ No other race/ethnicity information was able to be collected

Measures
➢ Students in freshman-level and senior-level EE courses completed an online survey.
➢ The survey included instruments to measure:
➢ Affordance beliefs about the EE profession
➢ Prosocial trait endorsement
➢ Measures on the importance of technical and professional skills

RESULTS

Comparison of Affordance Beliefs and Prosocial Trait Endorsements across Freshman and Senior EE Students
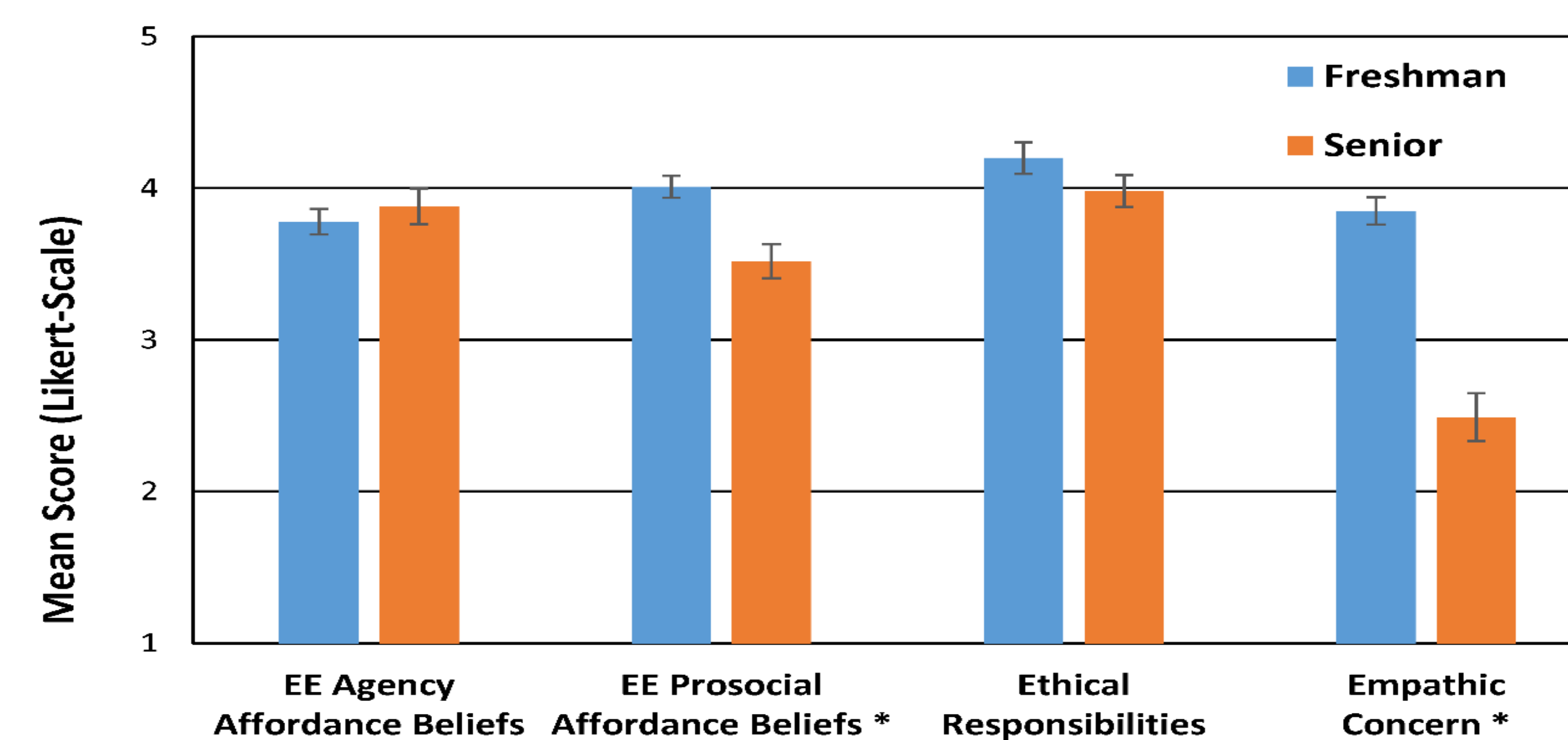
Note 1: Error bars are +/- 1x Standard Error.
Note 2: * Indicates statistically significant difference between groups (p<0.05)
Note 3: All measures are on 5-point Lilkert scale except Empathic Concern, which is on a 6-point scale.

➢ Both freshman and seniors believed that the EE profession afforded agentic value significantly above the neutral point
➢ Both also believed that the EE profession afforded prosocial value significantly above the neutral point.
➢ Significant decline in prosocial affordance beliefs for seniors

Student Perceptions of the Relative Value of Technical vs Engagement-Related Skills
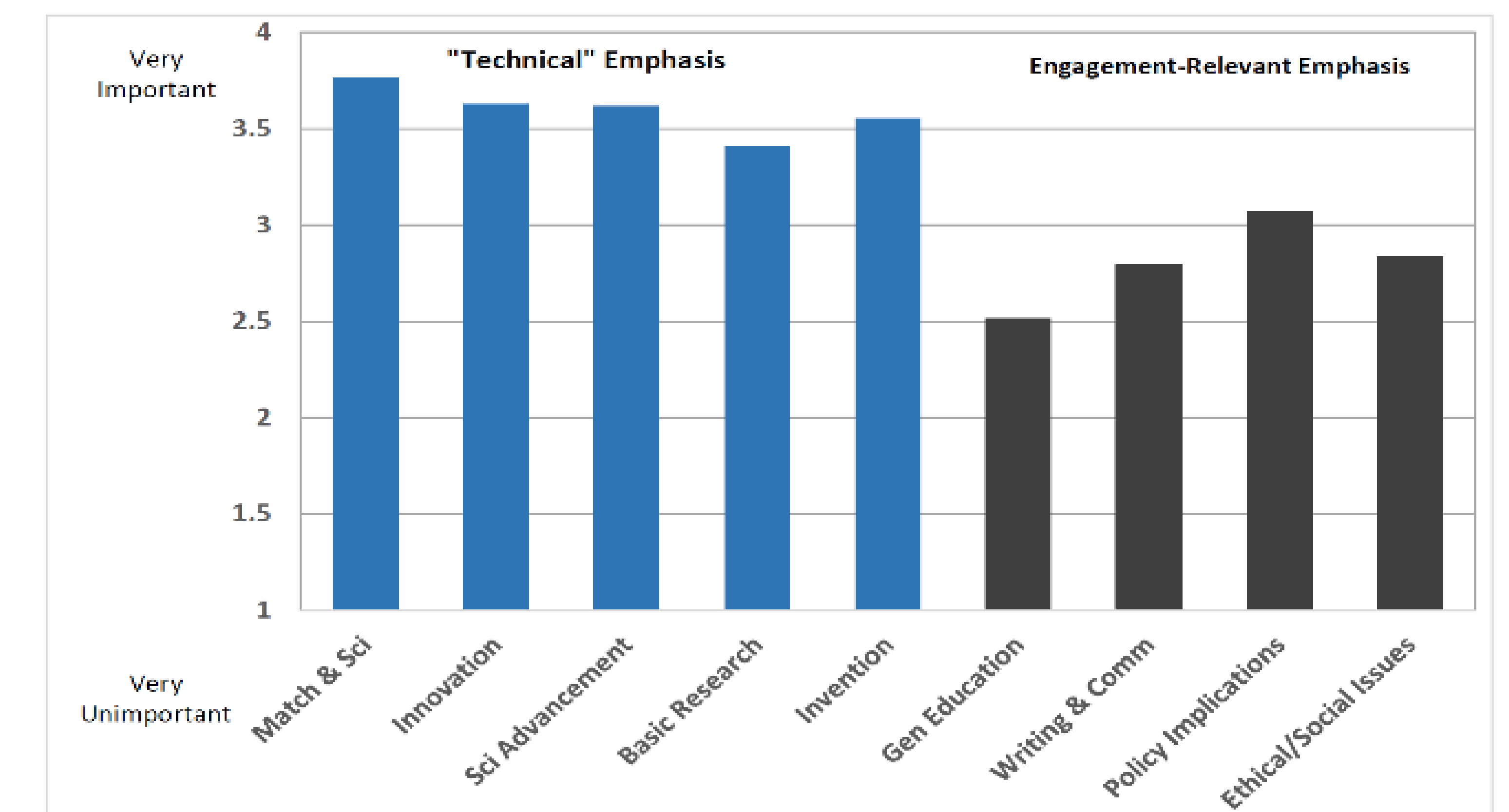
➢ No statistical difference in ethical responsibility endorsement.
➢ Significant difference between freshman and seniors in Empathic concern.
➢ Freshman shown to believe empathy was an important trait working as an electrical engineer.

CONCLUSIONS AND IMPLICATIONS

➢ Analysis showed beliefs about the communal value of engineering was relatively higher for introductory students and lower for advanced students (d=.68, p<.001).

➢ This relative decline is problematic because multilevel modeling revealed that the more intro students thought engineering afforded communal opportunities, the greater their motivation in the class, and to continue their training (95% CI: .01-.34).

➢ New to this line of work, we found trait empathy coincides with communal beliefs.

➢ Findings inform future research to understand what accounts for the decline in communal values (i.e., empathic students opting out)

➢ Along with pointing to new directions to improve social conscious engineering students continued participation in engineering.