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Interest in study abroad among underrepresented students: Insights from the case of Japan

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Abstract

This feature article aims to unpack the varying levels of interest in studying abroad among male students in science fields, a group often overlooked in the existing literature. Building on earlier empirical work that analyzed survey data from Japanese students across all majors and genders, this study draws on a subset of that dataset to examine whether male students in science programs display distinct patterns of interest. Ordered logit models reveal a similar pattern with minor differences. As in the previous work, factors such as academic global experiences, career prospects, and anticipated benefits significantly increase the interest of men in STEM degrees. At the same time, barriers to studying abroad have no significant bearing on this group's level of interest, suggesting a positive outlook toward international learning when appropriate recruitment strategies are employed.

Keywords Japan; study abroad; male, STEM students; gender gap; global learning

1. Introduction

Data and empirical evidence from multiple countries and prior research on international education exhibit a clear pattern: women are more likely than men to engage in study abroad (Di Pietro, 2022a; Di Pietro, 2022b; Pruitt, 2021; Rosenbaum et al., 2025; Sponseller, 2021). Existing research has explained the gender gap for two primary reasons. The first is differences in particular ways of thinking about culture and diversity. Studies show that women are more likely to be interested in cultural understanding, which increases the likelihood of their going abroad or intending to (Miller, 2017; Stroud, 2010; Vernon et al., 2017). Previous studies also suggest that the gender gap is partly explained by differences in students' choice of majors. Women are more frequently represented in the humanities, social sciences, and languages—fields where intercultural understanding is often emphasized in the curriculum. Men are more commonly found in STEM disciplines, where stricter program requirements tend to limit opportunities for international experiences (Loberg, 2012; Sponseller, 2021; Stroud, 2010; Walker, 2015).

This trend, of course, does not mean that male students especially in STEM fields lack interest in study abroad. In fact, some studies point out that surveys used in research tend to disproportionately include students who are already interested in studying abroad (Sponseller, 2021). The surveys are also often conducted in cultural and language learning classes, which leads to a higher proportion of female participants (Rosenbaum et al., 2025). As a result, the voices of male students, especially those in the science fields, may not be as fully captured as those of female students. To address this concern, Rosenbaum et al. (2025) conducted an empirical analysis using survey data from over 640 Japanese students across various majors and showed the complex reality behind the differing levels of interest in studying abroad. They found that most male respondents appeared to have a certain level of interest, although empirical evidence indicates that female students were more likely to report the highest level of interest, while male students were more likely than female students to report little or no interest. Miller's work (2017), based on a male focus group in the United States, also highlights the variation in men's attitudes toward studying abroad. Some are interested, while others cite reasons for not participating, such as already receiving intercultural experience at home or being committed to study, sports, family, and friends.

This feature article aims to investigate the level of interest in studying abroad among male STEM students, a group underrepresented in existing research. Using a subset of Japanese student data developed by Rosenbaum et al. (2025), it examines factors influencing their interest and considers whether their patterns differ from those observed in studies that include female students and other majors. Ultimately, this paper seeks to offer suggestions, where appropriate, for recruitment and programs tailored to students who are less emphasized in study abroad research.

2. Research Design

According to Rosenbaum et al. (2025), the dataset was developed in the summer of 2023, when they surveyed over 640 students at a Japanese university regarding their interests in study abroad programs as well as intercultural programs on campus. The survey also collected information on gender, major, academic status, previous global experience, future career prospects, expected benefits, and concerns about studying abroad. [1] Participants were recruited through email invitations and classroom visits with approval. In total, the original dataset included 20 students from the School of Agricultural Science, 358 from the School of Engineering, 5 from the School of Medicine, 22 from the School of Science, 9 from the School of Informatics, 25 from the School of Economics, 25 from the School of Law, 159 from the School of Education and Human Development, and 39 from the School of Humanities. Among the respondents, there were 170 freshmen, 205 sophomores, 230 juniors, 30 seniors, and 27 students above the senior level. This research uses a subset of the dataset focusing on male students in STEM fields, who tend to be underrepresented in studies that often rely on small survey samples.

The dependent variable for this analysis represents students' level of interest in studying abroad. The values range from 1 to 4, where 1 = not at all interested, 2 = somewhat uninterested, 3 = somewhat interested, and 4 = very much interested. Approximately 13% of male students in STEM fields reported being not at all interested (=1), and 25% of them reported that they are somewhat uninterested (=2). About 40% of students indicated some level of interest in study abroad programs (=3), and 22% of students reported the highest level of interest in such learning (=4). The analysis then incorporates various independent variables, such as students' past experience, expected benefits, and concerns about studying abroad, to examine which factors influence the varying level of interest among this group of students.

Prior research suggests that exposure to global experiences, whether gained abroad or within one's home country, plays an important role in shaping students' interest in global learning and their eventual choices regarding study abroad (Di Pietro, 2022; Hansen & Loucky, 2010; Pruitt, 2021; Walker, 2015). To capture this dimension, the analysis incorporates three explanatory variables representing whether students have 1) lived or traveled overseas, 2) participated in a conventional study abroad program, and 3) taken part in intercultural exchange activities within Japan. Each of these variables is coded dichotomously, with 0 indicating no experience and indicating prior experience.

Students' expectations for the future also influence their outlook. Research has shown that many students perceive study abroad as a "worthwhile investment" that can open up career opportunities (Hansen and Loucky, 2010, p.40). In the Japanese context, the growing demand for graduates with foreign language abilities has further elevated the importance of study abroad and other intercultural opportunities among college students (Rosenbaum, 2024; Howard, 2014). To capture this factor, the analysis includes a "career prospect" variable measured on a four-point scale. A score of 4 indicates that students regard study abroad as "very important" for their career after graduation, whereas values of 3, 2, and 1 represent "somewhat important," "somewhat unimportant," and "not at all important." Both the experience-based measures and the future-oriented variable are expected to be positively associated with students' interest in study abroad and intercultural exchange. In Rosenbaum et al.'s (2025) analysis of students across all genders and majors, the career prospect variable especially emerged as one of the most influential factors increasing interest in studying abroad.

The analysis includes several measures of barriers to studying abroad as well as expected benefits. Since these factors have been central to academic discussions of students' decisions about overseas learning, the study employs multiple variables to examine how students weigh the costs and benefits when forming their interest in global learning. The existing literature argues that barriers are among the most critical influences shaping students' willingness to participate (Nowlan & Wang 2018; Rosenbaum et al., 2025; Walker, 2015). If these obstacles are not overcome, students are unlikely to proceed in considering overseas programs (Loberg, 2012). Such barriers range from financial costs, curriculum constraints, fears of delayed graduation, separation anxiety, and insufficient information, to perceptions that studying abroad is not essential. Rosenbaum et al.'s original data also highlights the wide range of concerns expressed by Japanese students. Among the 95% of respondents who reported at least one concern, the most common was financial burden (n = 568). Other frequently cited issues were lack of confidence in foreign language ability (n = 388), tight schedules (n = 380), lengthy procedures (n = 308), insufficient knowledge about available programs (n = 248), curriculum restrictions (n = 238), and safety concerns (n = 225). Their empirical test confirmed that the greater the number of concerns students held, the lower their interest in studying abroad. This analysis follows that approach and uses the number of concerns expressed by respondents to represent the scale of barriers to studying abroad. In addition, a dichotomous variable is tested to assess whether students specifically reported financial concerns.

A set of independent variables is included to reflect the anticipated benefits of studying abroad, another element emphasized in earlier research (Iwaki, 2020; Rosenbaum et al., 2025; Sponseller, 2021; Walker, 2015). Like barriers, anticipated benefits can be diverse. These include opportunities for personal growth, developing or improving foreign language skills, cultivating cross-cultural interests, stepping away from the home environment, career advancement, gaining independence, and leisure (Sponseller, 2021). In Rosenbaum et al.'s

[1] In their original survey (Rosenbaum et al., 2025), students were given four options to choose from (male, female, other, or prefer not to answer). From the completed surveys, 414 students identified as male, 239 as female, and 9 selected "prefer not to answer." For consistency with prior research that relies on gender or sex as a binary measure, they developed a new variable that excluded the "prefer not to answer" category.

survey, Japanese students also reported a wide range of anticipated benefits, including earning academic credit (n = 459), interacting with local peers (n = 406), improving foreign language proficiency (n = 353), attending research conferences or gaining research opportunities (n = 349), securing internships or career-related experiences (n = 336), and exploring different cultures and histories (n = 316). Based on these responses, the authors generated a variable counting the number of benefits each student expected. They also created a specific measure for the most frequently cited benefit—earning credit hours—to determine whether it independently affected interest levels. Their analysis of all majors and both male and female students showed that the greater the number of benefits, the higher the likelihood of interest in studying abroad. However, the most cited anticipated benefit (earning academic credits) alone did not influence interest levels. Building on this framework, this study not only tests these variables but also introduces two additional measures to further examine the impact of anticipated benefits on men in STEM: one indicates whether students view improving foreign language skills as a benefit (yes or no), and the other, measured on a four-point scale, captures the length of time they would ideally like to study abroad (1 = within two weeks, 2 = three weeks to one month, 3 = a semester or two to three months, 4 = more than half a year).

3. Results and Discussion

Table 1 presents the results of two ordered logit models estimating the effects of independent variables on the varying levels of interest in studying abroad among male STEM students. [2] Model 1 examines the effects of students' prior experiences, career prospects, specific anticipated benefits, and the most commonly cited concern. Model 2 instead evaluates the overall impact of anticipated benefits and concerns by using variables that count the total number of benefits or concerns expressed by each respondent.

Table 1. Ordered Logit Model Results

Variables	Model 1	Model 2
Prior Experience Overseas	-.06	.06
	(.24)	(.23)
Prior Study Abroad Experience	1.25**	1.08**
	(.35)	(.36)
Prior Activity on Campus	1.36**	1.23**
	.26	.25
Career Prospect	1.78**	1.74**
	.18	.18
Financial Concern	-.55	
	(.50)	
Anticipated Benefits: Language Skill	.49*	
	(.23)	
Anticipated Benefits: Academic Credit	-.06	
	(.11)	
Desired Length of Study Abroad	.49**	
	.11	
The Number of Anticipated Benefits		.21**
		(.06)
The Number of Concerns		-1.11
		(.06)
Observations	317	330
Pseudo R-squared	.25	.24

Standard errors in parentheses: **p<.01, * p<.05

Regarding experience, the estimated coefficients for students' prior study abroad and campus-based intercultural activities are positive and statistically significant at the 99% confidence level in both models. In contrast, the coefficient for general overseas experience (e.g., family trips) is not statistically significant in either Model 1 or Model 2. This indicates that international academic experiences, rather than general exposure abroad, are the factors that cultivate students' interest in study abroad. Both models also show that students' perceptions of global learning in relation to their future careers are positive and significant at the 99% level. When students view global experience as an important part of career development, male STEM students are more likely to show interest in study abroad programs.

The estimated coefficient for financial concern is not statistically significant, nor is the estimated coefficient for the anticipated benefit of earning academic credit. By contrast, the anticipated benefit of improving language skills is positive and significant at the 95% level, and

[2] The Brant test and chi-square statistic showed no violation of the proportional odds assumptions in these models.

desired program length is positive and significant at the 99% level. These findings suggest that, for male STEM students, anticipated benefits matter more than financial concerns when shaping interest in studying abroad, although cost may resurface as a factor when they ultimately decide whether to participate. While academic credit carries little weight, opportunities for language skill development and longer programs are especially valued, suggesting that students are willing to extend their academic timelines if provided meaningful opportunities abroad. Model 2 further supports this conclusion. The estimated coefficient for the number of anticipated benefits is positive and significant at the 99% level, while the coefficient for the number of concerns is not significant at either the 95% or 99% level. This indicates that recognizing more benefits strengthens students' interest in studying abroad, while noting more barriers does little to diminish it.

To understand the magnitude of these effects, it is useful to examine the predicted probabilities. Figures from both models illustrate how these probabilities change depending on the values of the independent variables. Figure 1 shows predicted probabilities by prior study abroad experience, while Figure 2 shows them by campus-based intercultural activity. Figure 3 depicts probabilities by career perceptions, and Figure 4 illustrates them by desired program length. These figures are derived from Model 1. Figure 5, based on Model 2, displays predicted probabilities by the number of anticipated benefits. In all figures, the Y-axis represents predicted probabilities, and the X-axis shows values of the independent variables.

The probability analysis highlights several key patterns. First, male STEM students with prior study abroad or campus-based intercultural experiences are less likely to be uninterested and more likely to express strong interest compared to peers without such experiences. The probability of being only somewhat interested is similar across groups, but the contrast is greatest at the high and low ends, indicating that prior exposure shifts students from disinterest toward enthusiasm. Second, students' career perceptions demonstrate a particularly strong influence. As Figure 3 shows, when global learning is seen as having little or no career value, strong interest nearly disappears, and disinterest rises sharply. By contrast, when it is seen as career-relevant, strong interest increases significantly. Third, preferred program duration also shapes interest. Figure 4 indicates that while being somewhat interested is the most common response across all durations, students who consider one- to two-month or longer-than-six-month programs are more likely to express strong interest compared to those preferring very short stays. Finally, anticipated benefits further differentiate interest. Figure 5 shows that when students see no benefits, interest levels cluster around "somewhat interested," with low probabilities of strong enthusiasm. In contrast, when multiple benefits are anticipated, strong interest rises sharply while disinterest becomes rare. This suggests that expectations of concrete academic or personal gains play a pivotal role in boosting enthusiasm for study abroad.

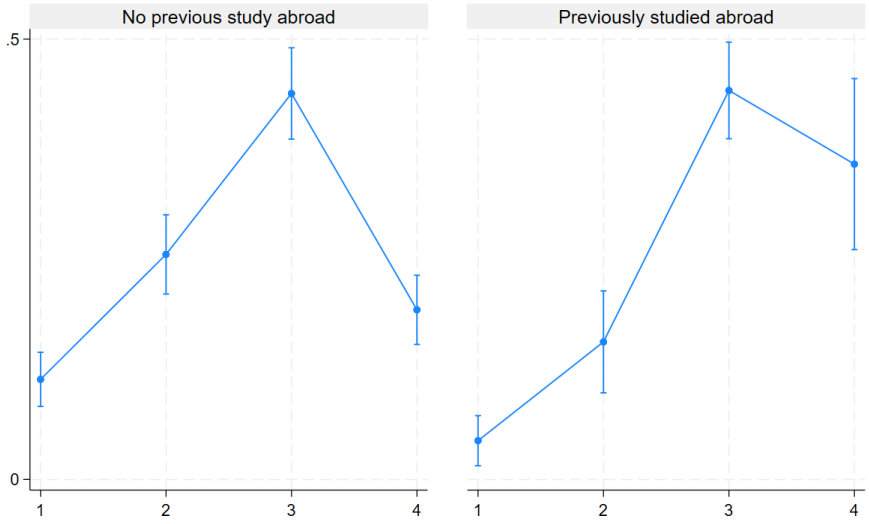

Figure 1. Predicted probabilities based on study abroad experience

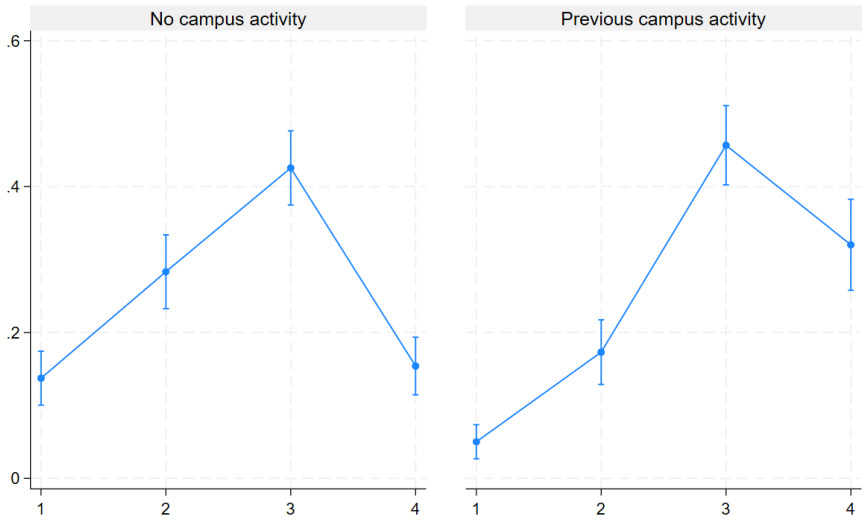

Figure 2. Predicted probabilities based on campus activity

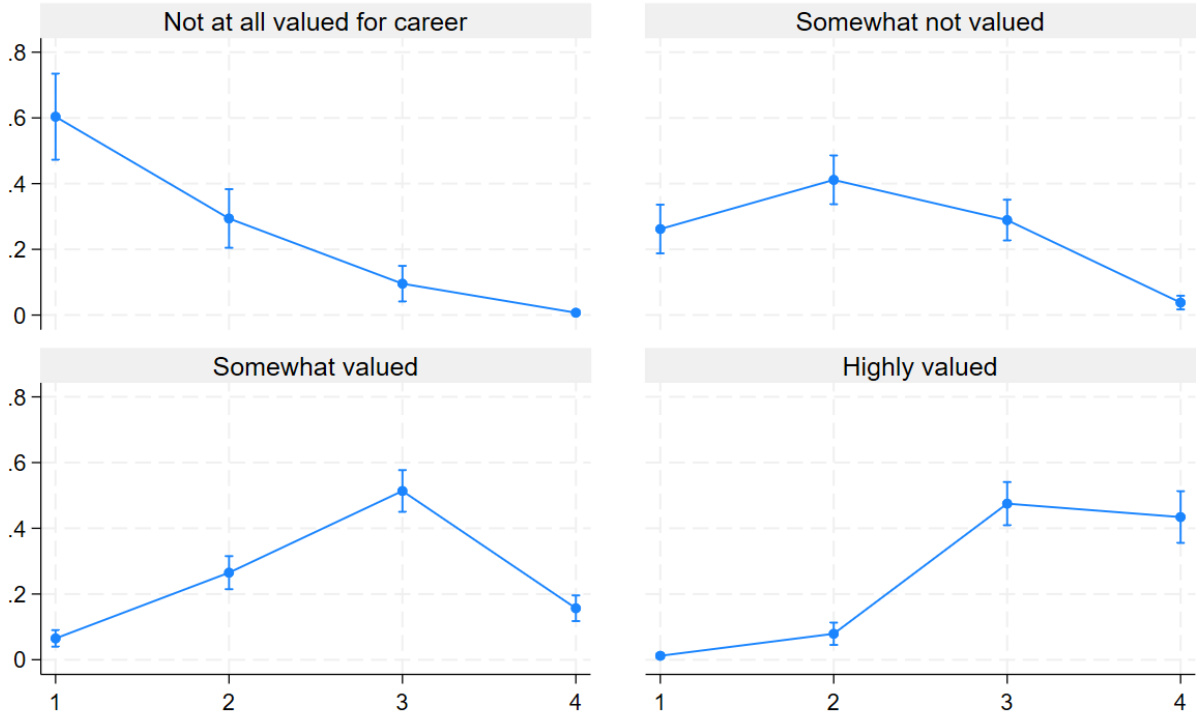

Figure 3. Predicted probabilities based on students' perception of global learning in career

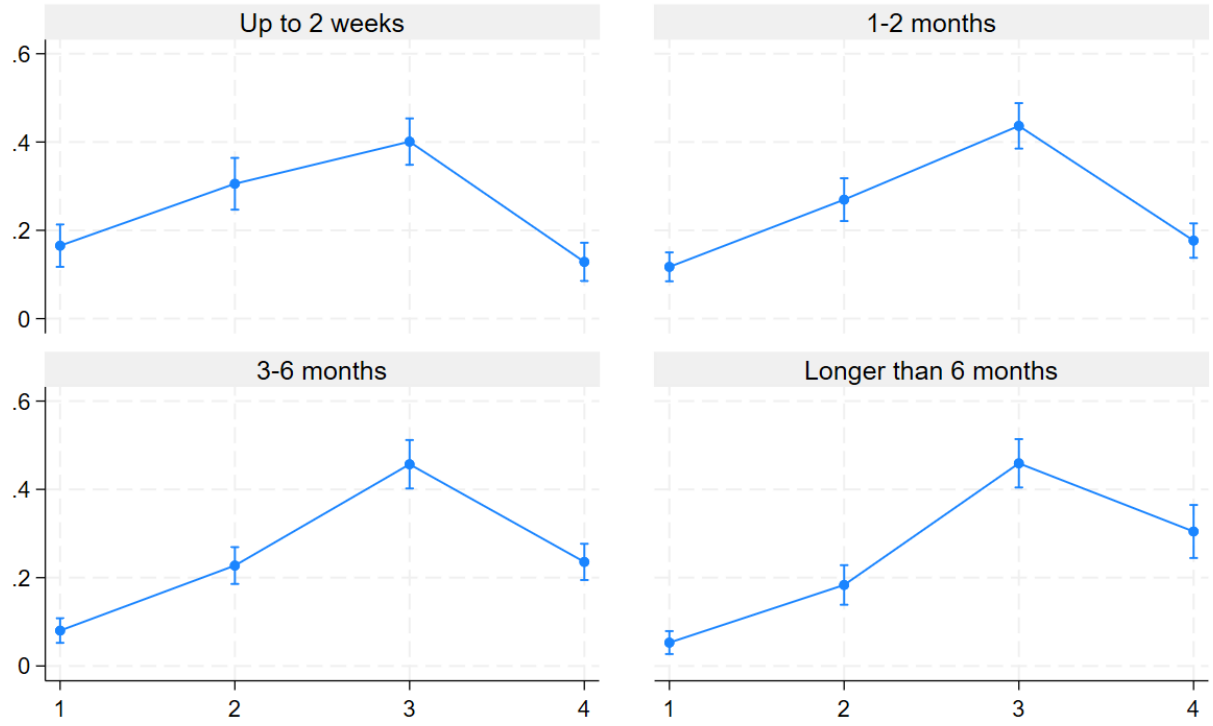

Figure 4. Predicted probabilities based on students' desired length of learning abroad

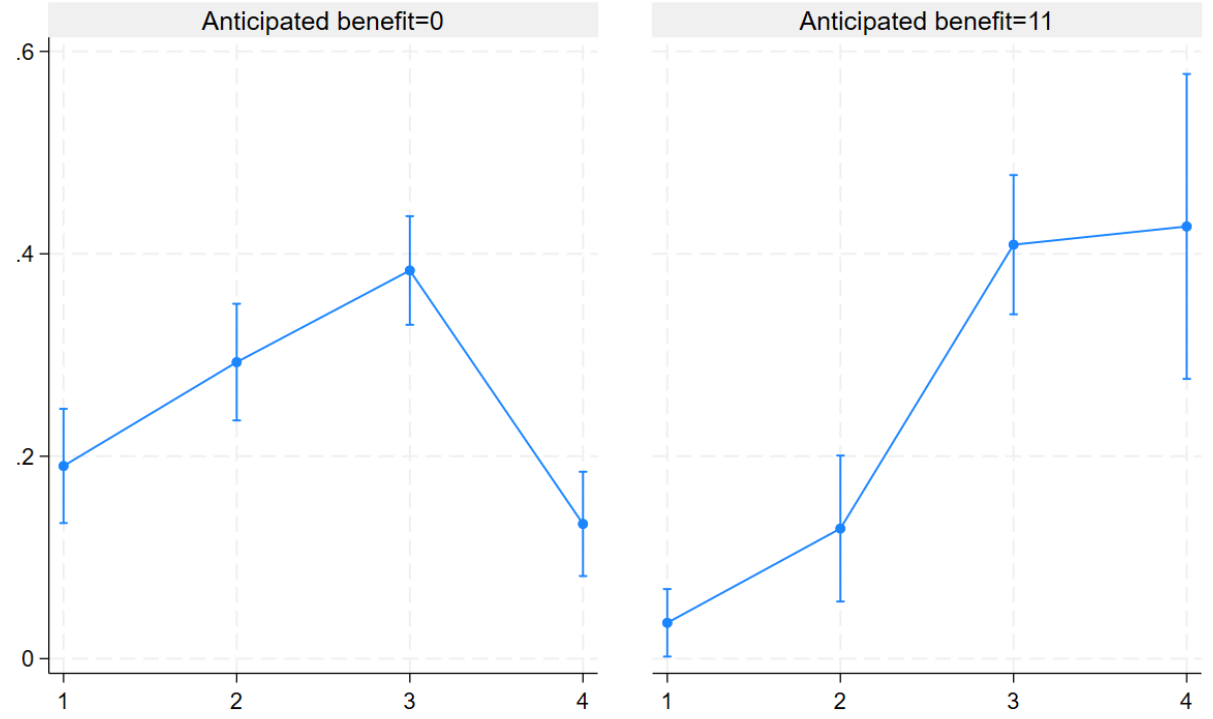

Figure 5. Predicted probabilities based on the number of anticipated benefits

The final and most important question is whether these findings about male science students differ from those identified in the broader sample of students which included both women and men across all majors. In terms of prior experience, the findings are consistent with those from the general sample: general overseas experience does not significantly affect interest, while specific academic experiences, such as studying abroad or participation in campus-based intercultural exchange, are associated with varying levels of interest. Career prospects also play an important role for both the overall group and the subset of male science students. The critical difference, however, lies in how barriers are perceived. In the general study, obstacles to studying abroad emerged as some of the most influential factors reducing interest. By contrast, in the STEM male subsample, concerns about barriers are not

statistically significant, whereas anticipated benefits are highly influential in shaping their interest. This suggests that, for male science students, expectations of concrete gains are more decisive than worries about potential difficulties in determining their enthusiasm for global learning.

4. Concluding Remarks

This article has highlighted the factors shaping male STEM students' interest in study abroad, a group often underrepresented in existing research. The analysis shows that anticipated benefits—particularly language development, program length, and career prospects—carry greater weight than perceived barriers in shaping interest for this group. Unlike the broader student sample that included women and all majors, where financial concerns and other obstacles were influential even in the initial stage of interest formation, male STEM students show little sensitivity to such barriers at the outset. Their attraction to global learning is driven primarily by expectations of concrete academic and professional gains.

These findings suggest several directions for practice. Efforts to recruit male STEM students into study abroad programs may be most effective when they emphasize tangible benefits, such as language skill development, research opportunities, and career advancement, rather than framing programs primarily as cultural experiences. Highlighting how global learning fits into career trajectories, offering flexible program lengths that align with students' academic schedules, and providing on-campus intercultural opportunities as entry points can also help build stronger interest. By focusing on the benefits that resonate most with male science students, institutions can broaden participation and ensure that global learning opportunities are accessible to a wider range of students.

This study is not without limitations. While the purpose of this feature article was to highlight a particular perspective as a follow-up to the broader data analysis—and it has done so—drawing on survey data from a single Japanese university inevitably limits the generalizability of the findings. Cross-national studies suggest similar patterns, yet subtle differences and nuances may well stem from the cultural and academic environments of students in specific countries.

Another limitation is that the analysis focuses on stated interests rather than actual participation. Future research could investigate how these expressed interests translate into concrete decisions to study abroad. Cost considerations, which appear less influential at the initial stage of interest formation, may resurface once male students in the science fields move from curiosity to actual commitment. At that point, strategies addressing financial concerns and practical feasibility become especially critical.

Finally, although this study provides important insights into male STEM students, it does not fully capture the diversity within STEM disciplines or across different institutional settings. Future work could explore these dimensions in more detail to deepen our understanding of how student backgrounds shape interest in global learning opportunities.

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Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.