Tailoring DEIA Programming through Current Field Analysis: Promoting Allyship in STEM of University Graduate Students

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Abstract

Although the fields of Science, Technology, Engineering, and Mathematics (STEM) have seen increased diversity over the last decade, there remains a significant disparity of representation across race, gender, ethnicity, sexual orientation, and more. Achieving diversity within STEM requires more than an increase in numerical representation: it must foster a sense of belonging and inclusivity for marginalized demographics. Allies in STEM (AiS), a graduate student-led organization at the University of Illinois Urbana-Champaign (UIUC), designs and hosts educational workshop programming to accomplish its mission to promote allyship and foster inclusivity within the STEM. AiS recognizes allyship, defined as active support and advocacy by individuals – particularly those with privilege – for marginalized groups, as a critical tool in reducing discrimination and promoting equity. Concurrently, AiS understands the importance of developing effective diversity, equity, inclusion, and accessibility (DEIA) programming to create concrete, demographic-specific strategies for allyship as informed by existing research within the literature. This process involves addressing the unique challenges faced by individuals within specific marginalized groups through tailored programming to meet their specific needs. This paper explores and measures areas where allyship is needed within STEM through assessing discrimination experiences and opinions on inclusivity to guide future AiS targeted programming. The mixed-methods approach employed by the authors includes quantitative methods, such as Likert scale measurements, and qualitative methods, including thematic coding through reflexive thematic analysis (RTA). Results show that study participants who have personally experienced or witnessed discrimination within their place of work or during any formal education within STEM based on a specific demographic category are more likely to perceive that group as very discriminated against, highlighting the importance of personal experiences on perceptions of STEM inclusivity. Additionally, the results identify that study participants perceive their current academic institutions or places of employment as more inclusive than the STEM field as a whole. The findings of this study provide insights into the current climate of inclusivity and discrimination within STEM, particularly at UIUC, that will inform the development of effective workshops for AiS programming. AiS can enhance awareness and understanding of systematic issues beyond individual experiences through allyship tailored for the overrepresented groups attending its programming. Furthermore, this study provides a guide for other graduate-led STEM DEIA programs at other academic institutions to develop effective targeted programming.

1. Introduction

1.1 Existing demographics of STEM

Historically and currently, science, technology, engineering, and mathematics (STEM) fields have been characterized by a lack of diversity, with limited representation from various demographic groups [1-6]. Although the workforce has become more diverse in recent years,

there are still significant disparities in the representation of women, racial minorities, and other historically underrepresented demographics [2,7-9]. Within the US, the dominance of White men in STEM flourished due to legal barriers that prevented access for other groups until the 1960s [2,7-9]. This domination has been institutionalized through a range of laws and social orders that facilitate the systematic prevention of historically marginalized groups from gaining access to institutions of higher education [8,10-11].

In 2021, 34.9 million individuals were employed within the STEM field, representing 24% of the total workforce of the United States [12]. Moreover, 29% of men in the total workforce were employed within the STEM field in comparison to 18% of women in the total workforce [12]. Although women earned half of science and engineering degrees in 2021, they remained underrepresented in STEM at around one third (35%) and consistently face lower wages than men [12-13]. Despite this, women in the STEM doctoral academic workforce more than doubled between 1997 and 2019 [13]. Within STEM, women were better represented in health care and social sciences but less so in physical sciences, computer and mathematical sciences, and engineering [13].

When identifying racial demographic information of the STEM workforce, in 2021 Asian workers had the highest representation at 39%, while Black workers were the least represented at 18% [13]. Underrepresented racial and ethnic minorities, including Hispanic, Black, American Indian, and Alaska Native individuals, in total made up 24% of the STEM workforce, with a higher concentration in roles requiring technical skills or certification rather than formal higher education [12]. Additionally, this group encountered lower median earnings compared to White or Asian STEM workers [12]. Unemployment rates in 2021 were higher for Black and Hispanic STEM workers than for White and Asian workers [12]. The number and proportion of STEM degrees earned by American Indian and Alaska Native students declined between 2011 and 2020 along with their representation in the STEM field [12]. Between 2011 and 2021, the STEM workforce experienced a 20% overall expansion, with notable increases of 31% for women and 2 million for Hispanic workers [12].

In 2019, immigrants constituted almost one-fourth of all STEM workers in the U.S., marking a 17% increase since 2010 [13-14]. Most H-1B visas issued for STEM-related roles are issued to those originating from India (28.9%) and China (10.9%) [13]. Of the top ten most represented birth places of immigrant STEM workers, seven are within Asia (India, China, Vietnam, Philippines, South Korea, Taiwan, and Pakistan), two are in North America (Mexico and Canada), with the remaining country being Russia (identifies as both Asian and European) marking a substantial proportion of foreign-born workers within STEM hailing from Asian or White backgrounds [13-14]. Immigrant STEM workers with a bachelor's degree or higher are more prevalent than those without [13]. Moreover, the expected stay rates of noncitizen STEM doctorate recipients planning to remain in the U.S. after graduation remained consistently high, especially among students from China and India [13].

In 2021, approximately 3% of the total workforce identified as having at least one disability, encompassing both physical and cognitive disabilities [12]. Of those in the workforce who identify as having at least one disability, 21% are employed in STEM fields [12]. Furthermore,

11% of science and engineering doctorate recipients in 2021 reported having at least one disability [12].

The representation of LGBTQ individuals in the STEM field is hindered by various challenges, leading to their underrepresentation and departure [15]. Limited data on sexual orientation and gender identity has restricted the understanding of their experiences [15]. Studies suggest that LGBTQ individuals are less prevalent in STEM, with significant numbers leaving the workforce [15-16]. Negative workplace experiences, including exclusion and discomfort, are prominent factors contributing to their departure [15-16]. Studies reveal that queer sexual, romantic, and related orientations in STEM were 7% less likely to persist compared to their heterosexual peers, although they were more engaged in undergraduate research programs [15-16]. This information emphasizes the need to incorporate sexual orientation and gender identity data in federal surveys and implement inclusive measures in STEM institutions to address disparities effectively [15].

The representation of religious individuals in the STEM field is relatively low, with significant disparities between their proportion in the general population and their presence in scientific professions [17-19]. The research indicates that scientists are generally less religious than the overall population, with notable underrepresentation of certain Christian denominations, particularly evangelical Protestants and traditional Catholics [17-19]. Conversely, religious minorities such as Muslims, Hindus, Jews, and Buddhists are overrepresented in STEM compared to their numbers in the general population [19]. The perception of tension between faith and science within certain religious communities, especially among evangelical Christians, may contribute to the challenges faced by religious individuals in STEM [18].
Stereotype threats and feelings of conflict between religion and science can negatively affect the performance and retention of Christian students in STEM fields [17-18].

Diversifying STEM environments creates more positive workspaces and leverages cognitive differences, including neurodiversity, which can boost performance, innovation, and creativity [20-22]. Beyond traditional classrooms, diverse learning environments offer valuable lessons to students to bring with them into the workforce [22]. Additionally, diversity in STEM strengthens national security, the economy, and scientific achievements [6, 23-25]. Despite this progress, it is crucial to recognize that achieving demographic inclusion involves more than just increasing numbers.

1.2 DEIA and allyship

True inclusion in STEM requires addressing barriers that have historically hindered the participation of underrepresented individuals [26-30]. This process begins with an emphasis on fostering a sense of belonging [26-27]. In addition to gender and race, we now understand that marginalization affects various identity dimensions, including non-heterosexual orientation, pregnancy, family caregiving, religion, age, cognitive and physical disabilities, and immigrant status, within the STEM fields [31-39]. Addressing institutional biases and barriers, developing academic intervention strategies, and addressing academic achievement gaps among diverse groups in STEM education may ultimately increase underrepresented individuals' persistence and representation in STEM careers by reducing attrition [2, 34, 40-41].

Diversity, Equity, Inclusion, and Accessibility (DEIA) programs are essential in promoting inclusivity [23, 29-30, 38, 42]. Effective DEIA programs take a tailored approach that considers the specific needs of different demographic groups [23, 30, 32]. Standardized, generic programs may fall short and fail to accommodate the unique challenges faced by various underrepresented populations [20, 29, 31, 43]. To create effective strategies for increasing diversity in STEM, DEIA programs must gather data on the demographics and culture of their organizations, using information from climate and demographic surveys [32, 43-47]. When planning DEIA initiatives, it is essential to involve insights from all underrepresented groups to ensure that the programs reduce barriers rather than perpetuate them [3, 35, 46, 48]. Graduate student-led DEIA initiatives have been particularly successful in creating more inclusive academic environments [49-55]. These programs empower graduate students to advocate for underrepresented groups, foster a sense of belonging, and address systemic inequities [56-57]. By taking the lead in these initiatives, graduate students can contribute to a more welcoming and equitable atmosphere, resulting in higher retention rates and increased representation for more robust and diverse academic communities [50-51, 56-57].

Allyship, defined as active support and advocacy by individuals, particularly those with privilege, for marginalized groups, is a critical tool in social justice movements [58-61]. While it has gained prominence, there are concerns that some forms of allyship may be performative rather than substantive [58]. Some advocate for replacing the term with "operating in solidarity with" to emphasize ongoing, accountable action [58]. To be effective, allyship necessitates continuous self-reflection, an understanding of privilege, and active efforts to dismantle oppressive systems [58, 62-65]. Allyship has garnered increased attention in discussions on inequality and social justice [58, 64, 66]. It has evolved to include its application as a tool for promoting diversity, equity, inclusion, and accessibility in various contexts, from workplaces to higher education institutions [52, 61, 67].

In practice, allyship can help foster inclusive environments and reduce discrimination [67-68]. It can create a culture of respect, understanding, and belonging, especially when those in positions of power actively support marginalized groups and advocate for their rights [67, 69]. Allyship interventions by leaders can serve as models for appropriate behavior and signal to others that discriminatory actions are not acceptable [67, 70]. The overall effect is to transform institutional culture, promoting positive and supportive atmospheres that enhance the well-being of communities [67, 70].

Effective allyship training programs are instrumental in reducing discrimination and promoting inclusion [67, 69, 71-72]. These programs encourage individuals from outside the targeted historically underrepresented group to adopt the role of an ally and actively participate in creating inclusive environments [69, 73-74]. This involves proactive strategies, such as providing opportunities for marginalized individuals and advocating for relevant policies [69, 72]. Organizations that align with principles of corporate social responsibility signal their commitment to social justice and responsible behavior, enhancing their image and reputation [69, 71-72]. Critical allyship moves beyond individual interactions and seeks to drive systemic change [60-61, 70]. It encourages individuals to analyze power structures within institutions and work towards dismantling discriminatory systems [60, 72, 75]. The approach includes proactive

efforts to identify and mitigate biases, fostering structural changes that result in more inclusive environments [60-61, 73, 75].

Allyship, whether at the individual or systemic level, is a powerful tool for reducing discrimination and promoting inclusion. It encourages a proactive approach to creating a culture of respect, understanding, and support for marginalized individuals, ultimately contributing to a more equitable and inclusive society. To adapt to the evolving needs of STEM communities and academic institutions, DEIA programs must consistently collect data, assess program effectiveness, and prioritize DEIA education for STEM graduate students [23, 31, 44, 46, 76]. Graduate student-led initiatives, rooted in the spirit of allyship, have proven to be successful in promoting DEIA within STEM programs, and this approach can also be effective for STEM academic faculty in advancing inclusion [49, 52-55].

1.3. Allies in STEM

Allies in STEM (AiS) began as a grassroots initiative among graduate students at University of Illinois at Urbana-Champaign (UIUC) to promote DEIA initiatives through allyship education. The original organizers established programming that consisted of six virtual workshops targeted at UIUC graduate students utilizing personal stories from minority leaders and educational tools from DEIA professionals in Spring 2020. The topics chosen for the first year's programming included a graduate student experience panel, the interconnectedness of the Black Lives Matter (BLM) movement and STEM; a lesson on personal advocacy; allyship through everyday actions; conflict resolution techniques; and a panel of professionals in academia, industry, and government on allyship throughout one's career. The introductory programming mostly consisted of broad tactics for allyship without discussing specific areas of discrimination. Additionally, the original members represented a broad range of registered student organizations (RSOs) on UIUC's campus to include Graduate Society of Women Engineers; Graduate Engineers Diversifying Illinois; National Society of Black Engineers; Society for the Advancement of Hispanics, Chicanos, and Native Americans in Science; Out in Science, Tech, Engineering, and Math; Society of Hispanic Professional Engineers; and the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers.

Since AiS's founding, the original members of the program have either graduated from the institution or no longer had the capacity to contribute towards the program. Those who were recruited to continue lead the program were not representative of the campus. In Fall 2022, the next round of programming occurred: also consisting of six presentations, but now offered in a hybrid format. The next round of programming included discussions on graduate workers' rights, anti-Asian racism in academia, invisible disabilities, cultural barriers for first-generation college students, advancement of LGBTQ students, and the intersectional identities of being an engineer and a member of a racially marginalized group. The selection of topics for this second round of workshops was predicated more on the organizers' preferences than on an assessment of the broader needs within the wider UIUC community. This poses an issue and can lead to a misalignment between the topics chosen and the community's actual needs.

1.4 Preliminary Impact and Survey Motivation

Upon completion of the second round of workshops, members of AiS began an assessment of the program to determine the most effective activities for the third and final round of workshops. This assessment reviewed the strengths and weaknesses of the previous workshops using metrics such as attendance, attendant workshop opinion survey results, and speaker feedback. The second round of programming differed from the first most significantly by identifying allyship needs for specific communities rather than teaching allyship tactics that can broadly be utilized. This shift has been demonstrated to have significant impacts on the effectiveness of allyship training, as discussed previously. Post workshop surveys signified a positive correlation of learned skills with the demographic specific content of the second workshops. The survey formulated in this study systematically gathers demographically specific insights through comprehensive data collection, encompassing respondent demographic information alongside inquiries into inclusivity within the STEM domain and lived experiences of discrimination. This approach serves to highlight specific allyship needs within the surveyed population and, therefore, will guide our programming.

Topic selection influenced by organizers' preferences, to be knowledgeable regarding the specific needs of the entire UIUC community, relies on a diverse leadership board and existing support for underrepresented demographics within STEM. Seeing this challenge as unsustainable, AiS's leadership team determined the necessity of understanding individual perspectives within STEM. To accomplish this, it was determined that a type of climate survey would be necessary, one that included the current atmosphere at UIUC as well as career fields that graduate students will be entering.

Earlier in section 1.2, we discussed the need for specific, widespread allyship programming across underrepresented demographics. We now address the need for demographic-specific content through our implementation of a discrimination and inclusivity survey. To better identify the climate in which current graduate students at UIUC may face as they enter the workforce in industry or continue to be employed within academia – our team proposes a methodology to understand how discrimination impacts perceptions of inclusivity and ultimately retention in the STEM field. We hypothesize that there is a gap between individuals who have witnessed and/or experienced demographic-specific discrimination and how inclusive individuals perceive the STEM field towards that demographic group. This gap, therefore, will lead to less understanding of targeted discrimination against groups that are not highly representative within the STEM field. We contrast the need for demographic-specific content with the relatively small footprint an organization like AiS has on a large academic campus, as well as the overall STEM field.

This paper following this introduction section includes methodology, results, discussion and future work, and conclusion sections. The methodology section details the methods utilized by our research team to collect and analyze data. The results section outlines the preliminary results of the study. The discussion and future work section processes the preliminary results of the study and proposes future analysis. Finally, the conclusion will offer our recommendations for future AiS programming and summarize the previous sections.

2. Methods

2.1 Survey development and deployment

To measure the areas where allyship is most needed within STEM, our team is seeking to know who is currently facing the highest levels of discrimination. Despite the target audience of AiS programming being graduate students at UIUC, our team recognized the need to expand the participants of our study to encompass the environment graduate students at UIUC will enter after completing their programs, as well as, to garner input from those who may have been discouraged from engaging in or continuing to pursue academic pursuits or careers in STEM due to discrimination. Therefore, the study allows for anyone to participate if they are over the age of 18 years old and currently reside in the United States (US) or one of its territories. The reason participants are required to live in the US or its territories is due to the impact differing laws and regulations have on not only discrimination faced within STEM programs by members of different marginalized communities, but also their ability to pursue a STEM career or higher education degree or openly identify with being a member of certain marginalized groups without reprimand. This study acts as a type of climate survey of the reach of the AiS organization, illustrating how sections of UIUC's campus, alumni network, and affiliated professionals view the inclusivity of STEM.

Since our team is aiming for diverse responses from a wide pool of eligible participants, we tailored our study to be conducted virtually for increased accessibility. We utilized the website Qualtrics to host an online survey to conduct our study. The Qualtrics platform allowed our team to meet its goal of having a completely virtual study, as well as capitalize on logic features that allow for questions to be coded conditionally based on respondent answers to allow for only relevant questions to be asked to participants. For example, if a participant responds to a question stating they are currently within the STEM field, they will not be asked a question asking if discrimination deterred them from pursuing a career within STEM. Due to this feature, the number of questions asked per person is not the same for every participant. The range of the number of questions that survey respondents are prompted to ask, outside of demographic information, is from four to 11 questions. All participants are asked to complete 13 personal demographic questions. The survey was designed to be completed in under 15 minutes time. Due to the goal of keeping the survey as short as possible and the limited computational resources at the disposal of the authors, the survey, although subjectively valid and reliable, was not measured for its statistical validity and reliability. The survey was advertised across UIUC's campus and its alumni network through student groups and multiple institutional and alumni listservs, as well as digitally through social media platforms, such as LinkedIn.

The survey consists of questions regarding current employment or academic enrollment, experiences with discrimination, opinion regarding discrimination and inclusivity within STEM, and personal demographic information. All the questions were designed by the authors with the guidance provided within the literature and the intrinsic understanding of the AiS's program [23, 31-32, 43-47, 76]. The main questions for analysis by our team relate to experiences and witnessing of discrimination within STEM, and perceptions of STEM inclusivity. These questions are meant to guide AiS's mission of promoting allyship, and in turn foster inclusivity and reduce discrimination among UIUC graduate students within STEM. In addition to the overall results, the responses will be compared between participants within academia to those in industry, participants attending or working at UIUC to those who are not, participants within and not within STEM, and across other personal demographic categories. The demographic

information being collected from the participants include age, gender, sexuality, marital status, physical (dis)ability, cognitive (dis)ability, parental status - to include pregnancy, religion, nationality, race, ethnicity, and citizenship status.

Open-ended questions were also included throughout the survey to allow participants to expand on any question with an "Other" or "Not Listed" category. Additionally, reflective questions were included within various sections of the survey, such as, "please provide any additional comments you may have regarding allyship in STEM." Qualitative analysis provides the context our team requires across such a diverse survey group [77]. While it has been shown that individuals who identify as 'other' are more likely to complete optional open-ended questions [78], our team identified this trend as a strength to include qualitative analysis. These open-ended questions offer insight as to how respondents perceive and define various sections of the survey [77]. Additionally, they allow for more nuance, an important aspect when considering diversity-focused surveys that may encounter a multitude of social identities [77]. The complete survey can be found in Appendix A.

2.2 Survey analysis

Responses to the survey are compared and analyzed across a multitude of variables. Demographic characteristics of respondents were identified from survey responses and confirmed with qualitative analysis. For example, if a respondent selected the option "Not Listed" for a question regarding demographics, we reviewed the response to determine whether the reply did or did not match categorically with one of the provided answers. Specific examples are discussed in Section 3. Once all the respondents' demographic characteristics are annotated, they are compared relative to responses to other questions within the survey.

A Likert scale is utilized to measure how inclusive respondents state the STEM field and their current workplace or academic institution is of individuals or diverse backgrounds, and how discriminated against groups of individuals are based on demographic categories within STEM. The responses to the Likert scale questions are compared based on demographic information of the respondents and respondents' history or experiencing or witnessing discrimination. The comparison is done by measuring the percentage of responses by each level of the Likert scale for all respondents first. The "neutral" percentage of total respondents is then calculated. The neutral percentage is measured as the center of the middle Likert scale percentage based on the percentage values of the polar Likert scales. For example, for a five-point Likert scale measuring from very noninclusive to very inclusive; with intermittent steps of somewhat noninclusive, neither inclusive nor noninclusive, and somewhat inclusive; the neutral percentage will be centered in the neither inclusive nor non inclusive step of the five-point Likert scale. In this example, if the responses are all equal – being 20% of respondents answering to each step of the five-point Likert scale – then the neutral percentage would be 50%. If instead, the responses were 10% very noninclusive, 10% somewhat noninclusive, 20% neither inclusive nor noninclusive, 30% somewhat inclusive, and 30% somewhat inclusive, then the neutral percentage would be at 30% from the very noninclusive end of the scale or 70% from the very inclusive end of the scale. The comparison variables are then measured against the neutral percentage to determine if there is a significant response difference between one variable and the others. For example, if the neural percentage for all respondents was 50%, and a specific

demographic of survey respondents had 70% answer either very noninclusive or somewhat non inclusive on the same five-point Likert scale listed above, then it can be concluded that this demographic group overall states that there is greater non inclusivity than inclusivity compared to the general survey population. The greater the value from the neutral percentage, the greater the difference in responses between the groups.

Open-ended questions were thematically coded through a reflexive thematic analysis (RTA) [79]. The coding researcher completed the six-phase process, proposed by Braun and Clarke [80], by first familiarizing herself with survey responses. Coding of "Other" or "Not Listed" answers was completed in view of a respondent's entire survey, while open-ended questions were extracted into excel for content analysis and then later compared to Likert scale results for methodological triangulation. Codes were determined utilizing an inductive content analysis followed by summarizing coding to create themes for steps two through five. Coding was completed by one researcher, with reflexive practices around the interpretation of codes and overall themes to two independent researchers who did not have context to the whole survey data. This process included extended discussion around diversity, discrimination, and social identity to two researchers trained in qualitative methods. Themes were not significantly altered throughout the process, as input data was limited. Out of the 98 individuals who completed the survey, only 19 completed open-ended questions. The lack of alteration limited the necessity for significant reports throughout the process (Phase 6). Since RTA was utilized as the coding technique, no statistical analysis was completed of the qualitative data.

RTA was chosen to complement the mixed-methods approach of the survey. Unlike constructionist epistemologies, RTA stems from an essential epistemology. Within the context of this survey, an essentialist approach allows for a richer analysis independent of the number of responses to a specific open-ended question. For example, one respondent clarified that they were "SOUTH East Asian" as an ethnicity in which they most identify. Since analysis could not be fully data-driven, researchers utilized a mainly semantic coding approach, with some interpretive analysis to increase contextual understanding. Semantic codes are based on the explicit definition of stated words. Conversely, latent codes interpret the hidden meaning, underlying assumptions, and context of the sample. In the previous example, latent coding would suggest the respondent had strong feelings about distinctions between various regions in Asia, rather than a semantic code simply restating a geographic region. This respondent also indicated that nationality, ethnicity, and citizenship status were demographics that were most discriminated against. The researcher then interprets that this individual theme relates more significantly towards an expression of discrimination than a clarifying definition.

3. Results

3.1 Demographics of respondents

At time of analysis, the survey was completed by 98 individuals. Of those 98 individuals, 86 survey respondents stated their current field of study or employment is currently or was ever within the STEM field, four stated they are not currently or ever have been employed or enrolled in STEM, and eight did not indicate a response. Due to lacking statistical significance, our team

did not conduct a thorough analysis comparing non-STEM respondents to those who identified as STEM.

Among the 86 survey respondents that indicated their current field of study or employment is currently or was ever within the STEM field, 72 provided which fields they identify belonging to (Table 1). Due to respondents being given the option to select all fields that apply, the total number of responses for STEM field respondents belong to within Table 1 exceeds the total number of survey respondents.

Table 1. Current fields that respondents identify with who have also indicated their field of study or current or former employment is within STEM. Percentage is calculated based on the number of respondents and not the total number of responses from all respondents.

Fields STEM Respondents Identify as Belonging to	Number of Responses	Percentage of Respondents (n = 72)
Architecture	3	4.17%
Business Administration	2	2.78%
Business Management	2	2.78%
Communications	1	1.39%
Engineering	53	73.61%
Entertainment	1	1.39%
Farming, Fishing, and Forestry	1	1.39%
Government	1	1.39%
Healthcare	7	9.72%
Information Technology	3	4.17%
Mathematics and Statistics	5	6.94%
Physics	1	1.39%
Psychology	1	1.39%
Public Policy	2	2.78%
Science and Technology	19	26.39%
Social Services	2	2.78%
Veterinary Medicine	1	1.39%

Among the total STEM respondents, almost three quarters identify their current field as engineering and over one quarter identify their current field as science and technology. Business administration, business management, entertainment, government, public policy, and social services are not considered STEM fields according to the Department of Homeland Security (DHS) and the NSF [81-82]. Of our respondents, only one stated being solely within a non-STEM DHS and NSF considered field, entertainment, while identifying their current field of study as being within STEM.

85 survey respondents that currently identify being within STEM have provided at least one demographic detail. The breakdown of demographic information of the respondents is shown in Table 2. A detailed discussion for which categories are chosen based on statistical significance and other contributing factors is in Appendix B.

Table 2. Respondent categories analyzed by demographic group for our study. These categories were determined by removing or simplifying statistically insignificant responses. The discussion of the process of determining these categories is in Appendix B.

Demographic Group	Category	Number of Respondents	Percentage of Respondents being Analyzed
Age (n = 71)	18-24 years old	29	40.8%
	25-34 years old	35	49.3%
	35 years or older	7	9.9%
Gender (n = 67)	Cisgender female	40	59.7%
	Cisgender male	21	31.3%
	Queer gender	5	7.5%
Sexuality (n = 70)	Heterosexual	55	78.6%
	Queer sexual, romantic, and related orientations	15	21.4%
Marital status (n = 70)	Never married	50	71.4%
	Currently married or in non-married partnership	16	22.9%
	Previously married and not currently remarried	4	5.7%
Physical (dis)ability (n = 71)	Has physical disability	5	7.0%
	Does not have physical disability	66	93.0%
Cognitive (dis)ability (n = 70)	Has cognitive disability	7	10.0%
	Does not have cognitive disability	63	90.0%
Parental status (n = 71)	Does not have children	64	90.1%
	Has one or more children or are expecting first child	7	9.9%
Religion (n = 65)	Agnosticism	10	15.4%
	Atheism	12	18.5%
	Christianity	21	32.3%
	Hinduism	11	16.9%
	Islam	7	10.8%
	Other religious affiliation	4	6.1%
US residency status (n = 67)	US born citizen	36	53.7%
	Non-immigrant visa holder	31	46.3%
Race (n = 58)	Asian	32	55.2%
	White	26	44.9%
Ethnicity (n = 58)	Does not identity as having Hispanic, Latino, Spanish, Middle Eastern, or North African origin	47	81.0%

	Identifies as having Hispanic or Latino or Spanish origin	5	8.6%
	Identifies as having Middle Eastern or North African origin	6	10.3%
Education (n = 77)	Attained doctorate degree	5	6.5%
	Pursuing doctorate degree	38	49.3%
	Attained master's degree and currently not pursuing another degree	7	9.1%
	Pursuing master's degree	21	27.3%
	Attained bachelor's degree and currently not pursuing another degree	6	7.8%
Profession (n = 85)	Employed in industry	13	15.3%
	Employed in academia	10	11.8%
	Currently a student	62	72.9%
Academic institution (n = 72)	University of Illinois Urbana-Champaign	63	87.5%
	Other academic institution	9	12.5%

3.2. Experiences of discrimination

To determine areas in need of allyship, a comparison of individual experiences of discrimination in STEM is necessary. Respondents that indicated their current field of study or employment is currently or was ever within the STEM field were asked whether they have ever personally witnessed discrimination against others or have they ever experienced discrimination within their place of work or during any formal education within STEM. Of the 79 respondents who answered this question, 33 (41.8%) have experienced and witnessed discrimination, four (5.1%) have experienced discrimination only, 19 (24.1%) have witnessed discrimination only, and 23 (29.1%) have never experienced or witnessed discrimination. The type of discrimination most experienced and witnessed by respondents identifying as STEM include gender, race, ethnicity, nationality, and citizenship status. Respondents who have selected the answer of "Other" provided the fill-in information of "socioeconomic status" and "Which university/research group one graduated from." These results are summarized in Figure 1 below. The figure has the total number of respondents who have indicated experiencing or witnessing discrimination by type. Not all respondents provided which discrimination by type they have experienced or witnessed, and respondents were able to respond with multiple types of discrimination being witnessed and experienced.
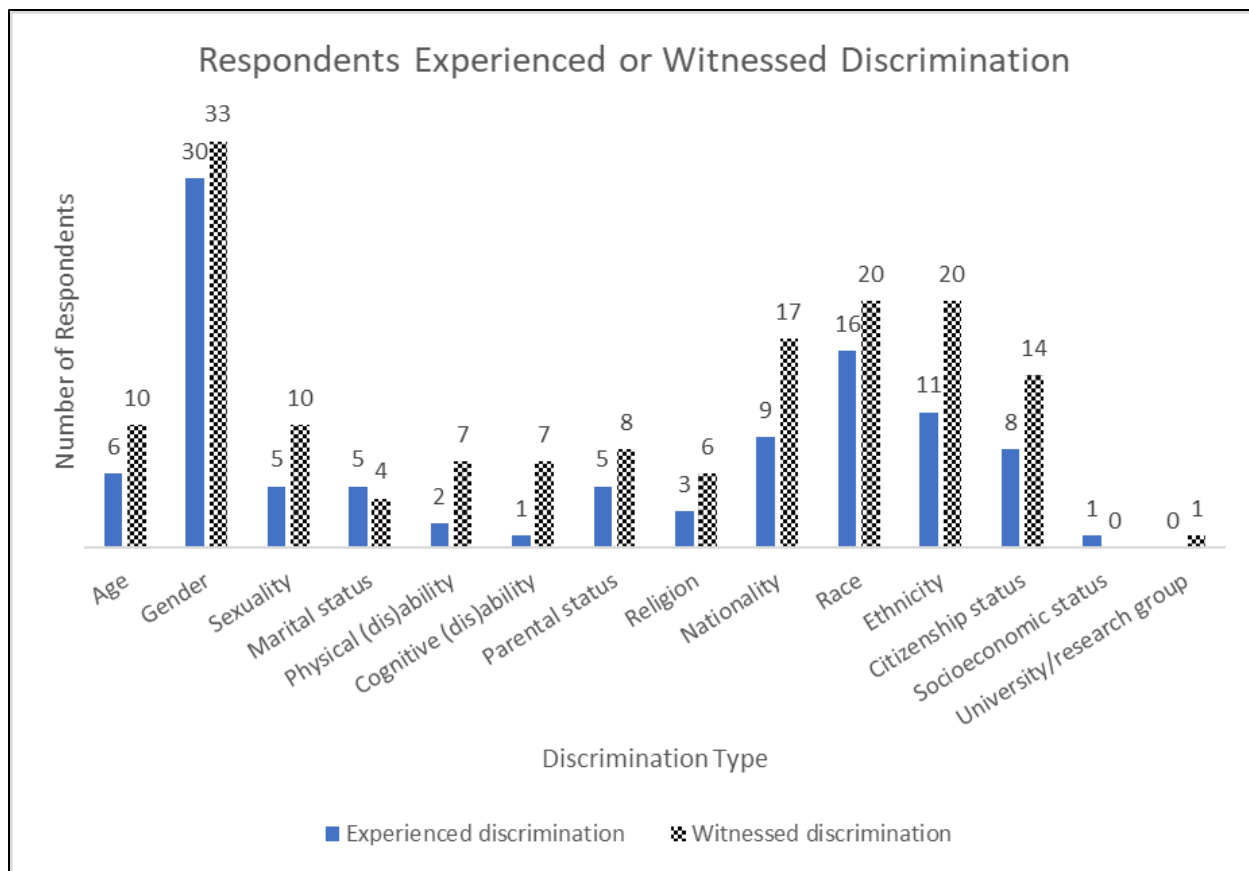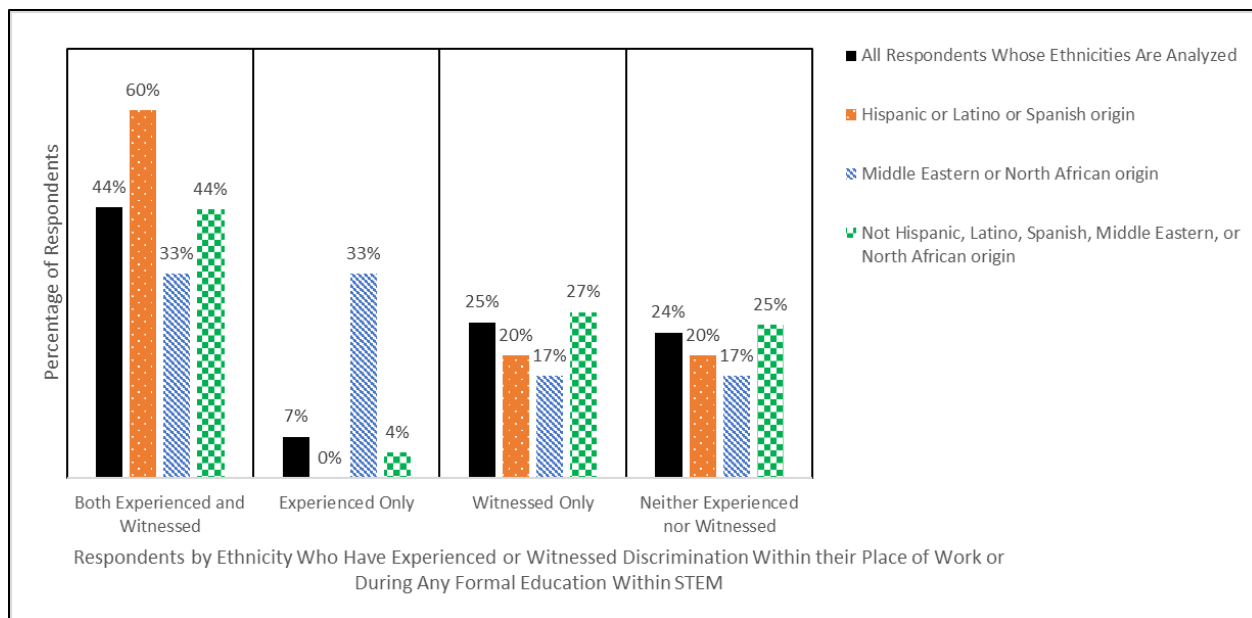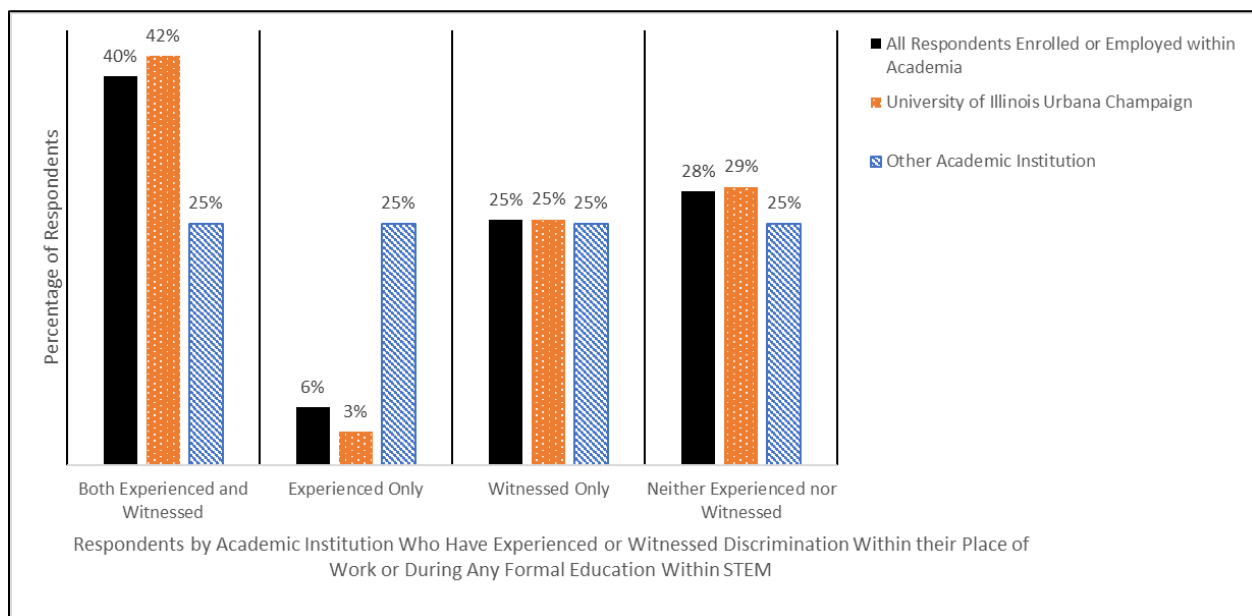
Respondents Experienced or Witnessed Discrimination

Figure 1: Number of respondents who have experienced or witnessed discrimination at their place of work or during any formal academic pursuits within STEM.

Our preliminary analysis of the relationship between demographic information and discrimination experiences began with comparing responses across ethnicity categories and across those enrolled or employed in academic institutions (Figure 2 and 3). For age and marital status categories, we further explored the relationship between demographic information and discrimination experiences by looking into what types of discrimination are experienced and witnessed (Appendix C, Figures 7-10). Responses of experiencing discrimination based on physical (dis)ability, cognitive (dis)ability, and religion did not reach a significant significance, and therefore were not included in this analysis.

Figure 2: Number of respondents who have experienced or witnessed discrimination at their place of work or during any formal academic pursuits within STEM by ethnicity category.

Figure 3: Number of respondents who have experienced or witnessed discrimination at their place of work or during any formal academic pursuits within STEM by academic institution.

3.3. Opinion regarding discrimination within STEM

Respondents were also asked to rank, in their own opinion, which groups within STEM were either very discriminated against, somewhat discriminated against, or not at all discriminated against. 69 respondents provided at least one ranking. Not every respondent ranked every group

nor ranked a group within every ranking option. The results presented in Figure 4 show the percentage of those that did provide a ranking for how discriminated against the group of individuals are. Of the responses, groups of individuals by gender (61%), race (50%), and citizenship status (42%) have more rankings of very discriminated against than those who have ranked them somewhat discriminated against. Additionally, gender and race having more or equal rankings of very discriminated against than somewhat discriminated against and not discriminated against combined. All groups have more than half of the rankings being either very discriminated against or somewhat discriminated against except for marital status that had 61% of respondents ranking that category not discriminated against. One respondent ranked "Other" as somewhat discriminated against and provided the text clarification of "Veteran (military) status."
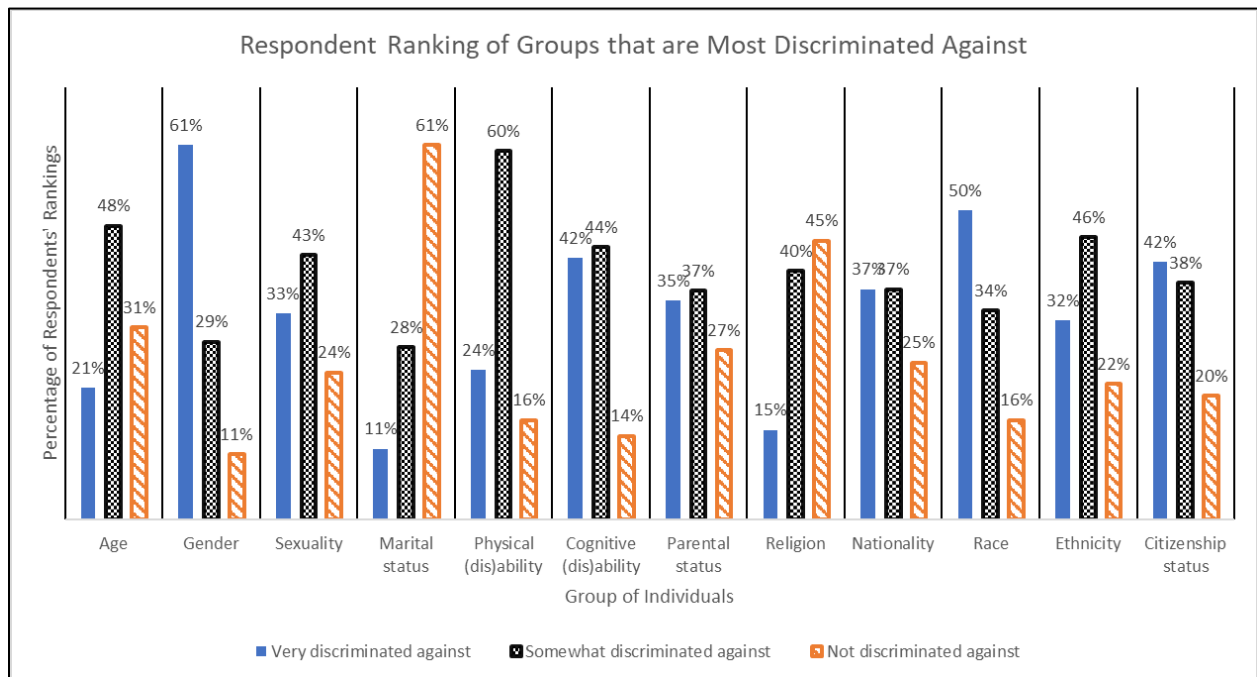
Figure 4: Percentage of respondents who have ranked groups of individuals as either very discriminated against, somewhat discriminated against, and not discriminated against.

Respondents who have not experienced or witnessed discrimination compared to those who have experienced or witnessed discrimination in all groups are more likely to rank a group of individuals as not discriminated against. This is especially true for discrimination based on gender, religion, ethnicity, and parental status (Appendix D, Table 3).

Respondents who have experienced discrimination by type compared to those who have not experienced discrimination in all groups are more likely to rank a group of individuals as very discriminated against. This is especially true for age, citizenship status, and nationality (Appendix D, Table 4). Due to lacking statistical significance, this comparative analysis is not conducted between those who have and have not experienced discrimination based on physical (dis)ability, cognitive (dis)ability), and religion.

Respondents who have witnessed discrimination by type compared to those who have not witnessed discrimination in all groups are more likely to rank a group of individuals as very discriminated against. This is especially true for parental status, physical (dis)ability, gender, marital status, citizenship, and age (Appendix D, Table 5).

3.4. Opinion regarding inclusivity within STEM

Respondents were asked how inclusive the STEM field is as a whole and their current academic institution or place of employment of individuals from diverse backgrounds on a 5-point Likert scale from very inclusive to very noninclusive. The responses are compared across the demographics of respondents to identify which lived identities felt the least included in STEM. Tables showing the detailed results are within Appendix E (Table 6 and 7).

Survey respondents overall answered that their current academic institution or place of employment is more inclusive than the STEM field as a whole. The demographic categories of respondents who find the STEM field the least inclusive are those who have been previously married and not currently remarried; have a cognitive disability; are a student or employed at an academic institution other than UIUC; are Agnostic; are pursuing a doctorate degree; and identify as a queer sexual, romantic, or related orientation. The demographic categories that find the STEM field the most inclusive are those who identify as a religious affiliation other than Agnosticism, Atheism, or Christianity; have attained a doctorate degree; and are currently married or in a non-married partnership. Figure 5 shows the difference from the neutral percentage of those who are enrolled or employed at UIUC and or those who are enrolled or employed elsewhere.
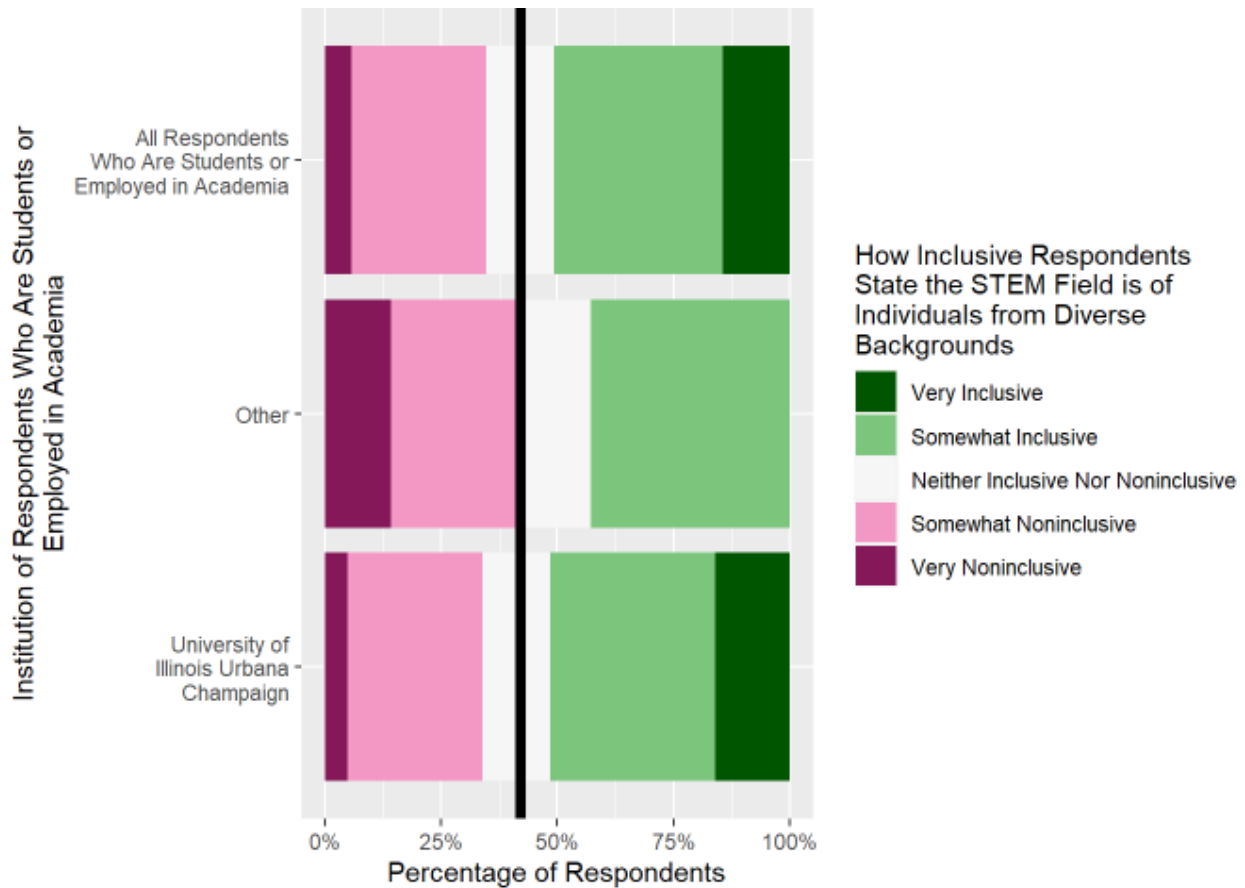
Figure 5: Difference in responses regarding how inclusive the STEM field is of individuals from diverse backgrounds from the neutral percentage for respondents enrolled or employed at UIUC or elsewhere.

The demographic categories of respondents who find their current academic institution or place of employment the least inclusive are those who have attained a bachelor's degree and are currently not pursuing another degree; identify as having Middle Eastern or North African origin or Hispanic or Latino or Spanish origin; are 35 years or older in age; and identify as queer gender. The demographic categories of respondents who find their current academic institution or place of employment the most inclusive are those who have a physical disability; have attained a doctorate degree; identify as a religious affiliation other than Agnosticism, Atheism, Christianity, or Hinduism; and have a cognitive disability. Figure 6 shows the difference from the neutral percentage of those who identify as having Middle Eastern or North African origin, Hispanic or Latino or Spanish origin, or do not identify as having Hispanic, Latino, Spanish, Middle Eastern, or North African origin.
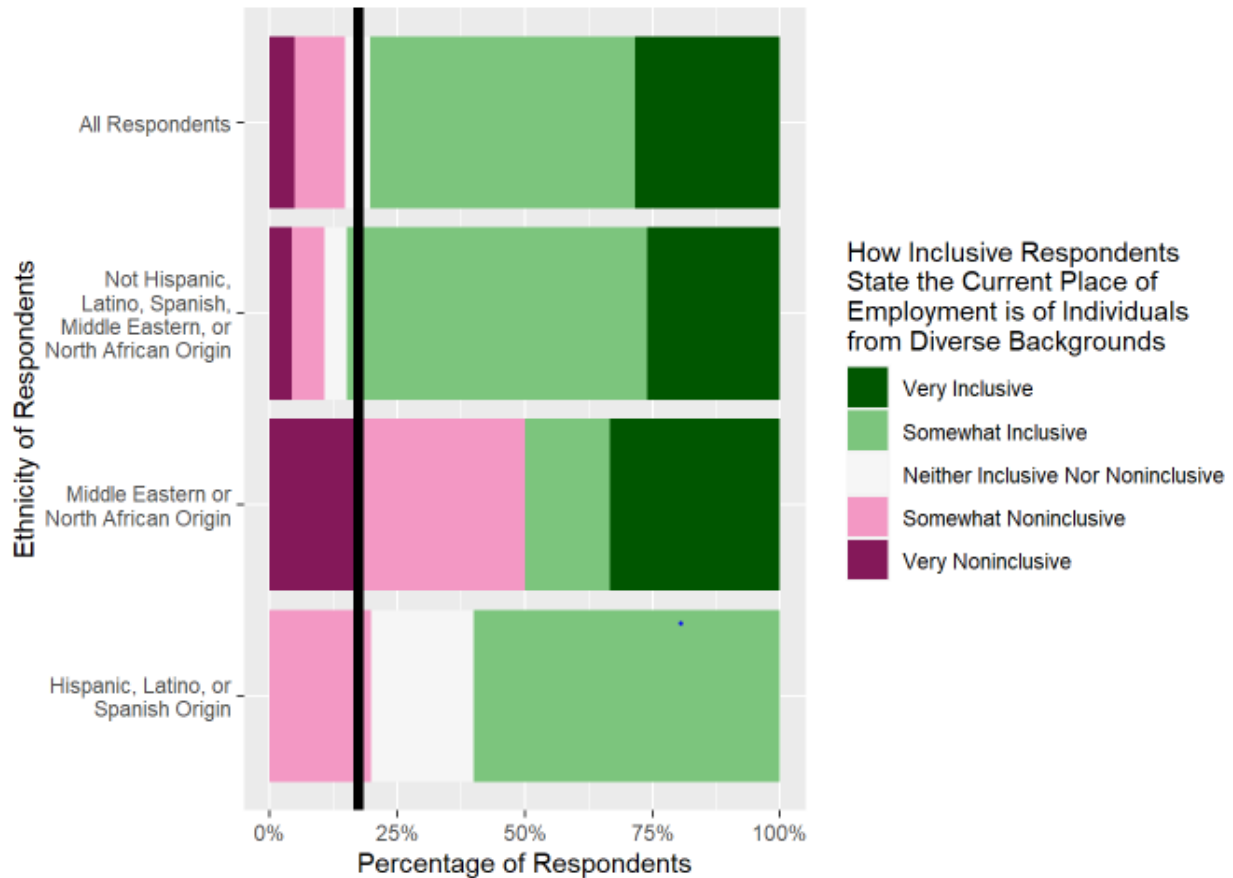
Figure 6: Difference in responses regarding how inclusive one's current place of employment or academic institution is of individuals from diverse backgrounds from the neutral percentage for respondents within different ethnicity categories.

3.4. Qualitative analysis

A key fault in a survey-type study is the rigid structure of responses. Although a multiple-choice survey allows for quick statistical summaries, it can be overly simplistic and obscure the complete motivation behind respondent's responses, thereby diminishing the comprehension of the survey results. We attempted to clarify how respondents understood survey questions by including qualitative aspects to our survey. By including an "other" or "not listed" fillable option for each demographic question we allowed for further expansion on the stated values. The "other" option was utilized to describe socio-economic class discrimination, in addition to the previously stated combinations within the demographic breakdown. These understandings have been integrated into quantitative analysis for perspective on if demographic groups could be combined for statistical significance.

Qualitative analysis of open-ended responses indicated themes of clarification of understanding, program recommendations, and personal expression. These themes are further discussed below.

3.4.1. Theme: Clarification of Understanding

Clarification of definitions included further explanation as to how respondents understood demographic categories, such as race or gender.

> "Women of better privilege (social economic, race, etc) sometimes misunderstand what it means to be of a underprivileged background."

While socio-economic was the largest 'other' group referred to, caste, veteran status, and academic background were also suggested for additional consideration in future surveys. Additionally, the above comment calls for further nuance to be possible, including a survey that can be analyzed through the lens of intersectionality.

Since our study focuses on the culture within the United States, caste was not considered. Additionally, "academic background" was coded as a definition clarification for education level, rather than an additional metric. The quote below, could indicate how academic background can refer more to the culture of disciplines, than the over inclusivity of STEM as a whole. "People are less accepting of individuals from diverse fields. People from different academic background face discrimination from people who form a larger group and have same discipline."

3.4.2 Theme: Personal Expression

Eight respondents also utilized the open-ended question to express emotions around discrimination and allyship in STEM. Some of them discussed personal experiences while others emphasized the importance of DEIA programs.

> "It is difficult to obtain jobs or even internship for graduate international student."

> "Representation matters! Also ask people pronouns!"

> "I'm a female engineer, and I know my male colleagues are paid $5-10k more than me! The pay gap exists! And it is aweful. Also, you are treated differently as a women based on relationship status. It's sometimes called "the mom tax." They cited studies that showed that women with children are less likely to be promoted because they're viewed as less dedicated, because their kids will always be their first priority (which should be the case for any parent imo…) but men with children are MORE likely to be promoted because "he has a family to take care of.""

Although these responses may not increase our team's understanding of the diversity of STEM, when discussing discrimination as a topic we find it vital to give space for individuals to express grief and lament. These qualitative responses are read and cherished for the ways individuals share their stories and renew passion to continue working for greater inclusivity in STEM.

3.4.3 Theme: Program Recommendations

Other institutions, such as the Colorado University BOLD Center and generalized comments of academic institutions were referred to in open-ended questions. Even though some of these

programs were not specifically identified by name, the positive response was an indication that multiple institutions are including DEIA programming. Programs from alternate institutions could be utilized for programming reference in the workshops.

> "I think we are trying to create a supportive environment at UIUC, and I have seen progress e.g. in the diversity of genders of ECE majors over the years, but it's not completely even."

Interestingly, when compared to quantitative results, respondents at UIUC believe UIUC to be slightly more inclusive than respondents from other institutions.

> "I think that the discrimination varies widely by context. Many specialized recruitment or retention programs do have high impacts on students, but in other comments they may experience discrimination for those same traits. This made it difficult to categorize the areas because I have seen different forms of discrimination at different institutions."

This final comment further identifies the need for demographic-specific training. Even this survey limited responses and could not account for the complexity of respondent's individual experiences.

4. Discussion and future work

4.1. Demographics

This survey aimed to comprehensively explore various demographic experiences in STEM. Unfortunately, not all demographics yielded a substantial response rate to achieve statistical significance. To address this, some categories were combined, while others were excluded from the analysis. Additional details can be found in the results section and Appendix B. For example, although race was included in our analysis, and overwhelming majority of respondents identified as White and/or Asian, resulting in limited responses from racial minorities. Qualitative responses, such as the comment regarding ethnicity stating "SOUTH East Asian", suggest that further breakdowns and clarifications within categories could enhance our survey's accuracy. However, this complexity exacerbates the already existing challenge of maintaining statistical significance across the numerous measured groups.

In many areas, such as sexuality, multiple identities were combined. This survey is currently still open and receiving responses. Therefore, there is potential for currently underrepresented demographic categories to achieve statistical significance in the future. We define statistical significance as having greater than 5% of respondents identifying with the listed responses; hence, there is not a specific number of responses threshold applicable to reach statistical significance in all categories. With more responses, however, our team is more likely to obtain statistically significant data from comparable groups, and therefore have our survey respondents more accurately represent the overall STEM climate within the United States.

Furthermore, the survey's reach closely mirrors the composition of the AiS organizational board rather than reflecting the broader demographics of the STEM field in the United States. With 75% of respondents self-identifying as cisgender female, the results are skewed, considering that

women constitute about 35% of STEM fields as defined by the NSF in 2021 [33]. A substantial portion of the respondents (85.18%) are between the ages of 18-35 years and are currently enrolled or employed in academia (62.12%). While this aligns with the program's intended audience, and therefore matches the pre-existing network AiS can advertise to most successfully, the survey respondents' make-up strays from the study's original aim. While the original intention of the survey was to understand the existing climate in STEM across academia and industry, results reflect a quasi-convenience sampling of those most reachable to AiS. Therefore, the current results of the study then act as an organizational climate survey, reflecting the thoughts and experiences of those semi-connected to the organization and anticipating the future experiences of current academic members.

However, the respondents' demographics negatively affect the survey distribution in age, parental status (85.19% not having any children), and marital status (68.63% having never been married). This might explain why these areas, along with religion, received higher rankings of "not discriminated against" compared to other areas measured in the survey. Conversely, this could lead to over-inflated percentages regarding how likely an individual would rate STEM or their workplace as noninclusive. The demographic disparity between our survey respondents and the overall STEM demographics poses a key challenge in interpreting results, as the neutral point could already be significantly skewed due to factors like a large gender disparity.

4.2. Most Discriminated Against/Inclusivity Rankings

The initial findings presented in Appendices E and F unveil a consistent pattern among respondents: those who have either experienced or witnessed discrimination based on demographic factors are more likely to perceive individuals from those demographic groups as being highly discriminated against. Specifically, individuals who have personally experienced discrimination are more inclined than those who have only witnessed discrimination to assert that individuals from that demographic group face significant discrimination. Notably, this trend persists even when considering respondents who have encountered any form of discrimination.

These findings provide valuable insights into shaping our programming. First, recognizing that personal experiences or witnessing discrimination raises awareness of group-based discrimination, we must explore ways to convey this information without subjecting participants to potentially traumatic incidents. However, intriguingly, some respondents who have experienced or witnessed discrimination by demographic type still perceive those groups as not being discriminated against. This raises the question: how can the AiS programming be tailored to include the perspectives of these individuals?

Second, while the preliminary results touch on the intersectionality of discrimination experiences and demographic information, further exploration is required. One respondent called for an intersectional approach, suggesting that women of minority race were the most discriminated against. We initiated this process by comparing discrimination experiences across age and marital status categories (Appendix C, Figures 7-10), revealing strong correlations for individuals over 35 years old and those previously married but not currently remarried. For instance, discrimination based on sexuality, parental status, and race showed notable associations. However, more in-depth analysis in future work is necessary to fully comprehend

the intersectional dynamics of demographic information on discrimination and inclusivity within STEM.

4.3. Affirmation of Allyship Program

Our results not only highlight the observed disparities between those who have and have not experienced and/or witnessed discrimination (Appendix D, Tables 3-5) but also underscore the continued importance of allyship training in the context of discrimination and overall inclusivity within STEM. Given the consistent nature of these discrepancies across all demographics, there is a discernible potential benefit for our survey's overrepresented groups to engage in targeted allyship training. Such training could be designed to specifically recruit individuals from non-minority demographic groups, fostering active support and advocacy for marginalized demographics. This is the core purpose of allyship training, to build active support and advocacy for marginalized groups from those with privilege. Allyship training focuses on educating individuals who have not experienced or witnessed discrimination to understand how to create inclusive environments. It's valuable for the ability to share stories and experiences of marginalized populations to those with privilege without requiring individual experiences of trauma. One respondent emphasized the need for allyship training, stating "a lot of people say they are allies, but then they make comments that seem uninformed or unwarranted, so maybe they don't understand the meaning of being an ally." Allyship training can provide the demographic specific skills necessary to dismantle oppressive systems. The respondent's comment calls out the importance of not only having allyship training, but ones that target marginalized demographics, as each demographic requires tailored support.

4.4. Further survey analysis

In addition to incorporating new survey responses to achieve statistical significance in every demographic category and academic and professional field, our future work includes a more in-depth analysis of the survey responses. As previously discussed, a significant challenge in developing allyship training is the creation of demographic-specific content, particularly when considering the impact of multiple forms of marginalization on individual retention within STEM. To address this challenge, demographics will be cross-analyzed against the three core questions – experiences with discrimination, ranking of discrimination by area, and the overall inclusivity of STEM and current work environments.

Through cross-analysis, our team aims to answer a crucial research question pertaining to the necessity of allyship programming: do individuals outside of historically underrepresented groups identify the need for allyship to those groups in the academic and industrial landscapes? For instance, do individuals who identify as cisgender females in STEM without a physical disability acknowledge the discrimination faced by those with physical disabilities? Or is an understanding of marginalization limited to those with first-hand or second-hand experience? To answer this question, survey responses of experiencing and witnessing discrimination will be cross analyzed with feelings of inclusivity and ranking within and outside those same demographics.

Furthermore, incorporating additional qualitative questions could provide valuable insights into respondents' perceptions of the survey questions. Our current survey responses do not have a significant enough qualitative response to allow for large scale analysis (19.4% response rate). The relatively low response rate may be attributed to the placement of the open-ended questions in relation to demographic-specific questions. Additionally, the open-ended question was left widespread and vague, allowing respondents to cover any area they particularly felt. Future survey iterations could include demographic-specific, open-response questions throughout the survey, to assist in definition clarification. The climate survey and program evaluations could allow for a more comprehensive connection through qualitative analysis.

5. Conclusion

Literature and previous workshops suggest that allyship programs are most effective when providing concrete, demographic-specific strategies for allyship. Therefore, AiS prioritized a survey to identify target areas for future programming. While gender ranked highest in most discrimination experiences and as a demographic category very discriminated against by respondents, the current outreach demographic of AiS is predominantly cisgender female. This information doesn't diminish the marginalization and underrepresentation faced by this demographic in STEM, but rather highlights the need for additional programming in other categories. According to our current survey results, AiS programming should include specific allyship strategies for the following demographic groups: those with an ethnicity of Middle Eastern, North African, Hispanic, Latin, or Spanish origin; those with a cognitive disability; those who identify with a queer sexual, romantic, and related orientation; and those who are gender queer. Further survey responses may potentially confirm an additional focus on physical (dis)abilities.

Moreover, literature and survey results confirmed the necessity of allyship training. All demographic groups indicated a disparity between the inclusivity of the STEM field as a whole and current places of employment or academic enrollment based on whether an individual has/has not experienced discrimination. Our current survey results confirm our hypothesis, as the majority of demographic groups also indicated that experiencing and witnessing discrimination by a specific demographic category corelates with individuals ranking that category with greater frequency as very or somewhat discriminated against. A larger sample size with statistical significance in every sub-category would further verify our hypothesis.

While the survey results provide clarity as to the current climate in STEM fields at UIUC and beyond, further studies are needed to understand what makes an effective allyship training program for how to build demographic-specific skillsets. Our team's research aimed to identify which demographics to focus programming efforts on but did not include discussion on the programming for these demographics. In future work, the AiS workshops will be designed in collaboration with partnering organizations outside of STEM, such as the Pride Center or the women's resource center, for their expertise in allyship programming. Furthermore, AiS will uphold its mission by analyzing the effectiveness of its programming through a comprehensive program evaluation, to include measuring the impact demographic-specific training.

In addition to partnering with demographic-specific organizations at UIUC, AiS will seek potential collaborations with similar graduate-led DEIA organizations at other universities. In this survey, the BOLD Center at the University of Colorado Boulder and a program at the University of North Carolina were suggested. These programs, with similar missions and successful execution of programming, may contribute to the improvement of AiS through knowledge sharing of best practices and collaboration, adjusted for UIUC's environment. Our organization continues to advocate for direct, tangible programming to maximize impact and increase diversity in STEM.

Acknowledgements

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Appendix A.

STEM Allyship

Q41 You are invited to participate in a research study regarding allyship in science, technology, engineering, and mathematics (STEM).

The goal of this research study is to identify the atmosphere STEM graduate students currently face and what environment they will potentially enter upon completion of their degrees. Furthermore, our team will identify areas of discrimination that have the greatest impact on individual feelings of inclusivity and STEM retention curtailment.

This study is being conducted by Mia Leigh Renna and Emily Lawson-Bulten and has been provided funding for this study through the IDEA Institute. The Primary Investigator (PI) of the study is Lance Cooper.

There are two qualifications to participate in this study: (1) you must be 18 years or older; (2) you must be currently living in the United States or its territories.

Participation in this study is voluntary. You may skip any questions you don't want to answer, and you may end the survey at any time.

You may feel discomfort when asked about any previous experiences with discrimination. However, the goal of this research study is to identify the atmosphere STEM graduate students currently face and what environment they will potentially enter upon completion of their degrees. Our team will identify areas of discrimination that have the greatest impact on individual feelings of inclusivity and STEM retention curtailment. With this knowledge, programs with the intent of increasing inclusivity and positive work environments can best design their plan of action to be successful in their mission.

Participation is expected to take less than 20 minutes. At the end of the survey, you will be offered the opportunity to enter a raffle to receive a $50 visa gift card as compensation for your participation. We will be raffling five visa gift cards across all participants, with the anticipated probability of award being 10% likelihood.

The information you will share with us if you participate in this study will be kept completely confidential to the full extent of the law. Responses will be anonymized and securely stored in University of Illinois Urbana-Champaign systems.

If you have any questions about this study, please contact Mia Leigh Renna at mrenna@umd.edu, Emily Lawson-Bulten at emilyjl3@illinois.edu, or Lance Cooper slcooper@illinois.edu.

If you have questions about your rights as a research participant, please contact University of Illinois Urbana Champaign's Office for the Protection of Human Subjects (217-333-2670 or irb@illinois.edu).

Please select whether you consent to participate in the research study.

○ I consent to participating in this research study (1)

○ I do not consent to participating in this research study (2)

End of Block: Consent

Start of Block: Allyship in STEM Survey

Q1 Are you currently employed in industry or academia as an administrator or faculty member?

○ Industry (1)

○ Academia (2)

○ Neither, I am a student (3)

○ Neither, I am unemployed (4)

Page Break

Q2 Have you ever attended post-secondary school in a STEM field?

○ Yes (1)

○ No (2)

○ I have never attended post-secondary school (3)

Q3 Have you ever been formally employed in a STEM role?

○ Yes (1)

○ No (2)

○ I have never been formally employed (3)

Page Break

Q4 Do you consider your current career field within STEM?

○ Yes (1)

○ No (2)

Page Break ——

Q5 What is the degree type you are currently pursuing as a student?

○ Associates (1)

○ Bachelor of Science (2)

○ Bachelor of Arts (3)

○ Master of Science (4)

○ Master of Arts (5)

○ Master of Business Administration (6)

○ Master of Public Administration (7)

○ Doctor of Philosophy (PhD) (8)

○ Medical Doctorate (9)

○ Doctor of Veterinary Medicine (10)

○ Juris Doctorate (11)

○ Other type of Bachelor's degree (12)
_____

○ Other type of Master's degree (13) _____

○ Other type of Doctorate degree (14)
_____

○ Other degree not listed (15) _____

○ Prefer not to answer (16)

Page Break

Q6 Are you currently enrolled or employed at University of Illinois Urbana-Champaign?

○ Yes (1)

○ No (2)

○ Prefer not to answer (3)

Q7 Do you consider your current field of study or employment within STEM?

○ Yes (1)

○ No (2)

Page Break

Q8 In your opinion, how inclusive is the STEM field as a whole of individuals from diverse backgrounds?

○ Very Inclusive (1)

○ Somewhat Inclusive (2)

○ Neither Inclusive nor Noninclusive (3)

○ Somewhat Noninclusive (4)

○ Very Noninclusive (5)

○ Prefer not the answer (6)

Page Break

Q9 From your personal experience, how inclusive is your current place of employment of individuals from diverse backgrounds?

○ Very Inclusive (1)

○ Somewhat Inclusive (2)

○ Neither Inclusive nor Noninclusive (3)

○ Somewhat Noninclusive (4)

○ Very Noninclusive (5)

○ Prefer not to answer (6)

Page Break

Q10 From your personal experience, how inclusive is your current academic institution of individuals from diverse backgrounds?

○ Very Inclusive (1)

○ Somewhat Inclusive (2)

○ Neither Inclusive nor Noninclusive (3)

○ Somewhat Noninclusive (4)

○ Very Noninclusive (5)

○ Prefer not to answer (6)

Page Break

Q11 Have you ever witnessed discrimination against others, or have you ever experienced discrimination within your place of work or during any formal education within STEM?

○ Yes, I have experienced and witnessed discrimination (1)

○ Yes, I have experienced discrimination but never witnessed discrimination against others (2)

○ Yes, I have witnessed discrimination but never personally experienced discrimination (3)

○ No (4)

○ Prefer not to answer (5)

Page Break

Q12 In which areas have you experienced discrimination within your place of work or during your formal education within STEM? Select all that apply.

- ☐ Age (1)

- ☐ Gender (2)

- ☐ Sexuality (3)

- ☐ Marital status (4)

- ☐ Physical (dis)ability (5)

- ☐ Cognitive (dis)ability (6)

- ☐ Parental status - to include pregnancy (7)

- ☐ Religion (8)

- ☐ Nationality (9)

- ☐ Race (10)

- ☐ Ethnicity (11)

- ☐ Citizenship status (12)

- ☐ Other (13) _____

- ☐ Prefer not to answer (14)

Page Break

Q13 In which areas have you witnessed discrimination within your place of work or during your formal education within STEM? Select all that apply.

☐ Age (1)

☐ Gender (2)

☐ Sexuality (3)

☐ Marital status (4)

☐ Physical (dis)ability (5)

☐ Cognitive (dis)ability (6)

☐ Parental status - to include pregnancy (7)

☐ Religion (8)

☐ Nationality (9)

☐ Race (10)

☐ Ethnicity (11)

☐ Citizenship status (12)

☐ Other (13) _____

☐ Prefer not to answer (14)

Page Break

Q14 Please rank which group of individuals, in your opinion, within STEM are most discriminated against?

Very Discriminated Against	Somewhat Discriminated Against	Not Discriminated Against
_____ Age (1)	_____ Age (1)	_____ Age (1)
_____ Gender (2)	_____ Gender (2)	_____ Gender (2)
_____ Sexuality (3)	_____ Sexuality (3)	_____ Sexuality (3)
_____ Marital status (4)	_____ Marital status (4)	_____ Marital status (4)
_____ Physical (dis)ability (5)	_____ Physical (dis)ability (5)	_____ Physical (dis)ability (5)
_____ Cognitive (dis)ability (6)	_____ Cognitive (dis)ability (6)	_____ Cognitive (dis)ability (6)
_____ Parental status - to include pregnancy (7)	_____ Parental status - to include pregnancy (7)	_____ Parental status - to include pregnancy (7)
_____ Religion (8)	_____ Religion (8)	_____ Religion (8)
_____ Nationality (9)	_____ Nationality (9)	_____ Nationality (9)
_____ Race (10)	_____ Race (10)	_____ Race (10)
_____ Ethnicity (11)	_____ Ethnicity (11)	_____ Ethnicity (11)
_____ Citizenship status (12)	_____ Citizenship status (12)	_____ Citizenship status (12)
_____ Other (13)	_____ Other (13)	_____ Other (13)

Page Break

Q15 Has discrimination against yourself or others deterred you from pursuing a career in STEM?

○ Yes (1)

○ No (2)

○ Prefer not to answer (3)

Page Break ——

Q16 In which areas has discrimination against yourself or others deterred you from pursuing a career in STEM? Select all that apply

☐ Age (1)

☐ Gender (2)

☐ Sexuality (3)

☐ Marital status (4)

☐ Physical (dis)ability (5)

☐ Cognitive (dis)ability (6)

☐ Parental status - to include pregnancy (7)

☐ Religion (8)

☐ Nationality (9)

☐ Race (10)

☐ Ethnicity (11)

☐ Citizenship status (12)

☐ Other (13) _____

☐ Prefer not to answer (14)

Display This Question:

If You are invited to participate in a research study regarding allyship in science, technology, eng... = I consent to participating in this research study

Q27 Please provide any additional comments you may have regarding allyship in STEM.

_____

Display This Question:

If You are invited to participate in a research study regarding allyship in science, technology, eng... = I consent to participating in this research study

Q28 How old are you?

○ 18-24 years old (1)

○ 25-34 years old (2)

○ 35-44 years old (3)

○ 45-54 years old (4)

○ 55-64 years old (5)

○ 65+ years old (6)

○ Prefer not to answer (7)

Display This Question:

If You are invited to participate in a research study regarding allyship in science, technology, eng... = I consent to participating in this research study

Q29 Which gender identity do you most identify?

○ Cisgender Male (1)

○ Cisgender Female (2)

○ Transgender Male (3)

○ Transgender Female (4)

○ Non-Binary (5)

○ Gender Variant/Non-Conforming (6)

○ Not Listed (7) _____

○ Prefer not to say (8)

Q30 Which sexual orientation do you most identify?

○ Heterosexual (1)

○ Homosexual (2)

○ Bisexual (3)

○ Queer (4)

○ Asexual (5)

○ Not Listed (6) _____

○ Prefer not to say (7)

Q31 What is your current marital status?

○ Married (1)

○ Widowed (2)

○ Divorced (3)

○ Separated (4)

○ Never married (5)

○ Not Listed (6) _____

○ Prefer not to answer (7)

Q32 Do you identify as someone with a physical (dis)ability?

○ No (1)

○ Yes (2)

○ Prefer not to answer (3)

Q33 Do you identify as someone with a cognitive (dis)ability?

○ No (1)

○ Yes (2)

○ Prefer not to answer (3)

Q34 How many children do you have?

○ None (1)

○ One or more children (2)

○ Currently pregnant/expecting first child (3)

○ Prefer not to answer (4)

Q35 Which religious affiliation do you most identify with?

○ Christianity (1)

○ Judaism (2)

○ Hinduism (3)

○ Buddhism (4)

○ Islam (5)

○ Atheism (6)

○ Agnostic (7)

○ Not listed (8) _____

○ Prefer not to answer (9)

Q36 What is your U.S. residency status?

○ Citizen born in the U.S. (1)

○ Naturalized citizen (2)

○ Resident (3)

○ Non-immigrant visa holder (4)

○ Undocumented immigrant (5)

○ Not listed (6) _____

○ Prefer not to answer (7)

Q37 Which race do you identify with? Select all that apply.

☐ American Indian or Alaska Native (1)

☐ Asian (2)

☐ Black or African American (3)

☐ Native Hawaiian or Other Pacific Islander (4)

☐ White (5)

☐ Not listed (6) _____

☐ Prefer not to answer (7)

Q38 Which ethnicity do you most identify?

○ Hispanic or Latino or Spanish origin (1)

○ Middle Eastern or North African origin (2)

○ Not Hispanic, Latino, Spanish, Middle Eastern, or North African origin (3)

○ Not listed (4) _____

○ Prefer not to answer (5)

Q39 What is your highest degree or level of school you have completed?

○ High School Diploma (1)

○ GED or alternative credit (2)

○ Did not graduate from high school or receive a GED (3)

○ Some college credit (4)

○ Associates degree (5)

○ Bachelor's degree (6)

○ Master's degree (7)

○ Doctorate degree (8)

○ Other professional degree (9) _____

○ Not listed (10) _____

○ Prefer not to answer (11)

Q40 Which field(s) do you identify as belonging to?

- [ ] Architecture (1)

- [ ] Engineering (2)

- [ ] Arts (3)

- [ ] Entertainment (4)

- [ ] Business management (5)

- [ ] Business administration (6)

- [ ] Communications (7)

- [ ] Social services (8)

- [ ] Education (9)

- [ ] Science and technology (10)

- [ ] Installation, repair, and maintenance (11)

- [ ] Farming, fishing, and forestry (12)

- [ ] Government (13)

- [ ] Healthcare (14)

- [ ] Law (15)

- [ ] Public policy (16)

☐   Sales, marketing, promotions, and advertising (17)

☐   Information technology (18)

☐   Finance (19)

☐   Mathematics and statistics (20)

☐   Not listed (21) _____

☐   Prefer not to answer (22)

End of Block: Demographics

Start of Block: Raffle and Membership

Q32 Are you interested in participating in future Allies in STEM studies or events or joining the Allies in STEM team?

○ Yes (1)

○ No (2)

Q35 Please go to this external survey and provide your email address to receive information regarding future studies or events with Allies in STEM. Your information you provide in the external survey will not be connected to your responses within this study.

Q33 Do you wish to enter a raffle to receive a $50 visa gift card as compensation for your participation?

○ Yes (1)

○ No (2)

End of Block: Raffle and Membership

Appendix B. Demographic Breakdown of Respondents

Age: Of the 71 respondents who have answered this question, 29 (40.8%) are between the ages of 18-24 years old; 35 (49.2%) are between the ages of 25-34 years old; six (8.5%) are between the ages of 35-44 years old; and one (1.4%) is between the ages of 45-54 years old. To meet statistical significance, the categories analyzed for our results are those between the ages of 18-24 years, 25-34 years, and those who are 35 years or older.

Gender: Of the 67 respondents who have answered this question, 40 (59.7%) identify as cisgender female; 21 (31.3%) identify as cisgender male; three (4.5%) identify as non-binary; and two (3%) identify as transgender male. One participant stated, "not listed" as their response and then provided the response "female" as the fill-in option, therefore not responding that they identify as either a cisgender or transgender female that our survey provided as listed answers. Our team did not analyze this respondent regarding gender identity. To meet statistical significance, the categories analyzed for our results are those who identify as cisgender female, cisgender male, and those who do not identify as cisgender, or are queer gender as defined by Aramati Casper, et al. (2022) [83].

Sexuality: Of the 70 respondents who have answered this question, 55 (78.6%) identify as heterosexual; four (5.7%) identify as asexual; five (7.1%) identify as bisexual; two (2.9% identify as homosexual; and four (5.7%) identify as queer. To meet statistical significance, the categories analyzed for our results are those who identify as heterosexual, and those who do not identify as heterosexual, or are queer sexual, romantic, and related orientations as defined by Aramati Casper, et al. (2022) [83].

Marital status: Of the 71 respondents who have answered this question, three (4.2%) are divorced and not currently remarried; 16 (22.5%) are married or in a non-married partnership; 50 (70.4%) have never been married, and one (1.4%) is widowed. Two responses recorded indicated their marital status was not listed as a choice in the survey with one responding "non-married partnership" and another indicating "have a boyfriend". The respondent who stated they were in a non-married partnership is analyzed with those who have indicated they are married. Additionally, the respondent who stated they have a boyfriend is not analyzed regarding their marital status. To meet statistical significance, the categories that will be analyzed are those who have never been married, are currently married or in a non-married partnership, and have been previously married but are not currently remarried.

Physical (dis)ability: Of the 71 respondents who have answered this question, five (7%) have a physical disability; and 66 (93%) do not have a physical disability.
Cognitive (dis)ability: Of the 70 respondents who have answered this question, seven (10%) have a cognitive disability; and 63 (90%) do not have a cognitive disability.
Parental status: For the 71 respondents who have answered this question, 64 (90.1%) do not have any children; six (8.5%) have one or more children; and one (1.4%) is currently pregnant or expecting their first child. To meet statistical significance, the categories analyzed for our results are those who do not have any children and those who have either one or more children or are expecting their first child.

Religion: For the 66 respondents who have answered this question, 21 (31.8%) identify as practicing Christianity; 10 (15.2%) identify as agnostic; 12 (18.2%) identify as atheist; 11 (16.7%) identify as practicing Hinduism; seven (10.6%) identify as practicing Islam; two (3%) identify as practicing Buddhism; and three (4.5%) do not identify as any of the aforementioned religious affiliations provided in the survey. One respondent responded, "Not Listed" regarding their religious affiliation identity and provided the clarifying response of "Catholic"; our team analyzed this response along with those who identify as practicing Christianity in accordance with guidance from Catholic literature and history (reference). One respondent responded, "Not Listed" regarding their religious affiliation identity and provided the clarifying response of "No religion"; our team did not analyze this response regarding religious affiliation. The other two respondents who also responded, "Not Listed", however, did not provide any additional clarification to their answer, and therefore was analyzed as identifying as another religious affiliation not previously mentioned. To meet statistical significance, the categories analyzed for our results are Christianity, Agnosticism, Atheism, Hinduism, Islam, and other religious affiliation.

US residency status: Of the 71 respondents who answered this question, 36 (50.7%) are citizens born in the US; two (2.8%) are naturalized citizens; 31 (43.7%) are non-immigrant visa holders; and two (2.8%) are residents. To meet statistical significance, the two categories analyzed for our results include those who are US born citizens and those who are non-immigrant visa holders.

Race: Of the 69 respondents who answered this question, 29 (42%) identify as White; 34 (49.3%) identify as Asian; four (5.8%) identify as Black or African American; one (1.4%) identifies as Native Hawaiian or Pacific Islander; and four (5.8%) responded stating their race was not listed as a survey response. Respondents were allowed to select all races that applied to them for this question, so therefore the number of races identified by respondents is greater than the total number of respondents. Of those who responded, "Not Listed," three provided the fill-in responses of "Hispanic," "Arab," and "South American." Despite not being the preferential approach to analyzing multi-race survey response data, our team did not analyze the respondents who have responded with multiple racial identities regarding race. Therefore, our team removed one respondent who replied as being both Asian and White and two respondents who replied as being both Black or African American and White from our analysis. Our team is also not analyzing the responses that indicated "No Listed" regarding race. To meet statistical significance, the only categories used for our results include those who identify as White or Asian.

Ethnicity: For the 67 respondents who answered this question, 47 (70.1%) do not identity as having Hispanic, Latino, Spanish, Middle Eastern, or North African origin; five (7.5%) identify as having Hispanic or Latino or Spanish origin; six (9%) identify as having Middle Eastern or North African origin; and nine (13.4%) responded stating their ethnicity was not provided as a survey response. Of those who responded, "Not Listed," three provided the following fill-in responses for their ethnicity "Chinese," "SOUTH East Asian" (capitalization provided by respondent), and "Asian." Our team did not analyze any of the "Not Listed" responses regarding ethnicity and will only analyze responses in the categories do not identity as having Hispanic, Latino, Spanish, Middle Eastern, or North African origin, identify as having Hispanic or Latino or Spanish origin, and identify as having Middle Eastern or North African origin.

Education: For the 81 respondents who provided information regarding their current academic pursuits and/or their highest degree or level of school they have completed, five (6.2%) have attained a doctorate degree; 38 (46.9%) are currently pursuing a doctorate degree – 36 respondents are pursuing a Doctor of Philosophy (PhD) and two respondents are pursuing a Doctorate of Veterinary Medicine (DVM); seven (8.6%) have attained a master's degree and are not currently pursuing another degree; 21 (25.9%) are currently pursuing a Master's degree – 17 respondents are pursuing a Master of Science (M.S.), one is pursuing a Master's of Computer Science, two are pursuing a Master of Engineering (M.Eng.), and one is pursuing a Master's (Non-Thesis); six (7.4%) of respondents have attained a Bachelor of Science (B.S.) degree and are not currently pursuing another degree; three (3.7%) are currently pursuing Bachelor's degrees; and one (1.2%) has not graduated high school or attained a GED. To meet statistical significance, the categories being analyzed for our results include those who have attained a doctorate degree, are pursuing a doctorate degree, have attained a master's degree and are not currently pursuing another degree, are pursuing a master's degree, and those who have attained a bachelor's degree and are not currently pursuing another degree.

Profession: For the 85 respondents who answered the question of whether they are currently employed in industry or academia as an administrator or faculty member, 62 (72.9%) are currently enrolled in academia as a student; 10 (11.8%) are currently employed in academia as an administrator or faculty member; and 13 (15.3%) are currently employed in industry.

Academic institution: Of the 72 respondents identifying as either enrolled or employed within academia, 63 (87.5%) are enrolled or employed at UIUC and nine (12.5%) are enrolled or employed at a different academic institution.

Appendix C. Type of discrimination experienced and witnessed by demographic information for age and marital status categories.

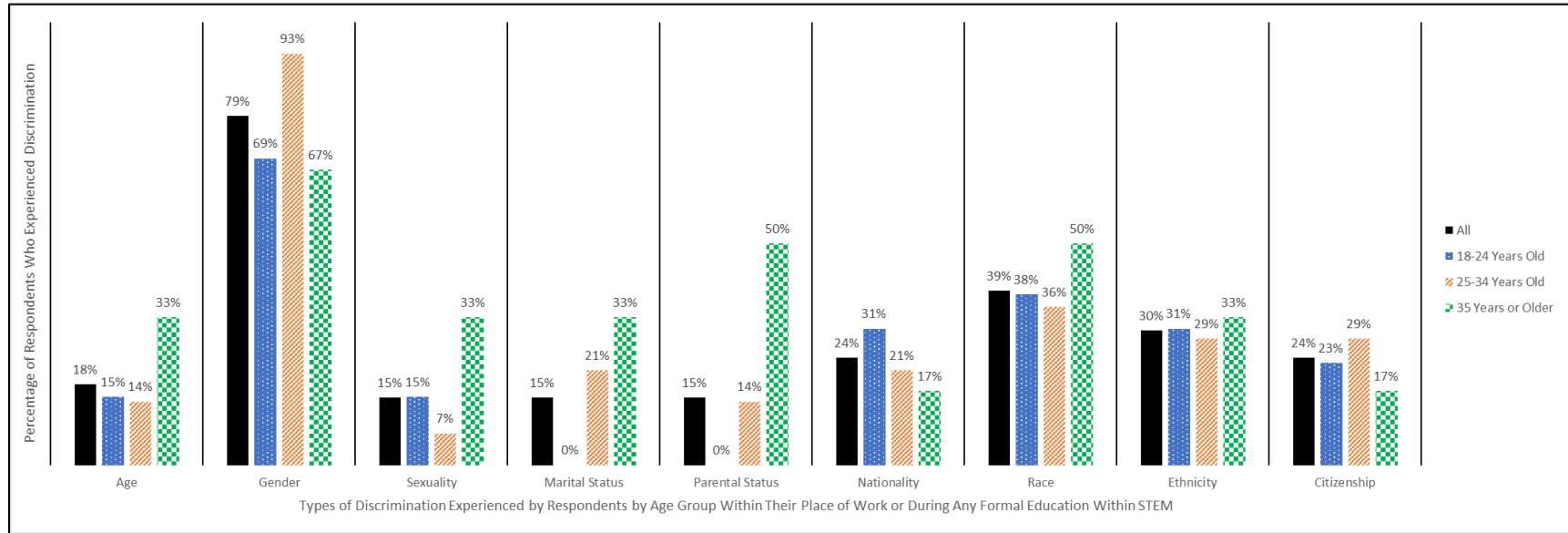Figure 7. Percentage of respondents who experienced discrimination by type across age categories.
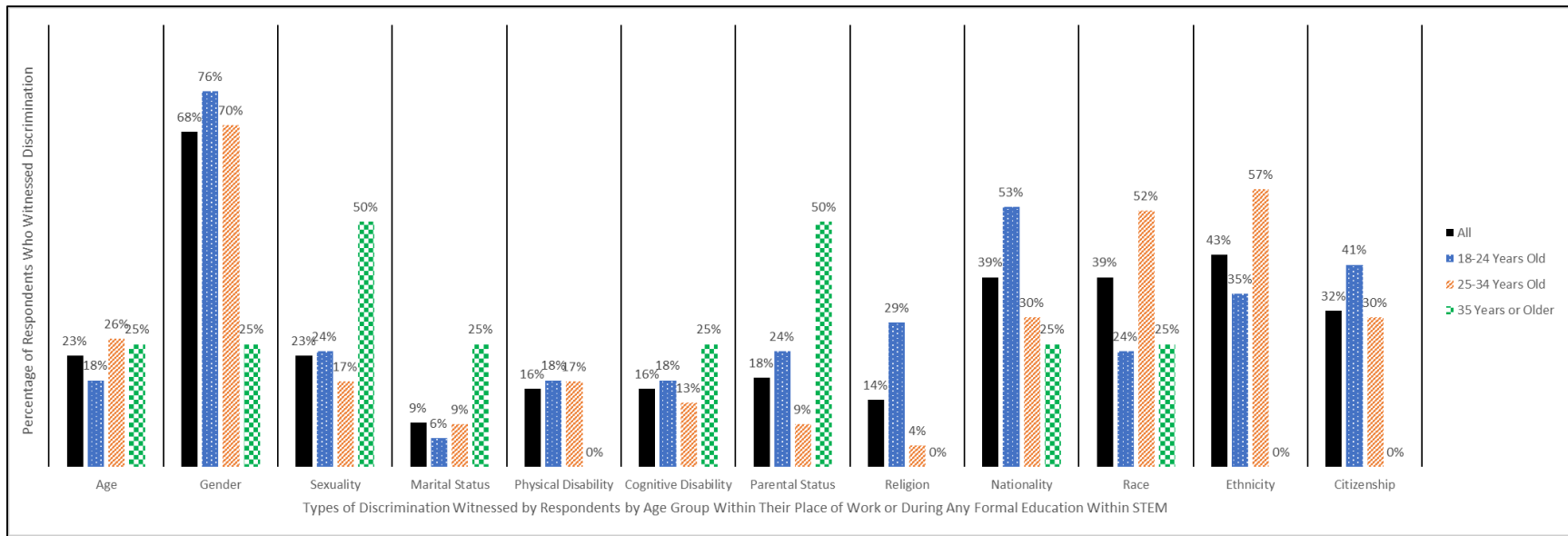
Figure 8. Percentage of respondents who witnessed discrimination by type across age categories.
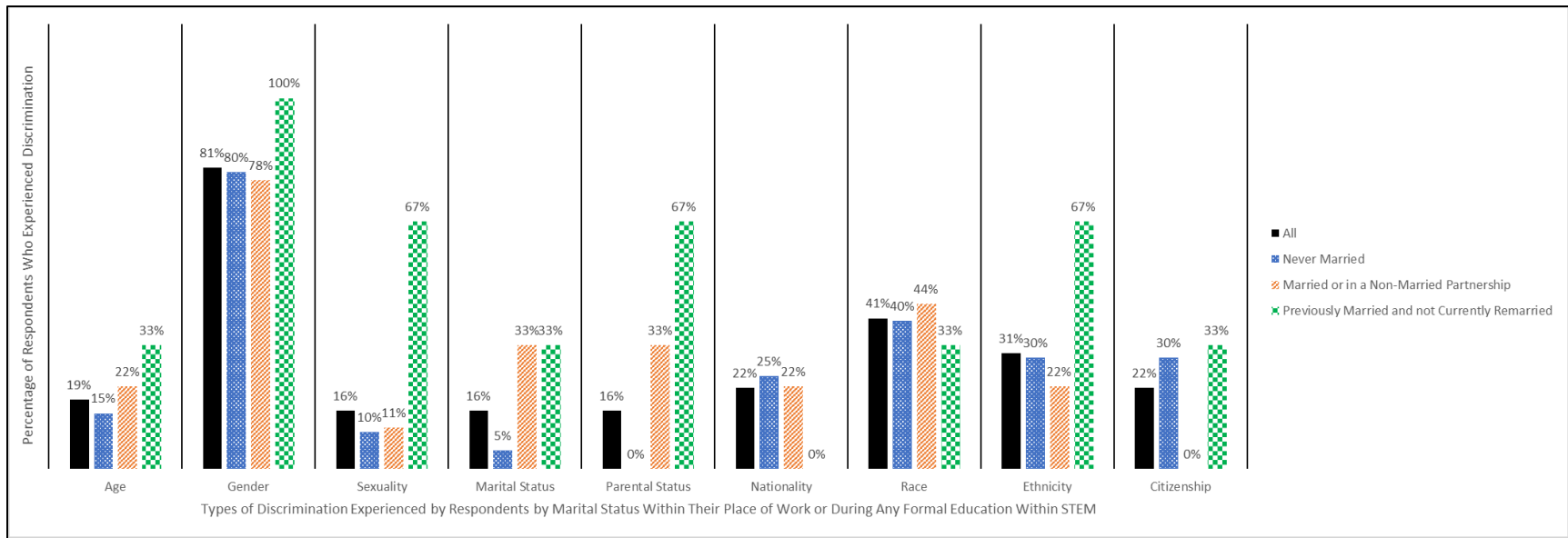
Figure 9. Percentage of respondents who experienced discrimination by type across marital status categories.
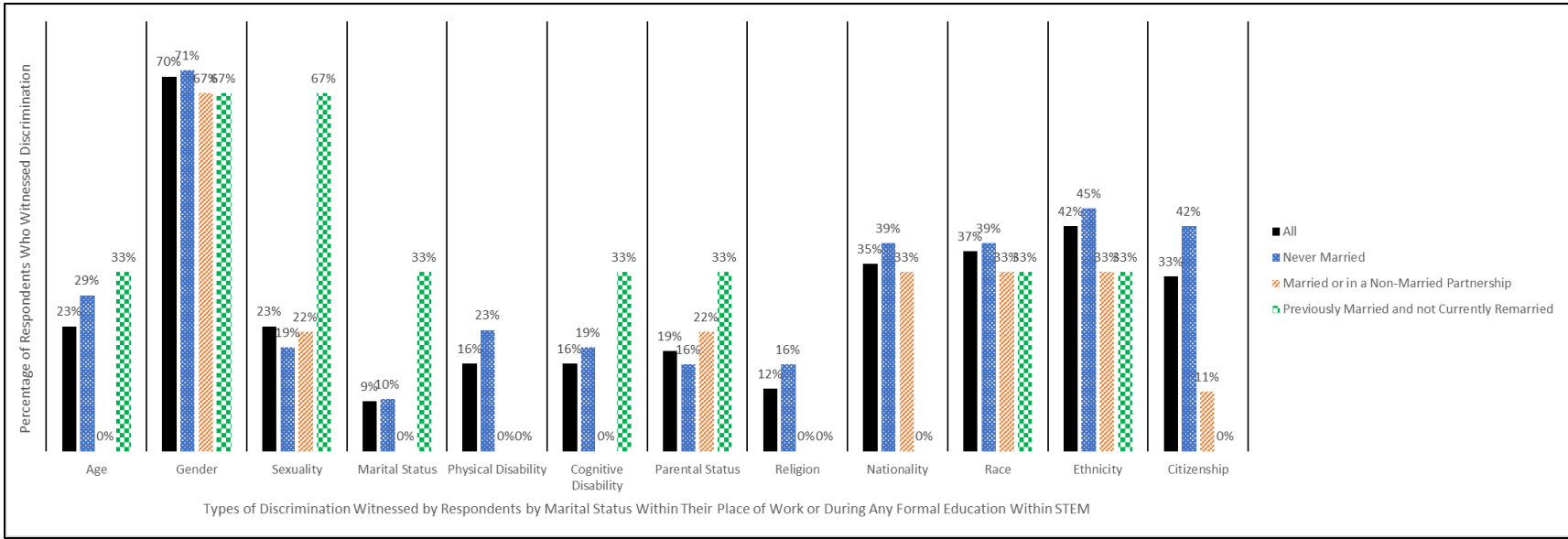
Figure 10. Percentage of respondents who witnessed discrimination by type across marital status categories.

Appendix D. Opinions on discrimination

Table 3. Ranking of how discriminated groups of individuals are for respondents who have not experienced or witnessed discrimination and for respondents who have experienced or witnessed discrimination of any kind in their place of work or during any formal education within STEM.

| | Never Experienced or Witnessed Any Discrimination | | | | Experienced or Witnessed Any Discrimination | | | |
	Total	Very discriminated against	Somewhat discriminated against	Not discriminated against	Total	Very discriminated against	Somewhat discriminated against	Not discriminated against
Age	21	4 (19%)	10 (47.6%)	7 (33.3%)	40	9 (22.5%)	19 (47.5%)	12 (30%)
Gender	21	6 (28.6%)	8 (38.1%)	7 (33.3%)	45	34 (75.6%)	11 (24.4%)	0 (0%)
Sexuality	20	4 (20%)	8 (40%)	8 (40%)	42	16 (38.1%)	18 (42.9%)	6 (14.3%)
Marital status	21	2 (9.5%)	5 (23.8%)	14 (66.7%)	40	5 (12.5%)	12 (30%)	23 (57.5%)
Physical (dis)ability	22	2 (9.1%)	15 (68.2%)	5 (22.7%)	39	12 (30.8%)	21 (53.8%)	4 (10.3%)
Cognitive (dis)ability	21	7 (33.3%)	8 (38.1%)	6 (28.6%)	38	18 (47.4%)	18 (47.4%)	2 (5.3%)
Parental status	21	4 (19%)	7 (33.3%)	10 (47.6%)	41	18 (43.9%)	16 (39%)	7 (17.1%)
Religion	21	3 (14.3%)	4 (19%)	14 (66.7%)	41	6 (14.6%)	21 (51.2%)	14 (34.1%)
Nationality	21	7 (33.3%)	5 (23.8%)	9 (42.9%)	38	15 (39.5%)	17 (44.7%)	6 (15.8%)
Race	20	7 (35%)	7 (35%)	6 (30%)	42	24 (57.1%)	14 (33.3%)	4 (9.5%)
Ethnicity	21	4 (19%)	8 (38.1%)	9 (42.9%)	38	15 (39.5%)	19 (50%)	4 (10.5%)
Citizenship status	20	8 (40%)	5 (25%)	7 (35%)	40	17 (42.5%)	18 (45%)	5 (12.5%)

Table 4. Ranking of how discriminated groups of individuals are for respondents who have experienced discrimination by each type and for respondents who have not experienced discrimination by each type in their place of work or during any formal education within STEM.

	Experienced Discrimination by Type				Have Not Experienced Discrimination by Type			
	Total	Very discriminated against	Somewhat discriminated against	Not discriminated against	Total	Very discriminated against	Somewhat discriminated against	Not discriminated against
Age	6	6 (100%)	0 (0%)	0 (0%)	55	7 (12.7%)	29 (52.7%)	19 (34.5%)
Gender	26	22 (84.6%)	4 (15.4%)	0 (0%)	40	18 (45%)	15 (37.5%)	7 (17.5%)
Sexuality	5	2 (40%)	2 (40%)	1 (20%)	57	18 (31.6%)	24 (42.1%)	13 (22.8%)
Marital status	5	2 (60%)	3 (60%)	0 (0%)	56	5 (8.9%)	14 (25%)	37 (66.1%)
Parental status	5	3 (60%)	2 (40%)	0 (0%)	57	19 (33.3%)	21 (36.8%)	17 (29.8%)
Nationality	8	7 (87.5%)	1 (12.5%)	0 (0%)	51	15 (29.4%)	21 (41.2%)	15 (29.4%)
Race	12	8 (66.7%)	4 (33.3%)	0 (0%)	50	23 (46%)	17 (34%)	10 (20%)
Ethnicity	9	3 (33.3%)	5 (55.6%)	1 (11.1%)	50	16 (32%)	22 (44%)	12 (24%)
Citizenship status	8	8 (100%)	0 (0%)	0 (0%)	52	17 (32.7%)	23 (44.2%)	12 (23.1%)

Table 5. Ranking of how discriminated groups of individuals are for respondents who have witnessed discrimination by each type and for respondents who have not witnessed discrimination by each type in their place of work or during any formal education within STEM.

	Witnessed Discrimination by Type				Have Not Witnessed Discrimination by Type			
	Total	Very discriminated against	Somewhat discriminated against	Not discriminated against	Total	Very discriminated against	Somewhat discriminated against	Not discriminated against
Age	10	5 (50%)	5 (50%)	0 (0%)	51	8 (15.7%)	24 (47.1%)	19 (37.3%)
Gender	29	25 (86.2%)	4 (13.8%)	0 (0%)	37	15 (40.5%)	15 (40.5%)	7 (18.9%)
Sexuality	9	5 (55.6%)	3 (33.3%)	1 (11.1%)	53	15 (28.3%)	23 (43.4%)	13 (24.5%)
Marital status	4	2 (50%)	2 (50%)	0 (0%)	57	5 (8.8%)	15 (26.3%)	37 (64.9%)
Physical (dis)ability	6	4 (66.7%)	2 (33.3%)	0 (0%)	55	10 (18.2%)	34 (61.8%)	9 (16.4%)

Cognitive (dis)ability	5	3 (60%)	2 (40%)	0 (0%)	54	22 (40.7%)	24 (44.4%)	8 (14.8%)
Parental status	8	7 (87.5%)	1 (12.5%)	0 (0%)	54	15 (27.8%)	22 (40.7%)	17 (31.5%)
Religion	6	1 (16.7%)	3 (50%)	2 (33.3%)	56	8 (14.3%)	22 (39.3%)	26 (46.4%)
Nationality	14	7 (50%)	7 (50%)	0 (0%)	45	15 (33.3%)	15 (33.3%)	15 (33.3%)
Race	16	10 (62.5%)	6 (37.5%)	0 (0%)	46	21 (45.7%)	15 (32.6%)	10 (21.7%)
Ethnicity	18	8 (44.4%)	9 (50%)	1 (5.6%)	41	11 (26.8%)	18 (43.9%)	12 (29.3%)
Citizenship status	14	10 (71.4%)	4 (28.6%)	0 (0%)	46	15 (32.6%)	19 (41.3%)	12 (26.1%)

Appendix E. Opinions on inclusivity

Table 6. How inclusive the STEM field is as a whole measured by survey respondents by demographic category.

Demographic Group	Category	Total	Very Inclusive	Somewhat Inclusive	Neither Inclusive nor Noninclusive	Somewhat Noninclusive	Very Noninclusive
	All	83	13 (15.7%)	30 (36.1%)	11 (13.3%)	24 (28.9%)	5 (6%)
Age (n = 71)	18-24 years old	29	3 (10.3%)	14 (48.3%)	6 (20.7%)	6 (20.7%)	0 (0%)
	25-34 years old	34	8 (23.5%)	9 (26.5%)	3 (8.8%)	11 (32.4%)	3 (8.8%)
	35 years or older	8	2 (25%)	2 (25%)	1 (12.5%)	1 (12.5%)	2 (25%)
Gender (n = 66)	Cisgender female	41	6 (14.6%)	14 (34.1%)	6 (14.6%)	12 (29.3%)	3 (7.3%)
	Cisgender male	20	5 (25%)	8 (40%)	2 (10%)	4 (20%)	1 (5%)
	Queer gender	5	1 (20%)	2 (40%)	1 (20%)	1 (20%)	0 (0%)
Sexuality (n = 70)	Heterosexual	56	12 (21.4%)	19 (38.8%)	8 (14.3%)	13 (23.2%)	4 (7.1%)
	Queer sexual, romantic, and related orientations	14	0 (0%)	6 (42.9%)	2 (14.3%)	5 (35.7%)	1 (7.1%)
Marital status (n = 70)	Never married	49	5 (50%)	19 (38.8%)	10 (20.4%)	13 (26.5%)	2 (4.1%)
	Currently married or in non-married partnership	17	8 (47.1%)	4 (23.5%)	0 (0%)	3 (17.6%)	2 (11.8%)
	Previously married and not currently remarried	4	0 (0%)	1 (25%)	0 (0%)	2 (50%)	1 (25%)
Physical (dis)ability (n = 71)	Has physical disability	4	2 (50%)	0 (0%)	0 (0%)	2 (50%)	0 (0%)
	Does not have physical disability	67	11 (16.4%)	25 (37.3%)	10 (14.9%)	16 (23.9%)	5 (7.5%)
Cognitive (dis)ability (n = 70)	Has cognitive disability	6	1 (16.7%)	1 (16.7%)	0 (0%)	4 (66.7%)	0 (0%)
	Does not have cognitive disability	64	12 (18.8%)	24 (37.5%)	10 (15.6%)	13 (20.3%)	5 (7.8%)

Parental status (n = 71)	Does not have children	63	10 (15.9%)	24 (38.1%)	10 (15.9%)	16 (25.4%)	3 (4.8%)
	Has one or more children or are expecting first child	8	3 (37.5%)	1 (12.5%)	0 (0%)	2 (25%)	2 (25%)
Religion (n = 65)	Agnosticism	11	0 (0%)	4 (36.4%)	3 (27.3%)	3 (27.3%)	1 (9.1%)
	Atheism	12	2 (16.7%)	4 (33.3%)	2 (16.7%)	4 (33.3%)	0 (0%)
	Christianity	21	3 (14.3%)	8 (38.1%)	1 (4.8%)	7 (33.3%)	2 (9.5%)
	Hinduism	11	2 (18.2%)	6 (54.5%)	2 (18.2%)	1 (9.1%)	0 (0%)
	Islam	6	3 (50%)	2 (33.3%)	1 (16.7%)	0 (0%)	0 (0%)
	Other religious affiliation	4	3 (75%)	0 (0%)	1 (25%)	0 (0%)	0 (0%)
US residency status (n = 67)	US born citizen	37	4 (10.8%)	12 (32.4%)	4 (10.8%)	16 (43.2%)	1 (2.7%)
	Non-immigrant visa holder	30	8 (26.7%)	12 (40%)	5 (16.7%)	2 (6.7%)	3 (10%)
Race (n = 57)	Asian	31	8 (25.8%)	11 (35.5%)	5 (16.1%)	4 (12.9%)	3 (9.7%)
	White	26	3 (11.5%)	9 (34.6%)	4 (15.4%)	9 (34.6%)	1 (3.8%)
Ethnicity (n = 58)	Does not identity as having Hispanic, Latino, Spanish, Middle Eastern, or North African origin	48	8 (16.7%)	16 (33.3%)	6 (12.5%)	16 (33.3%)	2 (4.2%)
	Identifies as having Hispanic or Latino or Spanish origin	5	0 (0%)	3 (60%)	0 (0%)	2 (40%)	0 (0%)
	Identifies as having Middle Eastern or North African origin	5	1 (20%)	1 (20%)	2 (40%)	0 (0%)	1 (20%)
Education (n = 76)	Attained doctorate degree	4	1 (25%)	2 (50%)	1 (25%)	0 (0%)	0 (0%)
	Pursuing doctorate degree	38	5 (13.2%)	9 (23.7%)	5 (13.2%)	16 (42.1%)	3 (7.9%)
	Attained master's degree and currently not pursuing another degree	8	2 (25%)	2 (25%)	1 (12.5%)	3 (37.5%)	0 (0%)
	Pursuing master's degree	20	2 (10%)	12 (60%)	3 (15%)	3 (15%)	0 (0%)

		Total					
	Attained bachelor's degree and currently not pursuing another degree	6	2 (33.3%)	1 (16.7%)	0 (0%)	1 (16.7%)	2 (33.3%)
Profession (n = 82)	Employed in industry	13	3 (23.1%)	4 (30.8%)	1 (7.7%)	4 (30.8%)	1 (7.7%)
	Employed in academia	8	2 (25%)	3 (37.5%)	1 (12.5%)	1 (12.5%)	1 (12.5%)
	Currently a student	61	8 (13.1%)	22 (36.1%)	9 (14.8%)	19 (31.1%)	3 (4.9%)
Academic institution (n = 69)	University of Illinois Urbana Champaign	62	10 (16.1%)	22 (35.5%)	9 (14.5%)	18 (29%)	3 (4.8%)
	Other academic institution	7	0 (0%)	3 (42.9%)	1 (14.3%)	2 (28.6%)	1 (14.3%)

Table 7. How inclusive survey respondents' current academic institution or place of employment is by demographic category.

Demographic Group	Category	Total	Very Inclusive	Somewhat Inclusive	Neither Inclusive nor Noninclusive	Somewhat Noninclusive	Very Noninclusive
All		81	23 (28.4%)	42 (51.9%)	4 (4.9%)	8 (9.9%)	4 (4.9%)
Age (n = 70)	18-24 years old	29	7 (24.1%)	18 (62.1%)	1 (3.4%)	3 (10.3%)	0 (0%)
	25-34 years old	34	11 (32.4%)	16 (47.1%)	2 (5.9%)	2 (5.9%)	3 (8.8%)
	35 years or older	7	2 (28.6%)	2 (28.6%)	0 (0%)	2 (28.6%)	1 (14.3%)
Gender (n = 65)	Cisgender female	39	11 (28.2%)	21 (53.8%)	2 (5.1%)	3 (7.7%)	2 (5.1%)
	Cisgender male	21	7 (33.3%)	11 (52.4%)	1 (4.8%)	1 (4.8%)	1 (4.8%)
	Queer gender	5	1 (20%)	2 (40%)	0 (0%)	2 (40%)	0 (0%)
Sexuality (n = 69)	Heterosexual	54	17 (31.5%)	26 (48.1%)	3 (5.6%)	5 (9.3%)	3 (5.6%)
	Queer sexual, romantic, and related orientations	15	2 (13.3%)	10 (66.7%)	0 (0%)	2 (13.3%)	1 (6.7%)
Marital status (n = 68)	Never married	49	10 (20.4%)	30 (61.2%)	3 (6.1%)	5 (10.2%)	1 (2%)

	Currently married or in non-married partnership	15	8 (53.3%)	4 (26.7%)	0 (0%)	1 (6.7%)	2 (13.3%)
	Previously married and not currently remarried	4	2 (50%)	1 (25%)	0 (0%)	1 (25%)	0 (0%)
Physical (dis)ability (n = 70)	Has physical disability	5	4 (80%)	1 (20%)	0 (0%)	0 (0%)	0 (0%)
	Does not have physical disability	65	16 (24.6%)	35 (53.8%)	3 (4.6%)	7 (10.8%)	4 (6.2%)
Cognitive (dis)ability (n = 69)	Has cognitive disability	7	4 (57.1%)	3 (42.9%)	0 (0%)	0 (0%)	0 (0%)
	Does not have cognitive disability	62	16 (25.8%)	33 (53.2%)	3 (4.8%)	7 (11.3%)	3 (4.8%)
Parental status (n = 70)	Does not have children	63	18 (28.6%)	33 (52.4%)	3 (4.8%)	6 (9.5%)	3 (4.8%)
	Has one or more children or are expecting first child	7	2 (28.6%)	3 (42.9%)	0 (0%)	1 (14.3%)	1 (14.3%)
Religion (n = 65)	Agnosticism	10	1 (10%)	7 (70%)	0 (0%)	1 (10%)	1 (10%)
	Atheism	12	5 (41.7%)	6 (50%)	0 (0%)	0 (0%)	1 (8.3%)
	Christianity	21	4 (19%)	12 (57.1%)	1 (4.8%)	3 (14.3%)	1 (4.8%)
	Hinduism	11	2 (18.2%)	7 (63.6%)	1 (9.1%)	1 (10%)	0 (0%)
	Islam	7	4 (57.1%)	3 (42.9%)	0 (0%)	0 (0%)	0 (0%)
	Other religious affiliation	4	3 (75%)	1 (25%)	0 (0%)	0 (0%)	0 (0%)
US residency status (n = 66)	US born citizen	35	8 (22.9%)	20 (57.1%)	2 (5.7%)	3 (8.6%)	2 (5.7%)
	Non-immigrant visa holder	31	11 (35.5%)	15 (48.4%)	1 (3.2%)	3 (9.7%)	1 (3.2%)
Race (n = 58)	Asian	32	11 (34.4%)	16 (50%)	2 (6.3%)	2 (6.3%)	1 (3.1%)
	White	26	5 (19.2%)	17 (65.4%)	0 (0%)	3 (11.5%)	1 (3.8%)
Ethnicity (n = 57)	Does not identity as having Hispanic, Latino, Spanish, Middle Eastern, or North African origin	46	12 (26.1%)	27 (58.7%)	2 (4.3%)	3 (6.5%)	2 (4.3%)
	Identifies as having Hispanic or Latino or Spanish origin	5	0 (0%)	3 (60%)	1 (20%)	1 (20%)	0 (0%)

	Identifies as having Middle Eastern or North African origin	6	2 (33.3%)	1 (16.7%)	0 (0%)	2 (33.3%)	1 (16.7%)
Education (n = 75)	Attained doctorate degree	5	4 (80%)	1 (20%)	0 (0%)	0 (0%)	0 (0%)
	Pursuing doctorate degree	38	6 (15.8%)	22 (57.9%)	3 (7.9%)	5 (13.2%)	2 (5.3%)
	Attained master's degree and currently not pursuing another degree	6	2 (33.3%)	4 (66.7%)	0 (0%)	0 (0%)	0 (0%)
	Pursuing master's degree	20	7 (35%)	12 (60%)	0 (0%)	1 (5%)	0 (0%)
	Attained bachelor's degree and currently not pursuing another degree	6	2 (33.3%)	1 (16.7%)	0 (0%)	1 (16.7%)	2 (33.3%)
Profession (n = 81)	Employed in industry	11	5 (45.5%)	4 (36.4%)	0 (0%)	1 (9.1%)	1 (9.1%)
	Employed in academia	9	4 (44.4%)	3 (33.3%)	0 (0%)	1 (11.1%)	1 (11.1%)
	Currently a student	61	14 (23%)	35 (57.4%)	4 (6.6%)	6 (9.8%)	2 (3.3%)
Academic institution (n = 70)	University of Illinois Urbana Champaign	62	15 (24.2%)	35 (56.5%)	4 (6.5%)	6 (9.7%)	2 (3.2%)
	Other academic institution	8	3 (37.5%)	3 (37.5%)	0	1 (12.5%)	1 (12.5%)