



# The Leaky Pipeline: The Effect of Personality and Goals on Female STEM Interest

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## Introduction

- The need for scientists, especially female scientists, is especially strong in the United States. Despite achieving near equality with men in male-stereotypically dominated careers (e.g., dentist, lawyer, physician), women continue to be a minority in science, technology, engineering, and mathematics (STEM) careers (Diekman, Brown, Johnston, & Clark, 2010).
- The goal congruity perspective (Diekman, Clark, Johnston, Brown & Steinberg, 2011) has been used by some researchers to suggest that endorsement of communal goals, which are defined as "mutual participation goals that entail a focus on the needs of both the self and another person" (Keener, Strough, & DiDonato, 2012, p. 86), is a substantive cause of women's underrepresentation in STEM occupations.
  - This perspective asserts that women especially value communal goals, often more than men do, and women tend to believe that STEM careers do not fulfill these goals.
- The trait that is most closely correlated with communal or compassionate goals is Agreeableness, because a critical element of agreeableness is a focus on teamwork and a prosocial and communal orientation.

## Methods

- The sample included 282 participants who were registered users of Mechanical Turk.
- Participants took a survey that included a personality inventory, a writing task, questions about a scientist's job description, and an IQ test, unrelated to the current study.
- Personality was assessed by the 50-item version of the International Personality Item Pool (Goldberg, 1999).
- Communal goals were manipulated with a writing task that asked participants to consider a time they had failed to act communally (experimental condition) or write about the forest floor (neutral control).
- Collaboration was tested by an independent-framed and an interdependent-framed description of a STEM career (Diekman et al., 2011.)
  - After participants read these descriptions, a seven-point Likert scale was used for the three items that assessed STEM interest (e.g., *How enjoyable do you believe you would find a career as an entry-level scientist?*).

## Results

- It was found that agreeableness was the only Big Five trait that moderated the effect of the manipulations on interest in STEM. The results indicated that the main effects and their two-way interactions explained 10.3% of the variance ( $R^2 = .103$ ,  $F(6,269) = 2.897$ ,  $p < .01$ ) in STEM interest.
- Agreeableness, goal manipulation, and gender were found to significantly predict opinion of STEM. The interactions between goal manipulation and agreeableness, gender and job description, job description and agreeableness, and gender and goal manipulation were also significant predictors of STEM interest (Table 1).

Table 1

Multiple Regression Analysis of Survey Variables on Opinion of STEM Careers

	Model 1			Model 2		
	B	SE B	$\beta$	B	SE B	$\beta$
Goal manipulation (A)	-.265	.171	-.093	-.623	.275	-.218*
Job description (B)	.500	.171	.175*	.124	.281	.043
Gender (C)	.076	.188	.026	-.688	.344	-.230*
Agreeableness (D)	.124	.150	.052	-.713	.324	-.299*
A x B				.301	.340	.092
A x C				.754	.372	.202*
A x D				.628	.302	.193*
B x C				.720	.377	.195
B x D				.649	.307	.196*
C x D				.352	.306	.094
$R^2$		.045			.103	
F for change in $R^2$		3.259*			2.897*	

Note. \* $p < .05$

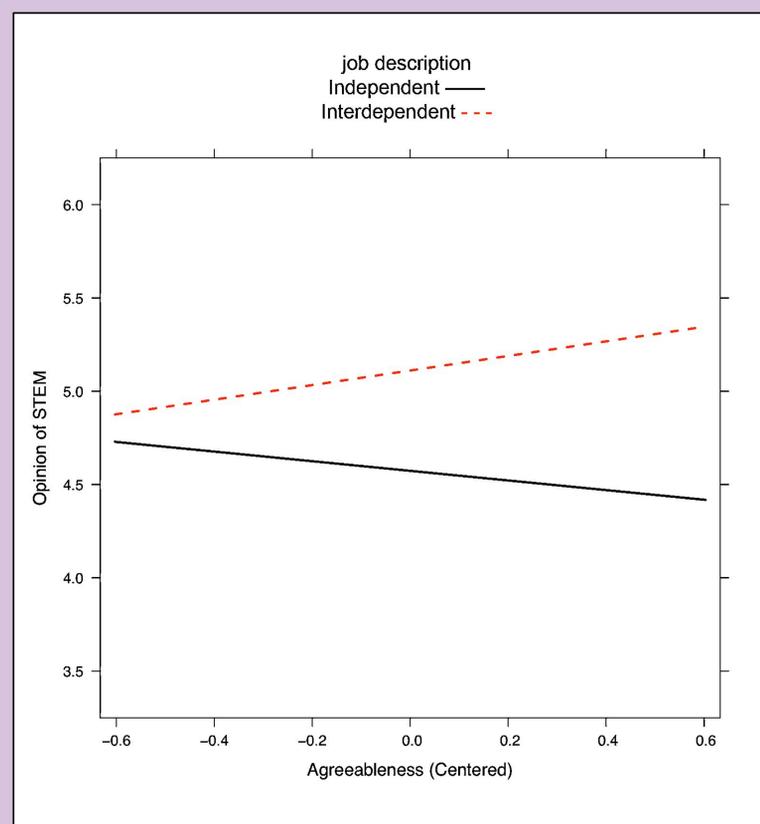


Figure 1. Change in opinion of STEM careers and agreeableness score between job description conditions.

- For the other four Big Five traits, there were only significant main effects for the predictor variables; no interactions attained significance. Only the independent versus interdependent job description variable significantly predicted STEM interest in the models for extraversion ( $\beta = .176$ ,  $p < .01$ ), conscientiousness ( $\beta = .177$ ,  $p < .01$ ), neuroticism ( $\beta = .181$ ,  $p < .01$ ), and openness ( $\beta = .173$ ,  $p < .01$ ).

## Discussion

- In this study, we did not have strong a priori hypotheses about which traits should be important for affecting interest in STEM. However, consistent with the goal congruity perspective, and given that the job of a solitary scientist would be unappealing to people who score high in Agreeableness, it makes sense that agreeableness moderated reactions to different framings (interdependent vs. independent) of a day in the life of a scientist.
  - Individuals who are high in Agreeableness tend to enjoy team-centered activities, because they are cooperative and trusting (Goldberg, 1992).
- Although we expected that Extraversion might be significantly affected by the goal manipulation and the job framing the lack of an interaction makes sense when considering the independent, agentic qualities of extraverts, who may not be as concerned about collaboration or communality as agreeable people.
- These results complicate the stereotype, supported by some research, that scientists are lower in Agreeableness and Extraversion. Agreeableness was the trait most affected by the goal manipulation and type of job description, in that those who scored highly in Agreeableness, had their communal goals activated, and viewed a STEM career as collaborative showed the most interest in STEM, especially men.
  - This result is in line with previous research that showed men having more overall interest in STEM careers than women (Diekman et al., 2010; Diekman et al., 2011).

## References

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