



STEM PhD Students' Career Preference and Sense of Belonging: Demographic Similarities and Differences

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INTRODUCTION

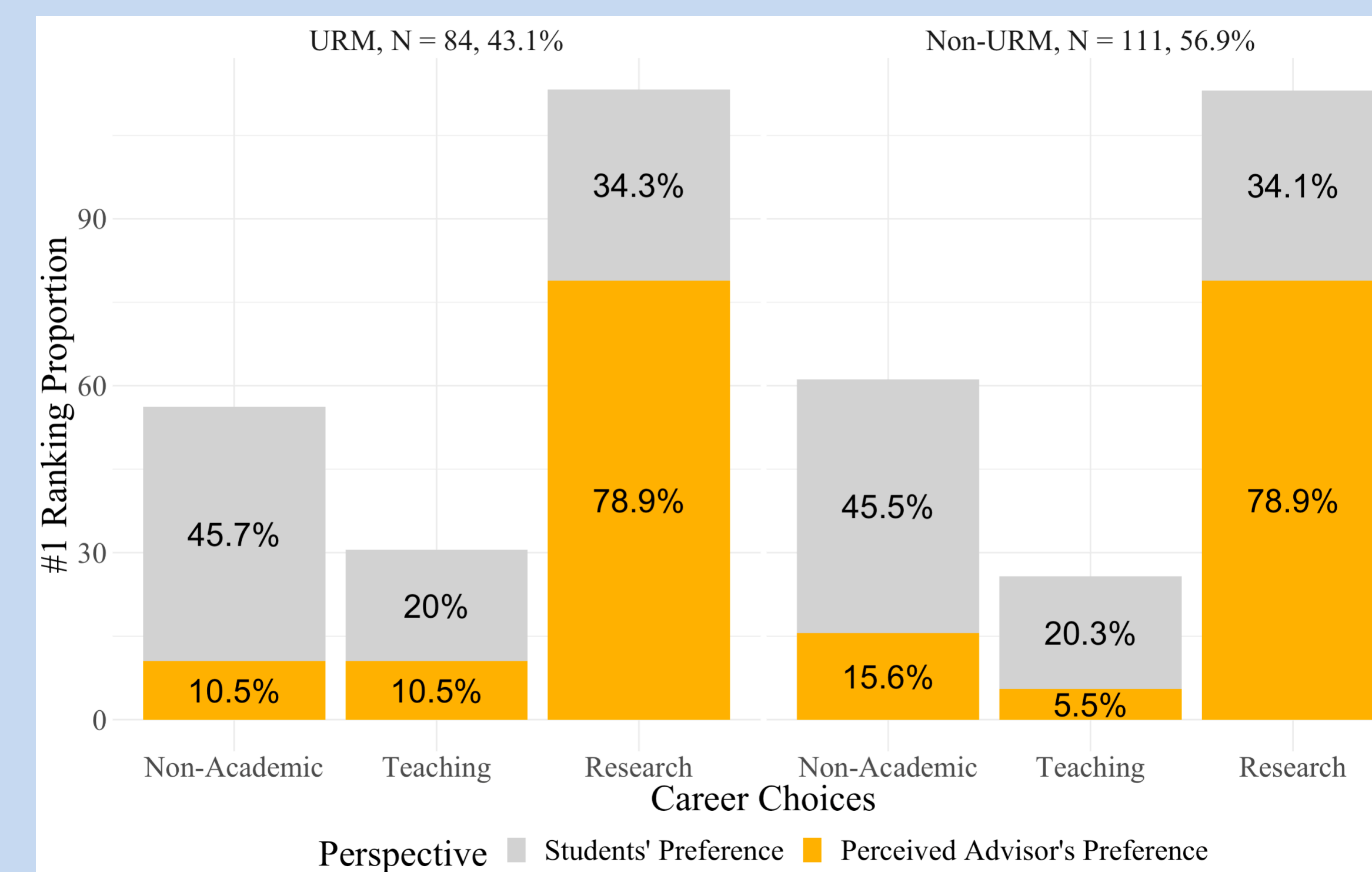
- According to the National Academies of Sciences¹, there is a huge disproportionate ratio, by race and ethnicity, on the number of doctoral degrees awarded in STEM fields.
 - The number of doctoral degrees awarded to White is more than three times higher compared to other racial groups
 - There is an increasing number of White doctorate degree holders, while it remains largely unchanged across all other racial groups
- The purpose of this study is to explore potential barriers to diversifying the professorate through:
 - Identifying differences and similarities in career goals for different groups of graduate students.
 - Identifying the discrepancies between graduate students' and their advisors' expectations of their career choices.
 - Examining graduate students' sense of belonging in the program by the targeted demographic characteristics.
- Through comparing 4 demographic groups (underrepresented minority (URM), gender, first-generation status and advancement status), we hypothesized that:
 - Graduate students across these four demographic groups will show interest in diverse career options (e.g., research, teaching, and non-academic roles) but will perceive greater advisor support for research than for careers in teaching or non-academic roles.
 - Graduate students who perceived discordance in career preferences will perceive a lower sense of belonging in their programs, and the lack of belonging will be more pronounced among students who are underrepresented (e.g., female, first-generation college students, underrepresented ethnic minorities).

STUDY PROCEDURE

Measures	Items	Alpha	Example Items
Career Preference Ranking (1 = Most desirable; 3 = Least Desirable)	3	NA	Please rank the following career options (Non-Academic- vs. Teaching- vs. Research-Focused Positions) in the order of your personal preference
Belongingness Scale	11	.86	People in my department like me

RESULTS

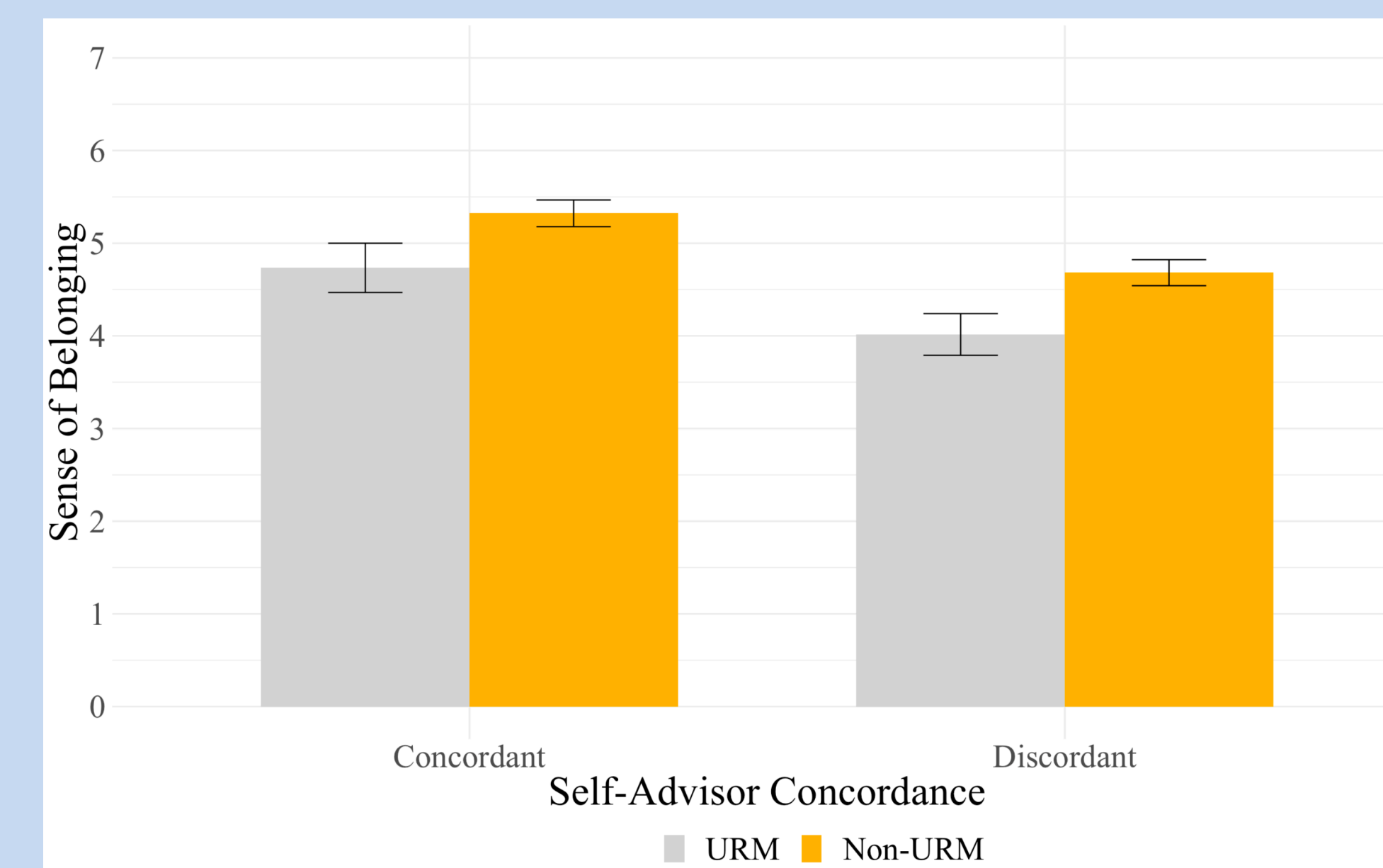
PhD students reported diverse career goals, and perceived that their faculty advisors strongly prefer research careers for them.



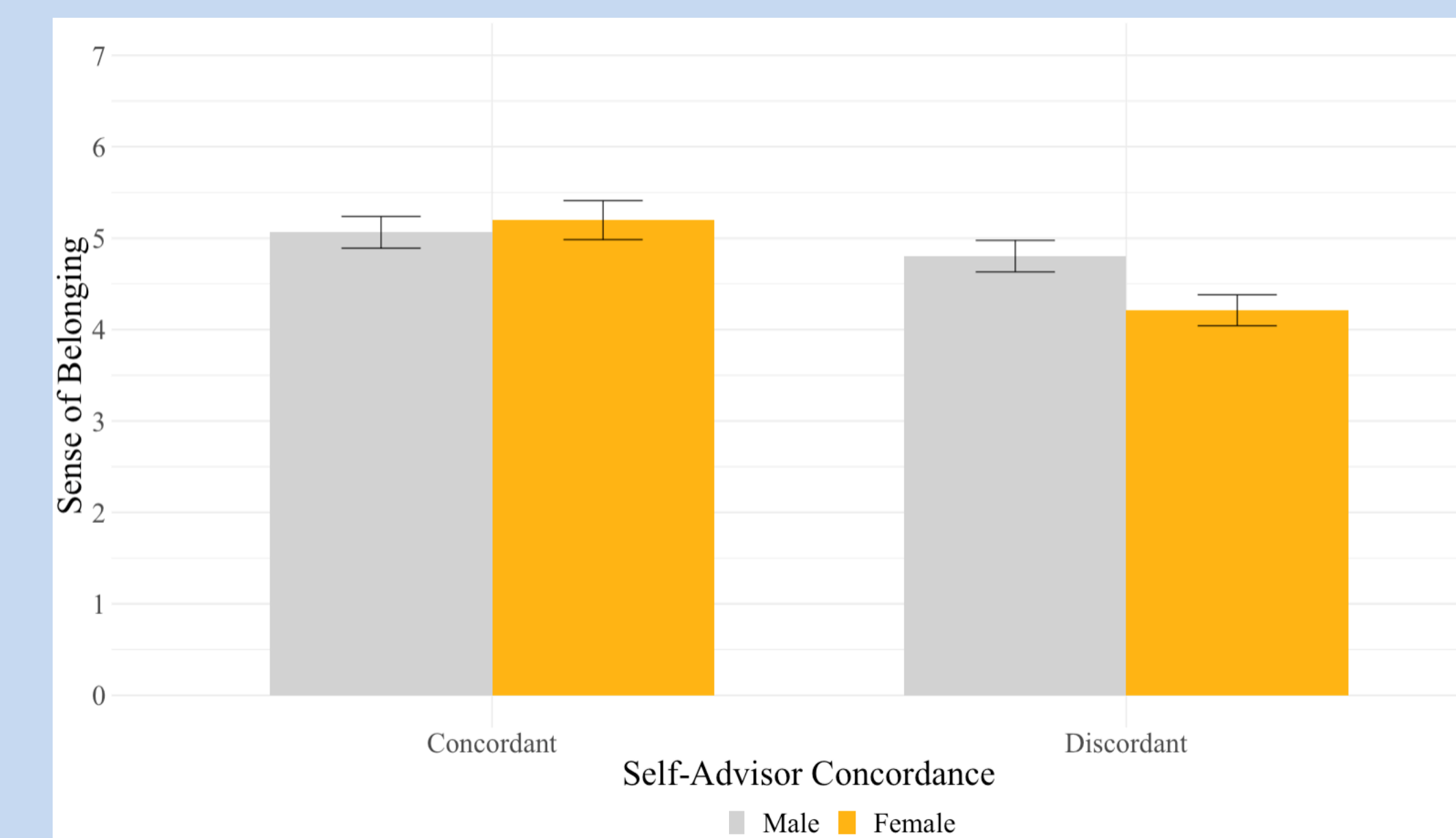
Participants' Perceived Self and Advisors' Career Preferences

		Non-Academic	Teaching	Research	Total	χ^2
		%	%	%	n	
Self Preference	URM	45.7	20	34.3	70	$\chi^2 (2) = .003, p = .99$
	Non-URM	45.5	20.3	34.1	123	
Perceived Advisor's Preference	URM	10.5	10.5	78.9	57	$\chi^2 (2) = 2, p = .368$
	Non-URM	15.6	5.5	78.9	109	
Self Preference	Male	48.9	13.3	37.8	90	$\chi^2 (4) = 6.44, p = .168$
	Female	42.2	27.5	30.4	102	
Perceived Advisor's Preference	Male	13	5.2	81.8	77	$\chi^2 (4) = 6.3, p = .177$
	Female	14.9	8	77	87	
Self Preference	First-Gen	40	26.2	33.8	65	$\chi^2 (2) = 2.517, p = .284$
	Continuing-Gen	48.8	17.1	34.1	129	
Perceived Advisor's Preference	First-Gen	12.7	12.7	74.5	55	$\chi^2 (2) = 3.714, p = .156$
	Continuing-Gen	14.4	4.5	81.1	111	
Self Preference	Pre-Advancement	43.2	21	35.8	81	$\chi^2 (4) = 2.624, p = .623$
	Candidates	46.4	20.5	33	112	
Perceived Advisor's Preference	Pre-Advancement	14.1	7	78.9	71	$\chi^2 (4) = .280, p = .991$
	Candidates	13.8	7.4	78.7	94	

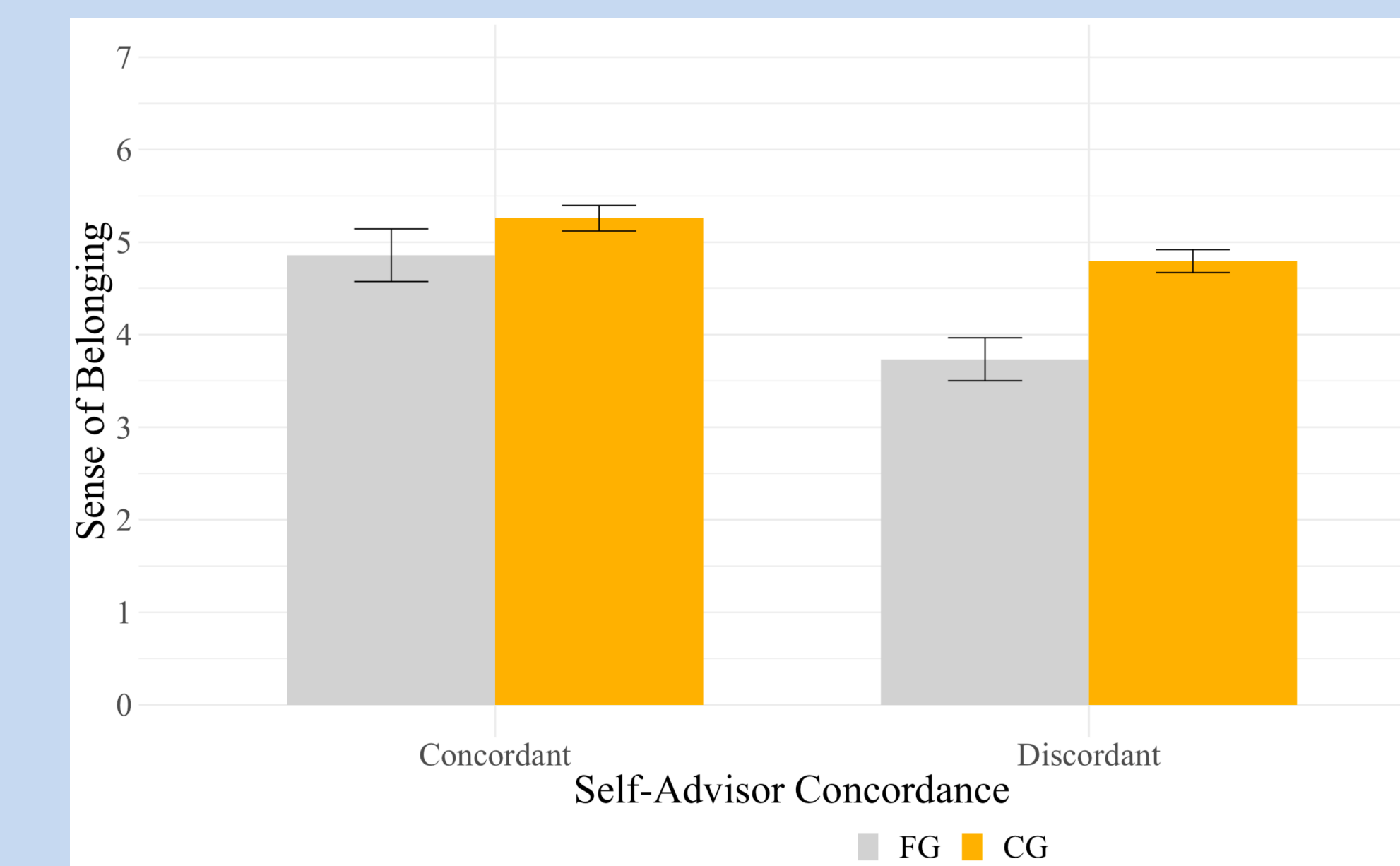
Perceived discordance between personal career goals and advisor's goals was associated with less feelings of belonging in department.



- ✧ Concordance: $F(1, 162) = 14.17, p < .001$
- ✧ URM Status: $F(1, 162) = 11.68, p < .001$
- ✧ Interaction: $F(1, 162) = .04, p = .83$



- ✧ Concordance: $F(1, 160) = 12.21, p < .001$
- ✧ Gender: $F(2, 160) = 2.96, p = .08$
- ✧ Interaction: $F(2, 160) = 3.88, p = .05$



- ✧ Concordance: $F(1, 160) = 15.53, p < .001$
- ✧ Gen-Status: $F(2, 160) = 15.75, p < .001$
- ✧ Interaction: $F(2, 160) = 3.22, p = .07$

DISCUSSION

- PhD students, regardless of their demographic characteristics, showed similar patterns in their career preferences, such that they preferred pursuing a non-academic position the most, followed by research-, and lastly, teaching-focused position.
- However, PhD students across groups had a general perception that faculty overwhelmingly prefer them to pursue research careers.
- URM (vs. Non-URM), first-generation college students(vs. continuing-generation college students) and females (vs. males) reported a lower sense of belonging in their program, but there was no difference in PhD students' advancement status.

STUDY 2: The next study focused on faculty perceptions of graduate students' career goals, compared to their own goals for them, as well as general career preferences for an ideal student to pursue. We examined whether the descriptive norms of what faculty actually prefer for their students are consistent with the perceived norms that students have about faculty. Correcting these discordant perceptions could lead to improved openness in communication between graduate students and their advisors, which may ultimately increase sense of belonging and facilitate attainment of PhD students' academic career goals.

References

- National Academies of Sciences, Engineering, and Medicine. (2018). *Graduate STEM Education for the 21st Century*. Washington, DC: The National Academies Press.

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