



The Draw-A-Scientist Test: Measures base rates not bias

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Research Goals

- To connect the literature on the assessment of gender stereotypes in science with work on basic cognitive processing of base rate content in the environment
- To investigate whether we can assess stereotypic content independently of base rate information, and whether college participants are sensitive to the base rates of women in science relative to other groups
- To investigate whether men and women are equally sensitive to base rate information, and how male and female scientists are perceived

Introduction

Stereotypes of Scientists

- Early scientist stereotype = “a man who wears a white coat and works in a laboratory” for high school students (Mead & Metraux, 1957, p. 386) and college students (Beardslee & O’Dowd, 1961)
- This early work did not allow for the assessment of more implicit stereotype content or for the assessment of stereotypic content in younger populations

The Draw-A-Scientist Test (DAST)

- Chambers’ (1983) DAST asks participants to simply “draw a picture of a scientist.” Drawings can then be examined for stereotypic indicators, such as gender, lab coats, facial hair, glasses, and symbols of research and knowledge, technology, and science-related captions (e.g., “Eureka!”).

- Using a sample of 5 to 11 year-olds, Chambers found the drawings to be mostly male, and contained at least a subset of stereotypic indicators as early as second grade.

- These findings have been replicated cross-culturally (Fung, 2002; She, 1997) and with college students (Thomas, Henley, & Snell, 2006).

- Chambers and future researchers found that the number of stereotypic indicators drawn increases with age (Chambers 1983; She, 1998; Fung, 2002).

Sensitivity to Base Rates

- Locksley, Borgida, Brekke, and Hepburn (1982) argued that stereotypes really could be considered to be the estimated probabilities of traits in social groups.

- Kahneman and Tversky (1973) demonstrated that people tend to ignore base rates when presented with stereotypic content.

Study 1

Participants

119 TCNJ undergraduates participated for course credit

Procedure

- Draw one, two, or five of the following: scientist, social scientist, TCNJ student, or person
- Participants answered questions about the characters in their drawings, their own experiences in science courses, and gender role and sexism beliefs

Hypotheses

- Women will be more likely to draw female scientists given the opportunity to draw one or two
- Unless men are completely insensitive to base rates, both men and women should draw some women in the draw-5 condition for all category types

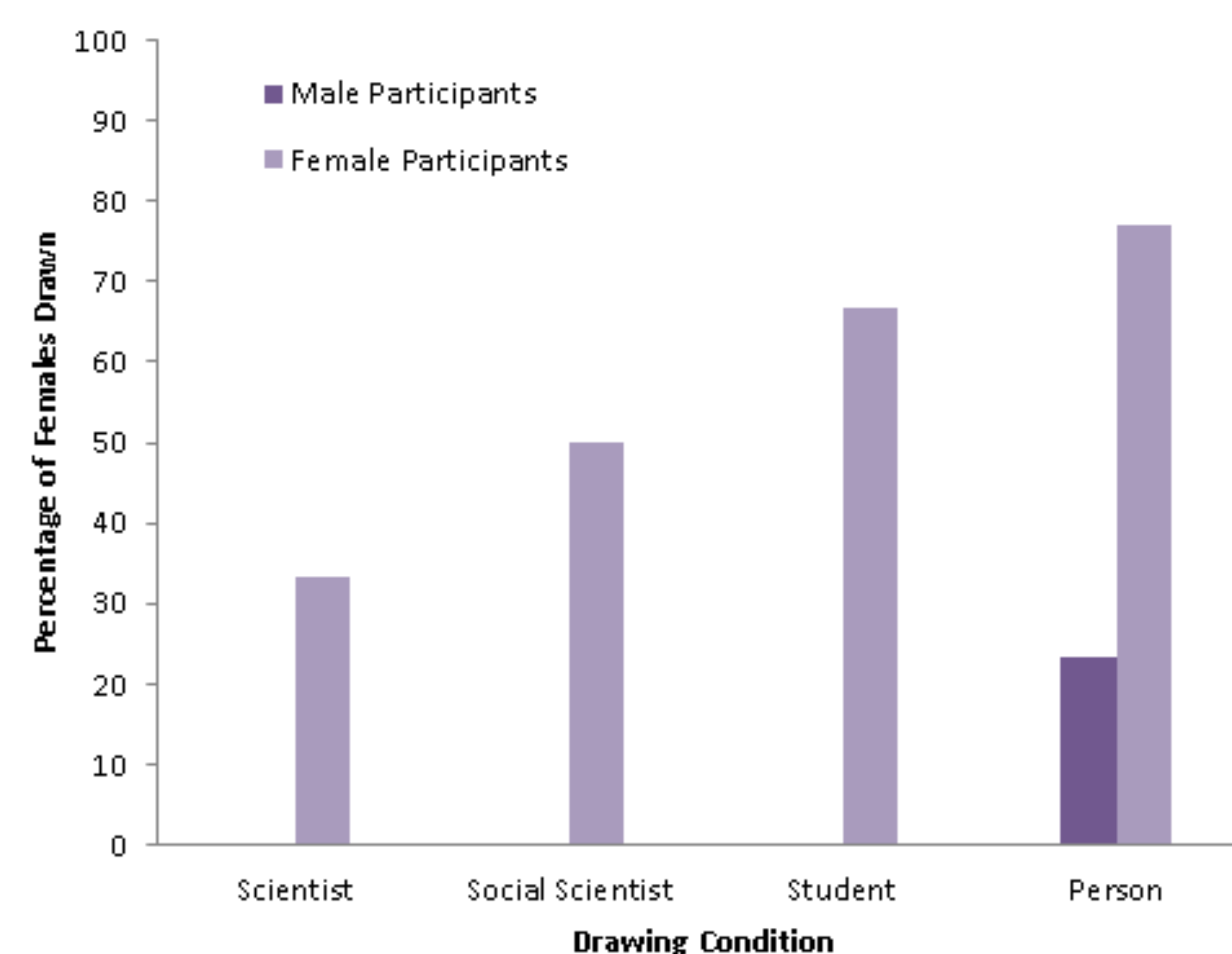
Example Drawings



Percentage of drawings within Drawing Type that contained characteristic feature

	Scientist	Social Scientist	Student	Person
Lab Coat	45.0	8.8	0.0	3.4
Glasses	33.8	18.8	8.6	11.2
Facial Hair	8.8	6.3	2.9	5.6
Research Symbols	26.3	8.8	0.0	0.0
Knowledge Symbols	13.8	8.8	12.9	3.4
Technology	3.8	2.5	0.0	1.9
Science Captions	1.3	1.3	0.0	0.0
Other Captions	1.3	3.6	2.2	4.1

Note: **Bold** indicates when Scientist condition was different from all other conditions.



- More male scientists than female scientists were drawn in the first drawing

- Women were sensitive to the actual base rates of women in different populations using their drawings; Men appeared insensitive to base rates

- Providing the opportunity to produce more drawings increases the likelihood of a female being drawn
 - 40% of men drew a female scientist when given the opportunity to produce a second drawing

Study 2

Participants

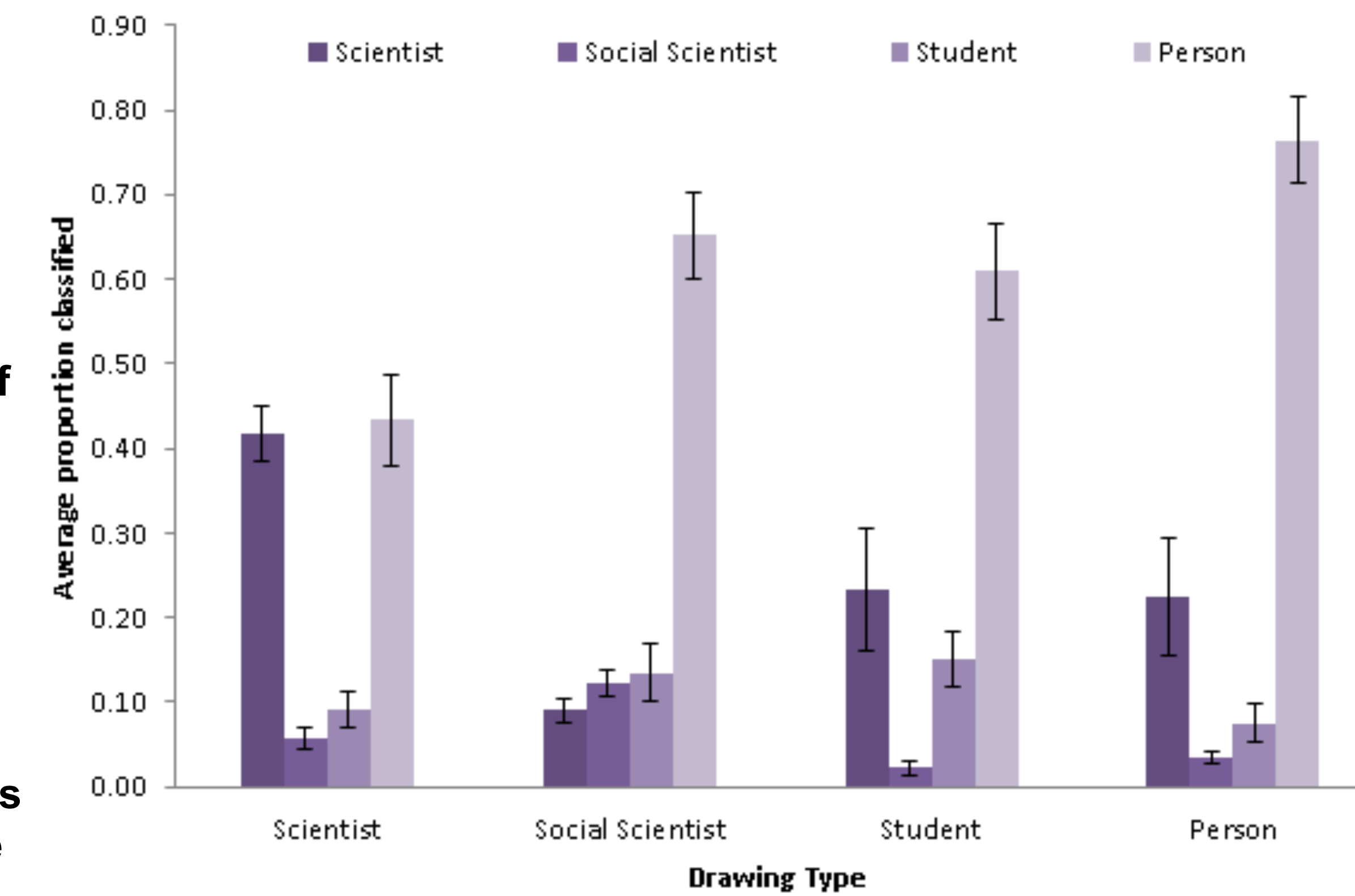
55 TCNJ female undergraduates participated for course credit

Materials and Procedure

- A total of 319 drawings were used from Study 1
- Participants rated the masculinity or femininity of the character in each drawing or were asked to categorize the drawings of belonging to one of the conditions (scientist, social scientist, TCNJ student, person) ; gender role and sexism beliefs were assessed

Hypothesis

- Sensitivity to base rates would cause female participants to rate women scientists as being more masculine and less feminine than women drawn in the other conditions



Average masculinity and femininity ratings for drawn female and male characters

	Scientist	Social Scientist	Student	Person
Scientist				
Female				
Femininity	4.86	5.26	5.05 ^a	5.27
Masculinity	2.69	2.15	2.32	2.19
Male				
Femininity	2.04	2.00	1.92	2.17
Masculinity	5.34	5.16	5.60	5.24

^a Femininity ratings for female scientists and students did not differ

- Participants were sensitive to the presence of characteristic features of scientists
 - Scientists were correctly classified 42% of the time
 - The other conditions were most likely to be classified as people
- Female scientists were viewed as less feminine and more masculine than women drawn in the other conditions

Concluding Remarks and Future Directions

- Female participants were more sensitive to the base rates of women in science than men but still relied heavily on their stereotypes to make judgments. While many factors influence the participation of women in the sciences, women may be leaving the sciences as a result of internalized base rates that contributed to their gender role development.

Future research:

- Why are women more sensitive to base rates than men? Might men may show base rate sensitivity in a domain where they are in the minority, such as nursing?
- How does base rate sensitivity interact with the presence of stereotypical content to influence perceptions of male and female scientists?

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