

**Title:** Representation and inclusion among members and affiliates of the Society for Epidemiologic Research: Findings from the 2021 Diversity and Inclusion Survey

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**Data Availability Statement:** Primary data we collected through the representation and inclusion survey data are not available, due to confidentiality. Data from the Association of Schools and Programs of Public Health (ASPPH) are available to member programs and schools, and others upon request through the ASPPH Data Center ([data@aspph.org](mailto:data@aspph.org)). Additional data sources used in this analysis are publicly available, including sociodemographic data from the US Census Bureau, UCLA Williams Institute, and the Los Angeles Times.

## **Abstract**

Diverse representation and inclusion are stated priorities for scientific institutions and professional societies, including the Society for Epidemiologic Research (SER). Prior studies have reported persistent underrepresentation and exclusion of marginalized groups across the sciences. We conducted a representation and inclusion survey among SER affiliates in 2021, following up on a similar 2018 survey. In 2021, we observed broad representation from diverse groups across multiple dimensions. However, across both surveys we found persistent underrepresentation of several marginalized groups, including Black or African American and Hispanic/Latinx people. Some groups reported feeling excluded in both the 2018 and 2021 surveys, and there was disproportionately high representation from a subset of higher-ranked US academic institutions. For several indicators of inclusion, perceptions of inclusion were more positive among White respondents compared to other respondents. Opportunities to work towards achieving SER's diversity and inclusion aims include increasing outreach to epidemiology trainees and Minority Serving Institutions, addressing cultural and financial barriers to participation, and improving access for epidemiologists with disabilities. Iterative follow-up work with diversity and inclusion scholars could improve our understanding of barriers to diversity and inclusion within SER and, more broadly, the field of epidemiology.

Diverse representation and inclusion are stated priorities for many scientific institutions and professional societies, including the Society for Epidemiologic Research (SER). Representation and inclusion are necessary elements in addressing critical questions in population health sciences, recruiting future generations of researchers and practitioners, and fostering more equitable educational and professional environments. As SER has acknowledged, however, representation alone is insufficient to achieve equity and inclusion (1). There has been persistent underrepresentation and systemic exclusion of marginalized groups in the sciences, including epidemiology (2–10). Individuals with multiple intersecting marginalized identities face compounded marginalization (11–13), which are symptoms of interpersonal and structural racism, classism, sexism, ableism, heteronormativity, religious-based discrimination, and other dimensions of marginalization, and which vary across institutional contexts (14,15). To advance SER's goals for diversity, equity, and inclusion (DEI), it is important to critically examine representation and elucidate structural barriers to equity and inclusion in our society and the discipline more broadly.

In response to this need, the SER Diversity and Inclusion (D&I) Committee has sought to characterize representation and inclusion among SER members and affiliates through surveys. Our aims were to compare representation among SER members and affiliates to relevant benchmarks in the places we live and work and to identify barriers to inclusion. In the 2018 baseline survey, while there was diverse representation among SER members across dimensions including race/ethnicity, gender, sexual orientation, language, and nationality, many groups were underrepresented relative to the United States (US) population, particularly transgender individuals, Black and Hispanic/Latinx people, and first-generation college students (10). Moreover, women and people with specific undisclosed racial/ethnic and religious identities were less likely to participate in SER activities and less likely to report feeling very welcomed.

Persistent underrepresentation and exclusion of marginalized groups are not unique to epidemiology, and there are some signs of improvement. The field of public health, and epidemiology specifically, has undergone substantial growth in recent decades, with some increases in representation from persistently marginalized groups. Between 1992 and 2012, there was an 8-fold increase in the number of public health baccalaureate degrees and a 4-fold increase in the number of public health master's and doctoral degrees conferred in the US (2). Over this time, graduates in public health programs have been more racially diverse than the general population of undergraduate students, with rising representation from racially marginalized groups throughout this period (3). The proportion of epidemiology master's and doctoral degrees awarded to students of color increased by 14.0% from 2007 to 2018, though the proportion of degrees awarded to Native American and Alaska Native students decreased (4). However, among epidemiology faculty, there was no change in representation of racially marginalized groups between 2010 and 2020, with persistent underrepresentation of American Indian, Alaska Native, Native Hawaiian, Pacific Islander, Black, and Hispanic/Latinx individuals (5). In other professional disciplines within the biomedical and geosciences sciences, investigators have found persistent exclusion of racially marginalized people, women, and gender minorities (7–9,16,17). Collectively, these studies indicate persistent barriers in recruiting and retention of individuals from marginalized backgrounds into biomedical careers, particularly in leadership positions (2,3).

There are significant gaps in the literature on diversity and inclusion in epidemiology, public health, and the sciences more broadly. More work is needed to compare diversity and inclusion between students and professionals in the public health sciences, which may help to identify deficiencies in the pathways between training programs and career opportunities. Few studies have longitudinally examined inclusion among public health trainees and professionals. Additionally, mixed methods approaches that integrate quantitative and qualitative data that provide important context regarding inclusion are infrequent. A critical and reflexive approach to designing and interpreting representation and inclusion studies, with engagement of relevant literature in the biomedical and social sciences, can improve the quality of analyses, interpretations, and resulting recommendations.

In this study, we provide an updated assessment of diversity and inclusion among SER members and affiliates and situate the experiences of SER members in the broader literature on diversity and inclusion. We compare the results from the 2021 SER D&I survey with those from the 2018 survey, as well as with relevant institutional and population benchmarks. We discuss specific DEI suggestions proposed by survey respondents. Finally, we make recommendations on how to produce more actionable diversity and inclusion knowledge, and how to address diversity and inclusion priorities identified by SER and similar professional societies.

## **Methods**

We recruited survey respondents through email, public announcements at SER's annual meeting, and social media. The survey was open to members and affiliates (including former members and others who had previously participated in SER activities). We collected data between May and September 2021 using SurveyMonkey, a web-based survey platform, on dimensions of diversity including race/ethnicity, gender, sexual orientation, (dis)ability, career stage, institution type, status as first-generation in higher education, religious affiliation, nationality, and language.

### *Positionality statement*

The positionality of researchers can influence the choice of topic, epistemological framing, ontology, methodological approaches, connection to study subjects, and communication of research findings (18,19). We met to discuss our positionality and wrote a collective statement (Appendix I).

### *Data*

The survey instrument comprised demographic questions across several domains, including individual, familial, educational, career, and institutional, as well as questions pertaining to participation and perceived inclusion in SER. The instrument was adapted from the 2018 survey (10) to include new questions that covered topics including self-described racial/ethnic identity, perceptions of diversity and inclusion within SER, and barriers to participation in SER events. There were four questions that overlapped between the 2018 and 2021 surveys: perceptions of whether institutions represented at SER were diverse, the diversity of ideas represented, the extent that respondents felt welcomed, and the extent to which the environment felt inclusive.

We included information from the SER members database to compare with information from survey respondents. As an external benchmark for representation in SER, we obtained racial/ethnic composition data from the Association of Schools and Programs of Public Health (ASPPH) for all faculty and U.S. citizen students attending U.S.-based institutions. ASPPH member institutions included 131 Council on Education for Public Health (CEPH) accredited schools/programs of public health and five applicants, though not all ASPPH member institutions reported demographic data. Finally, to compare representation among SER members and affiliates born or residing in the US with additional facets of US population diversity, we obtained nationally-representative sociodemographic data from the Los Angeles Times (20) for Middle Eastern/North African individuals (21), the Williams Institute at UCLA for sexual and gender minorities (22), and the US Census Bureau for the 2020 decennial census. To examine institutional diversity, we used data from the 2021–2022 US News and World Report (USNWR) Global University Rankings, which appraised 1,750 academic institutions globally and ranked them based on peer assessments from the Clarivate Academic Reputation Survey as well as bibliometric indicators of research productivity and impact (23). We also identified which universities met the criteria for Minority Serving Institutions (MSIs), including Historically Black Colleges and Universities (HBCUs) and Hispanic-Serving Institutions (HSIs).

### *Statistical analyses*

We calculated descriptive statistics for the number and percentages of survey respondents along each axis of diversity mentioned above along with medians and interquartile ranges for continuous demographic factors. Where possible, we compared metrics of representation for sociodemographic indicators that were assessed in both the 2018 and 2021 surveys. For perceptions of diversity and inclusion in SER, we asked participants to respond to questions either on a Likert scale (e.g., “very diverse” to “completely lacking diversity”) or to yes/no questions. For all inclusion-related questions, we reclassified responses numerically such that positive viewpoints (e.g., “very diverse”) were parameterized as positive numbers, negative viewpoints (“completely lacking diversity”) were represented with negative numbers, and neutral responses were represented by zero. We solicited suggestions for improving SER’s DEI efforts in an open-ended question. We calculated the mean and 95% confidence intervals for responses to each of these questions, including stratified analyses for race, gender, and religious groups.

### *Qualitative analyses*

To analyze responses to the open-ended questions collected in the survey, we used summative content analysis (24). Prior to analysis, we identified a coding scheme with broad categories of suggestions we hypothesized would emerge, including “reduce barriers,” “recruitment,” and “mentorship.” We refined initial codes and developed additional codes through the course of the analysis, informed by the content of responses, then quantified comments marked with each code and synthesized themes.

### *Ethical considerations*

The aim of this study was to evaluate the effectiveness of SER’s diversity and inclusion efforts, which did not require human subjects review. To ensure the confidentiality of respondents, at the time of survey administration we affirmed that we will not disclose personal identifiable information. We did not disclose responses related to inclusion for groups with fewer than 10 individuals. The SER D&I Committee is available to answer questions pertaining to the data and analyses presented here, and members of the Committee may be able to conduct additional analyses on behalf of interested parties.

## **Results**

There were 1,148 respondents to the 2021 survey, an increase of over 80% from the 2018 survey (Table 1). Among 2021 survey respondents, 866 respondents (79.3%) were current SER members, 165 (15.1%) were former members, and 61 (5.6%) had no history of membership but had attended at least one SER-sponsored event. Approximately 0.5% of survey respondents were current master’s students, undergraduates, or research assistants.

Between the 2018 and 2021 surveys, there were increases in the proportion of respondents who identified as Hispanic/Latinx (8.9% in 2018, 10.0% in 2021) and Asian/South Asian (17.1%, 18.5%). The proportion of Black/African American (10.2% in 2018, 7.7% in 2021) and Native Hawaiian/Pacific Islander (1.9%, 0.6%) respondents decreased; however, the absolute number of respondents from these groups increased. Among Hispanic/Latinx people, 7.8% were American Indian/Alaskan Native, 0.9% were Asian/South Asian, 11.3% were Black/African American, 0.9% were Middle Eastern/North African, and 63.5% identified as White (Table S1). Among people who identified as American Indian, nearly all referenced a “Hispanic” or “Mestizo” identity in responding to the free-response race/ethnicity question. Several individuals provided unexpected responses to the open-ended question on racial identity (Table S2). For example, some of these responses may indicate a sense of racial essentialism (“race is biologically assigned”) or racial colorblindness (“Human race”). Other unexpected responses may have been non-serious or a result of misunderstanding, such as “Venusian.”

With respect to gender, there was little change in the proportion of female (69.4% in 2018, 70.0% in 2021) or male (29.5%, 28.6%) respondents; however, there was greater representation from nonbinary individuals (0.2% in 2018, 1.0% in 2021) and transgender individuals (0.2%, 1.3%) (Table 1). With respect to sexual orientation, the proportion of bisexual (4.3% in 2018, 6.4% in 2021) and queer (0.6%, 9.0%) individuals increased whereas the proportion of heterosexual individuals (82.3%, 78.0%) decreased, though this may be attributable to differences in how these questions were asked in the survey.

There was also growth in representation of first-generation college students (12.8% in 2018, 20.9% in 2021) (Table 1). There were no substantial changes in the proportion of respondents born inside/outside of the US. The most frequent countries of birth or residence for SER affiliates were Brazil, Canada, China, India, and the US (Table S3). Between the two survey years, there was an increase in the proportion of respondents who speak a language other than English at home (17.6% in 2018, 27.6% in 2021).

With respect to disability, 3.8% of respondents indicated a physical disability in the 2018 survey, and in the 2021 survey, 2.0% (n=23) indicated that they required accommodations (0.3% mobility [wheelchair access], 0.8% hearing [assistive listening, sign language], 1.0% vision [large print]). This is a constrained assessment based on proxy indicators, and in the discussion we recommend improvements.

### *Institutional diversity*

Among the 24.9% of survey respondents reporting work in non-academic settings, the majority (56.7%) were working in positions affiliated with government, 12.2% were in industry, 11.9% were in consulting, and 19.3% were in other settings such as non-profits or health care organizations (Table S4). These respondents were more likely to reside in the US and not be affiliated with any school or program of public health (Table S5).

Among the survey respondents, 815 individuals (75.1%) worked in academic settings (Table S4). Among these respondents, 54.0% reported being affiliated with institutions in the upper 25th of the USNWR Global University Ranking distribution (higher-ranked) and 8.2% affiliated with institutions in the lower 25th of the distribution (lower-ranked) (Table S5). The remaining 37.8% were at institutions ranked between the 25th and 75th percentiles. Thus, there were 6.6 times as many respondents from higher ranked institutions as there were from lower ranked institutions (Table S6). Notably, higher ranked institutions were only 1.7 times as likely to have schools or programs of public health compared to lower ranked institutions (Table S7). Lower-ranked institutions represented in SER were more likely to be publicly funded, located in non-urban settings, or located outside the US compared to higher ranked institutions (Table S7). Additionally, participants affiliated with lower-ranked institutions were more likely to be first-generation college students (35.2% vs. 16.4% in higher-ranked). In both the 2018 and 2021 surveys, over a quarter of respondents were affiliated with eight higher-ranked US academic institutions, or 5.9% of the 135 institutions represented among respondents (Table S8).

There was relatively little representation from MSIs among survey respondents. Fewer than 1% of respondents were affiliated with HBCUs, with three HBCUs represented in the 2021 survey (of the 101 HBCUs), including one program of public health. Fourteen percent of respondents were at HSIs (including 19 public health programs/schools), representing 26 of the over 300 four-year HSIs. Notably, only 10.3% of survey respondents affiliated with HSIs identified as Hispanic/Latinx. None of the 32 Tribal Colleges and Universities (TCUs) were represented in any of the datasets used in this study, and none have accredited public health programs.

### *Benchmarks*

SER membership more than doubled between 2018 and 2021, from 1,631 to 3,494. Among all SER members, representation of Black/African American epidemiologists in SER increased from 7.1% in 2018 to 8.4% in 2021 (Table 1), similar to the proportion of SER members who took the survey (8.2%, Table S13). There was also an increased proportion of Asian/South Asian members, from 19.0% in 2018 to 20.9% in 2021. Members who identified as American Indian/Alaska Native, Native Hawaiian/Pacific Islander, White, and Hispanic/Latinx were more likely to complete the survey. Between 2018 and 2021, there were no substantial changes in representation by gender among SER membership, though notably there was disproportionately higher representation of women among survey respondents compared to the membership at-large.

Among SER affiliates residing in the US, and compared with the general US population, there was underrepresentation of people who identified as Hispanic/Latinx (8.4% in SER, 18.5% in the US) and Black/African American (8.6%, 13.4%) (Table S9). SER affiliates living in the US were more likely than the general population to have been born outside of the country (21.4% in SER, 13.5% in the US). Among SER members and respondents to the survey, there was greater representation of women compared to the general population (72.7%, 50.8%), as well as gender minorities (1.4% of SER members were transgender, compared to 0.4% in the US). Among respondents with tenure, 53.1% were women and 0.5% were gender minorities.

A total of 67,022 US students and 10,816 faculty across all public health disciplines were included in the ASPPH data, of which 9.0% were epidemiology students and 19.2% were epidemiology faculty (Table S10). Among students in the ASPPH dataset, compared to US-residing SER affiliates there was lower representation of Hispanic/Latinx (13.9% in ASPPH, 8.4% in SER) and Black/African American (12.9%, 8.6%) scholars in our survey. In the ASPPH data, both for students and faculty, representation of persistently racially marginalized groups declined with advancing seniority. For example, Black/African American individuals comprised 14.1% of master's students, 12.5% of doctoral students, 9.3% of assistant professors, 6.0% of associate professors, and only 3.1% of full professors.

#### *Indicators of inclusion*

We did not observe substantial differences across indicators of inclusion in a cross-sectional assessment of the 2021 survey when we stratified by the intersection of race/ethnicity and gender (Supplemental Figures 1-14) or by religion (Supplemental Figures 15-28). Indicators that were primarily neutral across these groups were: extent feel welcomed, felt particularly welcomed, and attempts to include early-career researchers. Indicators that were primarily negative across these groups were: attempts to include, institutions are diverse, diversity of ideas, extent environment inclusive, and members feel comfortable sharing.

Between the 2018 and 2021 surveys, there was an increase in respondents' perceptions that there was a diversity of ideas at SER, but a decrease in the proportion of respondents who felt that SER was inclusive or diverse, including for diversity of institutions. In both the 2018 and 2021 surveys, individuals from a specific religious group felt less welcomed. There were few notable differences when considering the intersections of race/ethnicity and gender (Supplemental Figures 29–32) or religion (Supplemental Figures 33–36). Compared to women, men had more positive perceptions of attempts of feeling welcomed, feeling comfortable sharing opinions, that members accept diversity, that early career researchers were included, that members communicate respectfully, and that there were opportunities for collaboration, with highest sense among White men (25). White individuals also were more likely to report positive changes with respect to the extent they felt welcomed, and these respondents also had more positive perceptions of the diversity of institutions represented at SER than other respondents. Of the 204 respondents who gave a reason for not renewing their membership, 32.8% indicated the cost of membership, 22.5% indicated not enough value, and 11.3% said they did not feel welcome or could not find their place (Table S11).

#### *Suggestions from respondents*

We analyzed 325 responses to the open-ended question regarding potential areas of improvement for diversity and inclusion at SER. We excluded 60 responses that were insufficient for analysis (e.g., “I don’t know”). The final code list included 32 codes. Respondents provided various suggestions as to how SER could improve diversity, equity, and inclusion both within the organization and the field more broadly, which we synthesized into ten key highlights (Table 2). Suggestions from survey respondents were holistic, targeting everything from the content and delivery of SER programming to the structure and composition of SER’s leadership and responsibility to the broader community. Suggestions ranged from small but potentially impactful changes that would be easily implemented to changes requiring considerable planning, commitment, and resources to actualize. For example, several respondents critiqued SERs current approach to Q&A sessions and provided suggestions for alternative approaches to increase accessibility:

*“The Q&A period needs to be re-thought so that it is not dominated by the same people, who tend to be senior, white, and male. Participants should be able to submit questions without going up to the microphone in front of the entire audience.”*

Others pointed to a need for more diverse representation in leadership roles:

*“Programming is great, but fundamental change will come when more department head and leadership roles are filled by women and people of color.”*

In addition, survey respondents highlighted subpopulations, such as individuals with disabilities, that have been overlooked even in the SER survey instruments to date:

*“SER has improved visibility & focus on racial health disparities, for which I am incredibly grateful. Keep this up! Still, disability is still essentially invisible within epidemiology work, especially health & wellbeing of people with disability. Epidemiologists with disabilities (physical, mental, neurodevelopment, etc) seriously need support - all the time, and also at annual meetings. Especially disabled epidemiologists with intersecting minoritized identities who face major barriers.”*

## **Discussion**

In this second iteration of the SER representation and inclusion survey, we observed broad representation from diverse groups and increases in representation of some groups. However, we also found persistent underrepresentation and exclusion of certain marginalized groups. Specifically, among SER members there was less representation of Black/African American and Hispanic/Latinx people compared to these groups’ representation among public health students, public health faculty, and the general US population. The proportion of American Indian, Alaska Native, Native Hawaiian, and Pacific Islander individuals in SER was similar to the proportion in the US population, though given the broad diversity within each of these groups, many tribal nations and perspectives are not represented. In some cases, there was greater representation of persistently underrepresented groups than in the general population, such as women and gender minorities. Institutional diversity did not improve substantially between the 2018 and 2021 surveys, with disproportionately high representation from a handful of higher-ranked US institutions. Our findings are similar to other studies assessing representation and inclusion in higher education and biomedical settings. Some survey respondents offered specific suggestions for ways to improve DEI efforts within the society, and we also offer our recommendations based on the analysis, a review of relevant literature, and the authors’ positionality. Additionally, we include suggestions for improving research efforts related to representation and inclusion in SER and peer scientific societies.

We recognize, and some survey respondents reported, that the racial categories included in the survey do not reflect self-identification of all respondents. This could be due to numerous factors, including broad diversity within racial/ethnic categories, as well as distinct histories of structural racism among countries represented in SER. Race is a social, not biological, construct and is

included in this study to help understand representation and inclusion among individuals with racial/ethnic identities that are persistently underrepresented and marginalized (26). To facilitate comparisons with population benchmarks, we focused on widely used racial/ethnic categories. However, many epidemiologists are already reconsidering how we study the interrelations between racism and health outcomes to mitigate health disparities (27–29). Racism is experienced at multiple levels, including internalized, interpersonal, institutional, and organizational racism (15), and more careful study of how racism manifests in SER and other scientific spaces is warranted.

We also found underrepresentation of people with disabilities, given that 22.2% of US adults report a disability (30), the largest legally protected group in the country (31). This is far more than the 2.0% of respondents who requested disability-related accommodations in the 2021 survey and the 3.8% who indicated they have a physical disability in 2018 (10). However, it is likely that at least some individuals with a disability were unable to indicate their status given survey constraints. Furthermore, disability scholars have noted common misconceptions among biomedical practitioners regarding the meaning of disability and diverse lived experiences of disability, and more careful consideration is needed (31).

As the field of epidemiology grows, there has been increasing representation of some racially and ethnically marginalized groups among trainees, but not among faculty (4,5). Among the growing population of undergraduate public health students, there is more representation from racially marginalized groups compared to all undergraduate degree programs, though the proportion of Black students decreased between 2003 and 2012 (2). Studies from other biomedical disciplines have observed similar trends. Among registered nurses, despite slight increases in racial diversity from 2008 to 2018, there have been persistent issues in recruiting and retaining nursing professionals who reflect the diverse patient populations they work with across the US (7,8). A study of diversity among vascular surgeons found that women, Black, and Hispanic/Latinx providers were persistently underrepresented at all career stages, with notably less diversity in senior positions (9), similar to what we observed. In the Society for Pediatric Anesthesia, there was disproportionately low representation of racially marginalized people, women, gender minorities, and sexual minorities in more senior positions (32), as has also been observed in epidemiology. Exclusion of racially and socioeconomically marginalized people in higher education has been reported across countries represented in SER, including Brazil, Canada, India, and the United Kingdom (33–39). Given the representation of epidemiologists worldwide, it is important to consider the diverse historical and cultural contexts through which marginalization has occurred in the biomedical sciences.

We observed low representation of MSI-affiliated scholars, a potential area for growth. According to the US Department of Education, in 2020, there were 456 four-year MSIs, including HCBUs, HSIs, TCUs, Asian American and Native American Pacific Islander-Serving Institutions, Native Hawaiian-Serving Institutions, Native American-Serving Non-Tribal Institutions (NASNTIs), and Predominantly Black Institutions (PBIs). Approximately 10% of MSIs have CEPH-accredited public health schools or programs. Among 138 four-year HBCUs or PBIs, six have an MPH program and two have schools of public health. Among the 238 HSI four-year institutions, 17 offer MPH programs and six have schools of public health. As epidemiology educational programs continue to expand to baccalaureate audiences, there is opportunity for SER to increase engagement with MSIs.

Persistent underrepresentation or exclusion of people with marginalized identities has broad impacts beyond the individual and impairs the quality of the scientific enterprise at large. Misconceptions of the extent of marginalization may exacerbate disparities and exclusion of marginalized groups. People from marginalized groups have higher rates of scientific innovation, but their new contributions are less likely to be recognized and these scholars are less likely to remain in scientific careers or to obtain research-oriented professorships (40). This may contribute to what some scholars describe as the minority tax or cultural tax, wherein individuals from persistently underrepresented groups are more likely to participate in diversity efforts (41,42). Uncompensated DEI work by individuals from marginalized groups contributes to burnout, adversely impacting their well-being and career advancement (42–45). In faculty hiring, DEI professionals have noted

the lack of structure or rubrics in evaluating candidates' contributions to DEI, which could contribute to lack of understanding of these professionals' workplace effectiveness (46). There are signs of DEI-related misconceptions among SER affiliates. Several survey respondents gave unexpected responses to the open-ended question on racial/ethnic identity, including erroneously characterizing race as biological (15) or calling the question itself "ridiculous." Without qualitative follow-up work, it is difficult to identify the underlying reasons for these responses. These unexpected responses may indicate a lack of awareness of the seriousness of racism and other dimensions of marginalization. Indeed, prior research has found widely held misconceptions about the severity of racial disparities, which may reduce the sense of urgency to address systemic racism (47). Notably, some of these unexpected responses came from more senior individuals in tenured positions.

Our assessment had several constraints and, in future iterations of this work, we recommend making changes to allow for more accurate and inclusive data collection. The data on ASPPH student race/ethnicity were restricted to US citizens in US-based institutions, and given disparities observed in other countries, data specific to public health training in those countries could elucidate further barriers. The USNWR Global University Rankings are subject to bias, though we addressed this by comparing institutions by quartile. Some of the trends we observed between the 2018 and 2021 survey may be spuriously attributable to the inclusion of non-members, systemic differences in the people who decided to respond to the survey, or to properties of the survey itself. For example, many individuals self-identified as queer in the 2021 survey, though this was not included as an option for the sexual orientation question in either survey. There was underrepresentation of men among survey respondents compared to SER membership, an issue that has been reported for other web-based surveys (48). Given that many individuals who identified as American Indian self-identified as Hispanic or Mestizo, in future survey iterations it may be helpful to assess representation of epidemiologists with tribal affiliations. Additionally, in questions on sexual orientation or gender identity (SOGI), the National Academies' Committee on Measuring Sex, Gender Identity, and Sexual Orientation suggests including Two-Spirit to represent Indigenous worldviews (37). The National Academies' Committee proposed five guiding principles for collecting SOGI data: inclusiveness, precision, autonomy, parsimony, and privacy (49). Future work should involve SOGI scholars in the design phase and incorporate validated questions from the SOGI literature. We neglected to include questions on disability status in the 2021 survey, and this absence was noted by several survey respondents; the 2018 survey asked one question regarding physical disabilities, though this does not adequately capture the diverse range of experiences of disability (31). We used the questions on requested accommodations as proxy indicators of disability status, but the omission of specific questions resulted in an incomplete dataset. We also did not ask about constructs including cognition, self-care, and independent living. In future survey iterations, we suggest asking questions inclusive of the full range of physical and neurological diversity represented among SER affiliates, such as the questions employed in the Behavioral Risk Factor Surveillance System regarding vision, cognition, mobility, self-care, and independent living (30). Specific questions about experiences of ableism in SER-sponsored events and other professional settings, including structural ableism (e.g., unaccommodating environments) and interpersonal ableism, would help elucidate modifiable barriers faced by these individuals. Survey respondents suggested anti-ableism educational programming and incorporating disability in discussions of various sources of bias and discrimination.

Issues of representation and inclusion are cross-cutting and there are many avenues that SER leadership, committees, and rank and file members can take to confront persistent structural and interpersonal barriers. Both within SER and ASPPH-affiliated institutions, a higher proportion of students and early-career researchers came from persistently marginalized backgrounds than did individuals in more senior roles. To improve diversity, SER could create more opportunities for meaningful involvement from students and trainees from marginalized backgrounds, including outreach to MSIs, which have additional resources to support these scholars. SER is already engaging in work of this type through the SERvisits program, through which SER-affiliated scholars visit underrepresented institutions and the Society provides financial support for students, faculty,

and staff from these institutions to attend the annual meeting. Establishing and maintaining connections with historically marginalized communities, including MSIs, requires sustained trust and relationship building (50–52). Further interventions could help students, trainees, and others from marginalized groups feel more included, such as reducing cost as a barrier to participation and structuring discussions in such a way that they are not dominated by more senior members. There are also opportunities to engage with underrepresented institutions across the globe, building on the diversity of countries, languages, and cultures already represented among SER members. In March 2023, for example, SER held a Mid-Year Meeting in Spanish at the Instituto Nacional de Salud Pública in Cuernavaca, México, incorporating recommendations from a recent commentary from the SER D&I committee (53).

In this assessment of representation and inclusion among SER affiliates, we found that while there is diverse representation along many dimensions, for some groups there has been persistent underrepresentation and exclusion. Many institutions, funding agencies, and professional societies such as SER have stated goals to improve diversity. Producing actionable knowledge with respect to representation and inclusion requires substantial investment of financial and other resources. Interdisciplinary methods and framing are necessary to design effective studies and generate richer discussion, iteratively incorporating both quantitative and qualitative data. Collaboration with trained diversity and inclusion scholars is a critical component of this work (52). As epidemiologists, we regularly partner with subject-area experts (e.g., pathologists, obstetricians, engineers) to design sound epidemiological studies and to carefully interpret the internal and external validity of such work, with the aim of informing clinical and policy interventions to improve public health. The study of diversity and inclusion within the field of epidemiology, and indeed the sciences in general, requires just as careful a process.

## Tables

**Table 1.** Descriptive statistics for respondents to the 2021 and 2018 diversity and inclusion surveys, as well as the 2021 and 2018 membership surveys (representing all SER members).

Measure	2021 survey	2018 survey	2021 membership	2018 membership
n	1,148	631	3,494	1,631
Gender (%)				
Female	70.0	69.4	66.1	65.7
Male	28.6	29.5	33.9	34.3
Nonbinary	1.0	0.2	—	—
Another gender not listed	0.3	0.6	—	0.6
No response	0.1	0.2	—	0
Transgender	1.3	0.2	—	—
Cisgender	98.2	99.3	—	—
No response	0.5	0.5	—	—
Race/ethnicity* (%)				
Hispanic or Latina/o/x of any race	10.0	8.9	5.2	5.5
American Indian or Alaskan Native	1.1	1.3	0.2	—
Asian or South Asian	18.5	17.1	20.9	19.0
Black or African American	7.7	10.2	8.4	7.1
Middle Eastern or North African	3.0	2.5	—	—
Native Hawaiian or Pacific Islander	0.6	1.9	0.1	—
White	68.6	67.8	53.3	61.7
Sexual Orientation (%)				
Asexual	0.4	0.2	—	—
Bisexual	6.4	4.3	—	—
Gay or Lesbian	7.0	7.4	—	—
Heterosexual	82.3	78.0	—	—
Pansexual	0.8	0.6	—	—
Queer	9.0	0.6	—	—
Questioning	0.1	—	—	—
Another orientation not listed	0.2	1.7	—	—
No response	2.0	7.2	—	—
Highest degree obtained				
Bachelor's	2.2	—	—	—
Master's	24.0	25.4	—	—
Doctorate	70.7	66.6	—	—
First-generation college student				
Yes	20.9	12.8	—	—
No	75.4	86.2	—	—
No response	0.7	1.0	—	—
Country of birth**				
US	64.4	65.8	81.1	—
Outside the US	31.3	29.3	18.9	—
No response	4.4	4.9	0.1	—
Speak non-English language at home				
Yes	27.6	17.6	—	—
No	72.4	80.4	—	—
No response	—	2.1	—	—

Data on sexual orientation, language use, and several specific racial/ethnic identity were not collected in the membership surveys. \* Race/ethnicity categories are not mutually exclusive; survey respondents could select all that applied. \*\* We provide more detailed information on country of birth or country of residence in Table S3.

**Table 2.** Key highlights from summative analyses of open-ended responses to the question: “What areas of improvement would you suggest for diversity and inclusion at SER? For example, are there any specific diversity and inclusion programming, events, or initiatives you would suggest that SER pursue in the next 1-3 years?”

Key Highlights	Main Codes	Example Quotes
1. Transparency and accountability are imperative from the outset	Accountability (N=2); Communication (N=5); Evaluation (N=1)	"Be visibly accountable for harms of the past." "It would be nice to see targets for diversity in sessions that are reviewed with symposium submissions, metrics publicly presented, tracked and presented year on year in the president's speech to show progress."

2. SER needs to expand where (and when) we target our recruitment and outreach efforts.	Recruitment (N=10); Outreach (N=22)	"I would like to see a commitment to (and focus on) the pipeline with general resources that can be used by anyone and are relevant to at least grade 7 through college level to help create greater interest in epidemiology and thought/ discussion on how we can generate local and national resources to make pursuing that interest feasible for more young people."
		"SER need to improve in engaging students and faculty from Historically Black Colleges and Universities (HBCUs) to be members of the organization. There are a lot of students at these institutions that aren't even aware this organization exists. SER have presentations related to diverse topics but the presenters do not represent the population that is being discussed, so there needs to be tremendous improvement in this area."
3. SER needs to reduce the financial, physical, and organizational barriers folks face in participating.	Reduce Barriers (N=16); Scholarships/ Funding (N=12); Virtual Options (N=14); Supporting Historically Excluded (N=15)	"A recent SPC survey found that 62% of respondents did not attend the annual meeting due to lack of funds. In addition, 63% of those attending the conference paid out-of-pocket. SER is missing out on a large amount of students and postdoc involvement. SER needs to advocate to it's members who are faculty/professionals to support student/mentee involvement with funds when possible and SER can also help support inclusion by continuation of fee reduction and waivers when possible, including membership fees. The virtual option is also another method to do this and should be considering going forward. "
		"When you have BIPOC panelists to discuss diversity and inclusion, you need to compensate them for their work. BIPOC academics tend to be more junior compared to their white counterparts, and when you are junior faculty or a doc/pos-doc student, your time matters immensely. Asking BIPOCs to discuss how we should be included in SER but then not compensating us for our time and thoughts is unacceptable."
		"Offering childcare options at conferences may support parents with children in attending."
4. SER needs to better address barriers for certain subgroups	Disability & Ableism (N=7); LGBTQ (N=11); International (N=33); Religion-Based Discrimination (N=2)	"SER has improved visibility & focus on racial health disparities, for which I am incredibly grateful. Keep this up! Still, disability is still essentially invisible within epidemiology work, especially health & wellbeing of people with disability. Epidemiologists with disabilities (physical, mental, neurodevelopment, etc) seriously need support - all the time, and also at annual meetings. Especially disabled epidemiologists with intersecting minoritized identities who face major barriers."
		"Please don't require us to state our personal pronouns before speaking."

5. Folks at different career stages have different needs that would benefit SER support	Early Career (N=18); Mid-Career (N=2); Older Epidemiologists & Agism (N=2); Beyond the Academic Epidemiologist (N=22)	<p>"Publish online accepted abstracts and posters/presentations so junior members can link to it from their profiles and build their reputations, networks, and careers. SER 2020 never published accepted abstracts in the Epidemiology Journal. Give junior members more discounts, have senior members mandatory mentor at least one junior member and incentivize with senior member recognition"</p> <p>"Mid-career individuals tend to be overlooked everywhere (grants, awards etc.) so more earmarked for them and for women ; true inclusion and not just those that seem the right things to do now"</p> <p>"Older professionals who return for advanced degrees later in life can find themselves caught in a generational gap that can make it hard for them to feel included (i.e. they are the same age or older than faculty or senior epidemiologists, but are junior in their career advancement. Sometimes this can cause a feeling of not belonging anywhere)."</p> <p>"There are attempts to include junior levels which is great. However, it seems student focused. It'd be nice to see inclusion of professionals that aren't PhD level.</p>
6. SER needs to further foster opportunities for members of marginalized and/or underrepresented groups to build community and social capital	Affinity Groups (N=12); Mentorship (N=15); Social (N=4)	<p>"I think SER could do a better job creating spaces for affinity groups beyond student or junior people - such as BIPOC epidemiologists or first generation students, etc."</p> <p>"I am not sure if this is a DEI initiative exactly, but I liked the mentorship pilot program and feel something similar to connect members and promote networking, mentorship, and collaboration would be potentially welcomed. As someone who did not go to one of the major public health universities for my schooling, I felt like the mentorship program really benefited me."</p>
7. SER needs to integrate more sessions for members that both provide historical context and guidance for how to advance DEI	Program Development (N=45)	<p>"Training on racial equity/historical injustice and how this has shaped health for everyone in the US. Training on how to put epi research into this historical context. Training for white mentors on how to support and not harm minoritized students &amp; junior folx. Just as important as methods trainings!"</p>
8. SER needs to employ strategies to diversify who we hear from at annual meeting sessions etc	Fostering SER Community Discussion (N=8); Thought Diversity (N=29)	<p>"Setting up ways for workshops/symposiums to be coordinated by first time folks with the support of mentors might bring in more diverse people and topics"</p> <p>"The Q&amp;A period needs to be re-thought so that it is not dominated by the same people, who tend to be senior, white, and male. Participants should be able to submit questions without going up to the microphone in front of the entire audience."</p>

<p>9. Improving DEI in SER and beyond requires reimagining the structure of SER's leadership</p>	<p>SER Structural Change (N=11); Center Marginalized Groups (N=8); Institutional Elitism (N=37)</p>	<p>"Programming is great, but fundamental change will come when more department head and leadership roles are filled by women and people of color."</p> <p>"Create two new positions on the SER Executive Committee: "Student Member at Large" and "Post-Doc Member at Large." Appointed by a nomination and award process, one to two students and one to two postdocs from underrepresented communities join the SER Executive Committee for a one-year term. Include a small monetary award, and frame the position like a leadership fellowship (in contrast to a research fellowship). And be clear that being a member of an "underrepresented" community is a condition of the position (since it exists to advance SER's objectives for diversity and inclusion), but that it can be defined expansively: include neurodivergence, disability, first-gen, LGBTQ, foster care, having been a "nontraditional student" in undergrad, having an incarcerated parent during childhood, from rural area, or otherwise disadvantaged background."</p> <p>"Really evaluate the diversity of institutions and ideas represented across activities and leadership. I have a love-hate relationship with SER because it is a large and important forum in epidemiology, but the leadership and opportunities are pedigree-based. The people in leadership more often than not came out of or are at certain programs (NICHD, BU, etc). This reinforces the incorrect notation that good research only comes out of institutions that look and act a certain way. Ultimately, the diversity of ideas and institutional representation is seriously lacking and people not in the pedigree pipeline have to "pay-to-play" because attending an expensive meeting and passively attending other virtual activities is the only way to participate. SER just feels like yet another gatekeeper in the path to success in epidemiology rather than an organization that is truly inclusive and supportive of all people, institutions, and ideas that comprise epidemiologic research."</p>
<p>10. SER should be an advocate for broader community needs</p>	<p>Advocacy (N=7); Improvements to Education (N=5); Research Priorities (N=11)</p>	<p>"Leading in discussion &amp; development of recommendations for equity-promoting (or at least not equity-harming) epidemiological research"</p> <p>"Promote diversity in epidemiologic training. Conduct research into the phenomenon of diversity in epidemiologic professions. Identify goals for promotion of diversity in epidemiologic professions, and conduct actions to promote diversity."</p>

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## Supplementary Materials

**Table S1.** Survey respondent race stratified by Hispanic ethnicity.

Metric	Hispanic or Latinx	Not Hispanic or Latinx
n	115	1,000
Race (%)		
American Indian or Alaskan Native	7.8	0.4
Asian or South Asian	0.9	21.1
Black or African American	11.3	7.4
Middle Eastern or North African	0.9	3.4
Native Hawaiian or Pacific Islander	0	0.7
White	63.5	71.2
Country of birth (%)		
Born in the U.S.	67.0	83.7
Not born in the U.S.	31.3	15.3
No response	1.7	1.0

**Table S2.** Unexpected responses to the open-ended question about racial/ethnic identity.

There is only ONE race: the human race. Referring to ethnicity: I am Hispanic
Identifiers? I am African American. Please change how this is worded. Race is not a group of adjectives you choose, race is biologically assigned.
I don't wish to be identified by my race
paneuropean caucasian
Female
I do not think about this: a "mongrel" is the best description, if pressed.
she, her
white, but I don't think of myself that way since my family is multiracial.
White curly hair
evangelical
Human race
White melting pot
Human being
white fragility
Venusian
yellow race
Fair skin, blue eyes
Mixed, such as almost everybody in this planet
I don't feel a racial identity but I am socially recognized as white
I do not wish to answer that
RACE is not equivalent to ethnicity
This is ridiculous, what was the purpose of question 5?
There is only ONE RACE. The human race
mixed

**Table S3.** Count of survey respondents by country of birth and country of residence at time of the survey.

Country*	Country of birth (n)	Country of residence (n)**
Brazil	27	16
Canada	55	80
China	28	-
Great Britain	13	-
India	28	-
Japan	12	-
Mexico	11	-
Nigeria	13	-
Republic of Korea (South Korea)	12	-
United States	739	917

\*Respondents identified additional countries of birth and residence, but due to small cells ( $n < 10$ ) they were suppressed. These suppressed countries included: Afghanistan, Argentina, Australia, Austria, Bangladesh, Belgium, Belize, Bermuda, Bolivia, Bulgaria, Cameroon, Central African Republic, Chile, Colombia, Costa Rica, Czech Republic, Dominican Republic, Ecuador, Egypt, Estonia, Ethiopia, France, Germany, Ghana, Grenada, Guatemala, Guyana, Haiti, Honduras, Indonesia, Iran, Ireland, Islamic Republic of Iran, Israel, Italy, Ivory Coast, Jordan, Kazakhstan, Kenya, Kuwait, Lebanon, Liberia, Malaysia, Nepal, Netherlands, Nicaragua, Pakistan, Peru, Philippines, Poland, Portugal, Puerto Rico, Republic of Korea, Republic of Macedonia, Romania, Russian Federation, South Africa, Spain, Sweden, Switzerland, Syria, Taiwan, Trinidad & Tobago, Uganda, Ukraine, United Arab Emirates, United Kingdom, Venezuela, Vietnam, Yemen, Zambia, and Zimbabwe.

\*\*Seven countries of birth with  $\geq 10$  respondents but  $< 10$  respondents residing there were also suppressed.

**Table S4.** Reported category of current occupational setting (column %,  $n=1085$ ).

Primary Occupational Setting	Academic ( $n=815$ )	Non-academic ( $n=270$ )*
Academic*	100.0%	
Government/Governmental Contractor	-	56.7%
Industry	-	12.2%
Consulting	-	11.9%
Other*‡	-	19.3%

\* Other text responses that indicated being currently retired or unemployed were set to missing; students were recoded to as being in an academic setting; total missingness of 63.

‡ Other text responses included common write ins such as: non-profit, health care organizations, clinical careers, etc.

**Table S5.** Reported institutional affiliations and linked information (column %, n=908).

Metric	Academic (n=715)	Non-academic (n=193)*
Institutional Location (%)		
US	83.5	85.6
Non-US	16.5	14.4
Missing n	13	5
City		
City	88.0	88.2
Suburban	9.7	11.8
Town/rural	2.3	0.0
Missing n	139	159
ASPPH Affiliation (%)		
School of Public Health	55.9	11.4
Program of Public Health	13.0	2.1
CEPH Applicant	0.4	0.1
Not affiliated	30.6	86.0
Missing n	0	0
Context (%)		
Public	58.9	18.0
Private	38.8	6.9
Other	2.3	75.1
Missing n	14	4
Carnegie R Designation (%)		
R1 Doctoral University with Very High Research Activity	84.9	73.5
R2 Doctoral University with High Research Activity	5.0	11.8
Special Focus Four Year Medical School or Center	8.3	11.8
HBCUs	0.4	2.9
HSIs	25.7	17.7
TCUs	0.0	0.0
Missing n	139	159
USNWR Global Rank (%)		
Upper 25th Percentile	54.0	52.5
Interquartile	37.8	37.5
Bottom 25th Percentile	8.2	10.0
Missing n	57	153

\* Other text responses that indicated being currently retired or unemployed were set to missing; students were recoded to as being in an academic setting; 177 (100 academic, 77 non-academic) individuals were missing institutional information to allow linkage to external data or declined to provide this information.

**Table S6.** Individual characteristics for respondents affiliated with academic institutions (column %, n=658)

	USNWR Global Ranking*		
	Upper 25th (n=355)	Interquartile (n=249)	Lower 25th (n=54)
<b>Race/ethnicity (%)</b>			
Hispanic or Latina/o/x of any race	8.5%	11.2%	9.3%
American Indian or Alaskan Native	0.6%	2.0%	-
Asian or South Asian	17.5%	17.7%	18.5%
Black or African American	8.5%	3.6%	9.3%
Middle Eastern or North African	1.7%	4.8%	7.4%
Native Hawaiian or Pacific Islander	0.6%	0.8%	-
White	74.1%	76.3%	63.0%
Multiracial	5.9%	7.6%	3.7%
<b>First generation college student (%)</b>			
Yes	16.4%	20.2%	35.2%
No	83.9%	79.8%	64.8%
Missing	1	2	0
<b>Part or all of childhood included any of the following (%)</b>			
Public Assistance	11.0%	7.6%	16.7%
Housing Insecurity	4.2%	4.4%	11.1%
Single Parent	17.8%	19.3%	20.4%
None	76.1%	76.3%	68.5%
Missing	0	0	0
*Percentiles were based on the distribution of USNWR Global Ranks available online for the 135 institutions identified by survey respondents. The interquartile range was between 72 to 587.			

**Table S7.** Characteristics of academic institutions for respondents from academic contexts (column %, n=658)

	USNWR Global Ranking*		
	Upper 25th (n=355)	Interquartile (n=249)	Lower 25th (n=54)
<b>Institutional Location (%)</b>			
Based in US	90.4%	82.7%	68.5%
Based outside the US	9.6%	17.3%	31.5%
Missing	0	0	0
<b>City</b>			
City	94.4%	84.4%	59.5%
Suburban	5.6%	11.2%	32.4%
Town or rural	0.0%	4.4%	8.1%
Missing	34	44	17
<b>ASPPH Affiliation (%)</b>			
School of Public Health	66.8%	57.8%	37.0%
Program of Public Health	11.3%	18.9%	9.3%
Not affiliated	22.0%	23.3%	53.7%
Missing	0	0	0
<b>Context (%)</b>			
Public	52.7%	67.9%	79.3%
Private	47.0%	32.1%	20.8%
Other	0.3%	0.0%	0.0%
Missing	0	0	1
<b>Carnegie R1 Designation as Doctoral University with Very High Research Activity (%)</b>			
Carnegie R1 Designation as Doctoral University with Very High Research Activity (%)	94.4%	84.4%	35.1%
<b>Carnegie R2 Designation as Doctoral University with High Research Activity (%)</b>			
Carnegie R2 Designation as Doctoral University with High Research Activity (%)	0.0%	5.4%	37.8%
<b>Carnegie Designation as Special Focus Four Year Medical School or Center (%)</b>			
Carnegie Designation as Special Focus Four Year Medical School or Center (%)	5.6%	10.2%	13.5%
Missing	34	44	17

\*Percentiles were based on the distribution of USNWR Global Ranks available online for the 135 institutions identified by survey respondents. The interquartile range was between 72 to 587.

**Table S8.** Academic institutions with the greatest representation among survey respondents.

<b>Academic Institution</b>	<b>Frequency (%)</b>	<b>USNWR Global Rank</b>
Harvard University*	5.01	1
Boston University*	4.30	65
Johns Hopkins University*	4.30	9
Emory University*	4.01	74
University of North Carolina*	3.87	39
Columbia University*	3.30	6
University of Minnesota	3.01	55
McGill University	2.87	51
University of California, Berkeley	2.72	4
University of Washington	2.72	7
University of California, San Francisco*	2.44	11
University of Utah	2.44	151
University of Arizona	2.15	99
New York University	2.01	30
Brown University	2.01	119
Drexel University	2.01	354
University of Toronto	1.86	16
Pittsburgh University	1.72	42
Yale University	1.58	12
Ohio State University	1.58	52
University of Michigan	1.43	19

A total of 698 survey respondents (both working in academic and other settings) provided an institutional affiliation that could be linked to the USNWR Global Rankings. \*These schools and the University of Iowa (not shown, with 0.9% frequency) comprised 25% of the survey responses in the 2018 survey.

**Table S9.** Demographics for the 917 U.S.-based survey respondents compared to representative figures for the U.S. population.

Metric	U.S.-based SER affiliates (%)	U.S. population (%)
Gender (%)		
Female	72.7	50.8
Male	25.8	49.2
Nonbinary	1.0	0.4
Another gender not listed	0.3	—
Transgender	1.4	0.4
Cisgender	97.9	99.6
Race/ethnicity (%)		
Hispanic or Latina/o/x of any race	8.4	18.5
American Indian or Alaskan Native	1.4	1.3
Asian or South Asian	16.4	5.9
Black or African American	8.6	13.4
Middle Eastern or North African	3.1	0.9
Native Hawaiian or Pacific Islander	0.7	0.2
White	74.2	76.3
Multiracial	6.0	2.8
Highest degree obtained		
Bachelor's	1.9	22.2
Master's	23.8	9.6
Doctorate	74.0	1.9
Missing	0.3	—
Country of birth		
U.S.	77.2	86.5
Outside the U.S.	21.4	13.5
Missing	1.4	—

Representative U.S. data for identity as non-binary, transgender, or cisgender UCLA were obtained from Williams Institute 2021 estimates. Data for highest degree obtained for adults 18 years or older from the 2020 American Community Survey. Data for Middle Eastern and North African population from a 2021 Los Angeles Times analysis of U.S. Census Data. Outside the U.S. includes those born in Puerto Rico, U.S. Island areas, or born abroad to American parent(s) (1.6%)

Gender (<https://williamsinstitute.law.ucla.edu/publications/nonbinary-lgbtq-adults-us/>, <https://williamsinstitute.law.ucla.edu/wp-content/uploads/LGBT-Adult-US-Pop-Jul-2020.pdf>)

Race/ethnicity: <https://www.census.gov/quickfacts/fact/table/US/PST045221>

Educational attainment: <https://www.census.gov/data/tables/2020/demo/educational-attainment/cps-detailed-tables.html>

Foreign born: <https://data.census.gov/cedsci/table?q=foreign%20born&tid=ACSDP5Y2020.DP02>

MENA: <https://www.latimes.com/projects/la-me-census-middle-east-north-africa-race/>

**Table S10.** Racial and ethnic composition of students and faculty in Association of Schools and Programs of Public Health (ASPPH) members, Fall 2020.

	All U.S. Students*				Epidemiology U.S. Students*				All Faculty*			Epidemiology Faculty*				
	Total (n=67,022)	Doctoral (n=7,009)	Masters (n=30,049)	Bachelors (n=29,964)	Total (n=6,038)	Doctoral (n=1,375)	Masters (n=4,537)	Bachelors (n=127)	Total (n=10,816)	Professor (n=3,142)	Associate (n=2,371)	Assistant (n=2,593)	Total (n=2,076)	Professor (n=694)	Associate (n=504)	Assistant (n=518)
<b>ASPPH Member Programs/Schools of Public Health N (%)**</b>	<b>112</b>	<b>78</b>	<b>112</b>	<b>47</b>	<b>83</b>	<b>65</b>	<b>82</b>	<b>2</b>	<b>177</b>	<b>111</b>	<b>114</b>	<b>116</b>	<b>89</b>	<b>78</b>	<b>81</b>	<b>81</b>
Hispanic or Latinx, of any race	9296 (13.9)	715 (10.2)	4043 (13.5)	4539 (15.1)	683 (11.3)	105 (7.6)	566 (12.5)	13 (10.2)	684 (6.3)	267 (8.5)	189 (8.0)	128 (4.9)	117 (5.6)	41 (5.9)	29 (5.8)	24 (4.6)
American Indian or Alaskan Native	271 (0.4)	36 (0.5)	142 (0.5)	93 (0.3)	33 (0.5)	10 (0.7)	23 (0.5)	0 (0)	41 (0.4)	7 (0.2)	7 (0.3)	14 (0.5)	2 (0.1)	1 (0.1)	1 (0.2)	0 (0)
Asian	9381 (14.0)	902 (12.9)	4306 (14.3)	4174 (13.9)	987 (16.3)	233 (17.0)	747 (16.5)	7 (5.5)	1452 (13.4)	422 (13.4)	363 (15.3)	432 (16.7)	297 (14.3)	90 (13.0)	87 (17.3)	89 (17.2)
Black or African American	8617 (12.9)	876 (12.5)	4222 (14.1)	3519 (11.7)	746 (12.4)	143 (10.4)	592 (13.0)	11 (8.7)	683 (6.3)	98 (3.1)	140 (5.9)	241 (9.3)	111 (5.3)	19 (2.7)	29 (5.8)	44 (8.5)
Native Hawaiian or Pacific Islander	175 (0.3)	12 (0.2)	58 (0.2)	105 (0.4)	6 (0.1)	2 (0.1)	4 (0.1)	0 (0)	16 (0.1)	4 (0.1)	5 (0.2)	7 (0.3)	1 (<0.1)	1 (0.1)	0 (0)	0 (0)
White	33973 (50.7)	3881 (55.4)	14771 (49.2)	15322 (51.1)	3110 (51.5)	771 (56.1)	2259 (49.8)	80 (63.0)	6204 (57.4)	1984 (63.1)	1394 (58.8)	1372 (52.9)	1199 (57.8)	450 (64.8)	304 (60.3)	278 (53.7)
Two or more races	3011 (4.5)	270 (3.9)	1169 (3.9)	1572 (5.2)	230 (3.8)	47 (3.4)	167 (3.7)	16 (12.6)	83 (0.8)	17 (0.5)	22 (0.9)	27 (1.0)	14 (0.7)	3 (0.4)	3 (0.6)	5 (1.0)
Race unknown	2298 (3.4)	318 (4.5)	1339 (4.5)	641 (2.1)	244 (4.0)	64 (4.7)	180 (4.0)	0 (0)	1653 (15.3)	343 (10.9)	251 (10.6)	372 (14.3)	335 (16.1)	89 (12.8)	51 (10.1)	78 (15.1)

\*ASPPH members are located in the U.S. (n=131) and other countries (e.g. China, Grenada, Lebanon, Mexico, Taiwan). Student data only includes US-citizen students and US-based programs. Faculty information is based on US-citizen and non-citizen (for select programs) information.

\*\*Member Programs/Schools of Public Health with race/ethnic data are either CEPH accredited (n=131) or current CEPH applicants (n=5).

**Table S11.** Indicators of inclusion among current SER membership. Results from the 2021 Diversity and Inclusion Survey (N=1,148)

Metric	n (%)
SER membership status	
Current member	866 (75.4)
Never member (only attended the annual meeting)	61 (5.3)
Past Member	165 (14.4)
Not applicable	56 (4.9)
Last year that attained an SER Membership	
1995-2010	10 (0.9)
2011-2020	130 (11.3)
Not applicable	1,008 (87.8)
Duration of the membership (years)	
Less than 5	110 (9.6)
5-9 years	25 (2.2)
10-19 years	12 (1.0)
20 or more	11 (1.0)
Not applicable	990 (86.2)
Reasons for not renewing membership	
Cost	67 (5.8)
Not enough value for the cost	46 (4.0)
Retired or ended my career	8 (0.7)
Felt unwelcomed or couldn't find my place	23 (2.0)
Other	60 (5.2)
Not applicable	944 (82.3)
Submitted an abstract to SER	
Submitted as a first author	567 (49.4)
Not applicable	581 (50.6)
Abstract accepted for poster presentation	
Accepted as a first author	540 (47.0)
Not applicable	608 (53.0)
Abstract accepted for oral presentation	
Accepted as a first author	313 (27.3)
Not applicable	835 (72.7)
SER Symposium submission	
Submitted a proposal	122 (10.6)
Not applicable	1026 (89.4)
SER Symposium invitation	
Invited to present	150 (13.1)
Not applicable	998 (86.9)
Acceptance of Symposium invitation	
Presented as part of an accepted proposal	159 (13.9)
Not applicable	989 (86.1)
SER workshop Submission	
Submitted a workshop proposal	42 (3.7)
Not applicable	1106 (96.3)
Conducted an SER workshop	
Conducted a proposed workshop	42 (3.7)
Not applicable	1106 (96.3)
Chaired an SER spotlight session	
Chaired or co-chaired a spotlight session	69 (6.0)
Not applicable	1079 (94.0)
Served as a judge for posters	
Judged posters	145 (12.6)
Not applicable	1003 (87.4)
Served on a standing committee	

Served on a committee	170 (14.8)
Not applicable	978 (85.2)
Served as an abstract reviewer	
Reviewed abstracts	356 (31.0)
Not applicable	792 (68.1)
Served on an ad-hoc committee	
Volunteered on an ad-hoc committee	61 (5.3)
Not applicable	1087 (94.7)
SER-talk participation	
Attended an SERtalk	428 (37.3)
Not applicable	720 (62.7)
SER-digital participation	
Attended an SERdigital online	295 (25.7)
Not applicable	853 (74.3)

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## Appendix I. Group Positionality Statement

A positionality statement is a brief description of author(s)'s "identity, social location, experiences, influences, and philosophy concerning an issue" (1), usually located at the end of a publication to acknowledge the author(s)'s consideration of their own identities in relation to the research being presented. These statements are a common element of research in the social sciences, and recently authors in the sciences and engineering have called for including positionality statements in quantitative studies (2,3). The positionality of researchers can influence the choice of topic, epistemological framing, ontology, methodological approaches, connection to study subjects, and communication of research findings (3). Consequently, positionality is particularly important for studies addressing issues of representation and inclusion, such as the current study of SER members and affiliates.

We, the authors of the current study, considered our own positionality by responding to a survey, collectively discussing our positionality following the structure suggested by Secules et al. (3), and collaboratively writing this statement. The survey asked how authors identified in the following areas: racial/ethnic identity, gender, sexual orientation, religion, institution type, position within institution, tenure status, first-generation college student status, country of birth, country of residence, and SER membership status.

Results from the positionality survey indicated authors identified from the following racial and ethnic groups: Black or African American, Hispanic or Latinx, and White. Gender identities included men and women. Sexual orientations included: queer, heterosexual, and pansexual. Respondents identified with the following religions: Agnosticism, Christianity, Judaism, Inter-Nondenominational, and no religion. Institution affiliations included public and private universities and federal government. Current positions included students, postdocs, tenured and untenured faculty, staff, principal investigators, and independent researchers. Some respondents identified as being first-generation college students. Reported countries of origin included: Guatemala, Nigeria, and the United States, including Puerto Rico. Country of residence for all respondents was the United States. Respondents reported being SER members, former SER members, and never being a SER affiliate. All of the co-authors volunteered their time to conduct, interpret, and write this study.

Reflexivity is an important part of developing a positionality statement. It provides us space to individually and collectively reflect on our position as researchers within the investigation and the ways bias and exploitation may show up (1). The positionality of researchers can influence the choice of topic, epistemological framing, ontology, methodological approaches, connection to study subjects, and communication of research findings (3). We discussed each of these themes as it relates to our approach to this work. With respect to research questions, several of us made connections between our work on health equity with our work on representation and inclusion, given similarities with underlying structural processes that have led to these sets of disparities. For the epidemiologists on our research team, asking questions related to representation and inclusion in our professional spaces pushed the boundaries of our own methodological and theoretical training. We felt that this process was necessary and helped us understand the constraints of the data we work with in our public health research.

With respect to epistemology, we recognize that training in epidemiology and the biomedical sciences in general typically involves a positivist framework, wherein we generate objective scientific knowledge through posing and empirically testing hypotheses. In this work on representation and inclusion, however, we must also consider that individuals' experiences of inclusion or exclusion are subjective. Research approaches,

rather than assessing the effects of exposures on health outcomes, involve promoting understanding, enriching communication, and improving experiences for SER members. Our team also included researchers with formal training in conducting diversity and inclusion research, providing valuable perspective and assistance with interpreting our findings. With respect to ontology, in this work we engage with dynamic social identity constructs such as sexual orientation, gender identity, and ethnicity. As epidemiological investigators, this can feed back into our work on structural health disparities, for example, understanding experiences of race and racism as dynamic, open-ended, and context specific as opposed to discrete, categorical, and universal. With respect to researcher-as-instrument, most members of our research team had insider status in SER, studying a group of which we are a part. Our affiliations with the SER Diversity and Inclusion Committee granted us access to the survey data, and the involvement of collaborators external to SER broadened our perspectives and theoretical framing. As insiders, we were able to reach SER members to promote the survey through official email communications and at the 2021 annual meeting. Many of us have attended SER-sponsored events and have experienced inclusion and exclusion in these spaces. For some of us, experiences of marginalization and exclusion influenced our decision to participate in this work. Finally, with respect to communication, we embraced transparency in how we can improve our survey instrument and we recognize our own intellectual growth through the course of conducting this research, and that this is an ongoing process.

We are a group of multidisciplinary researchers across diverse career stages, including both SER affiliates and external collaborators. Our identities shape our experiences and how we approach research (1). Indeed, we made different choices with respect to methods and framing than the group that analyzed the 2018 SER representation and inclusion survey data (4), though there was some overlap between these two research teams. We recognize that a different group of scholars with different identities and lived experiences may have taken a different approach to framing, conducting, and interpreting the analyses presented in our paper.

#### *Literature Cited*

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3. Secules S, McCall C, Mejia JA, et al. Positionality practices and dimensions of impact on equity research: A collaborative inquiry and call to the community. *J. Eng. Educ.* 2021;110(1):19–43.
4. DeVilbiss EA, Weuve J, Fink DS, et al. Assessing Representation and Perceived Inclusion among Members in the Society for Epidemiologic Research. *American Journal of Epidemiology*. 2020;(http://dx.doi.org/10.1093/aje/kwz281)

Figure S1. Indicators of Inclusion: Minimal attempts to include by race, ethnicity, and gender

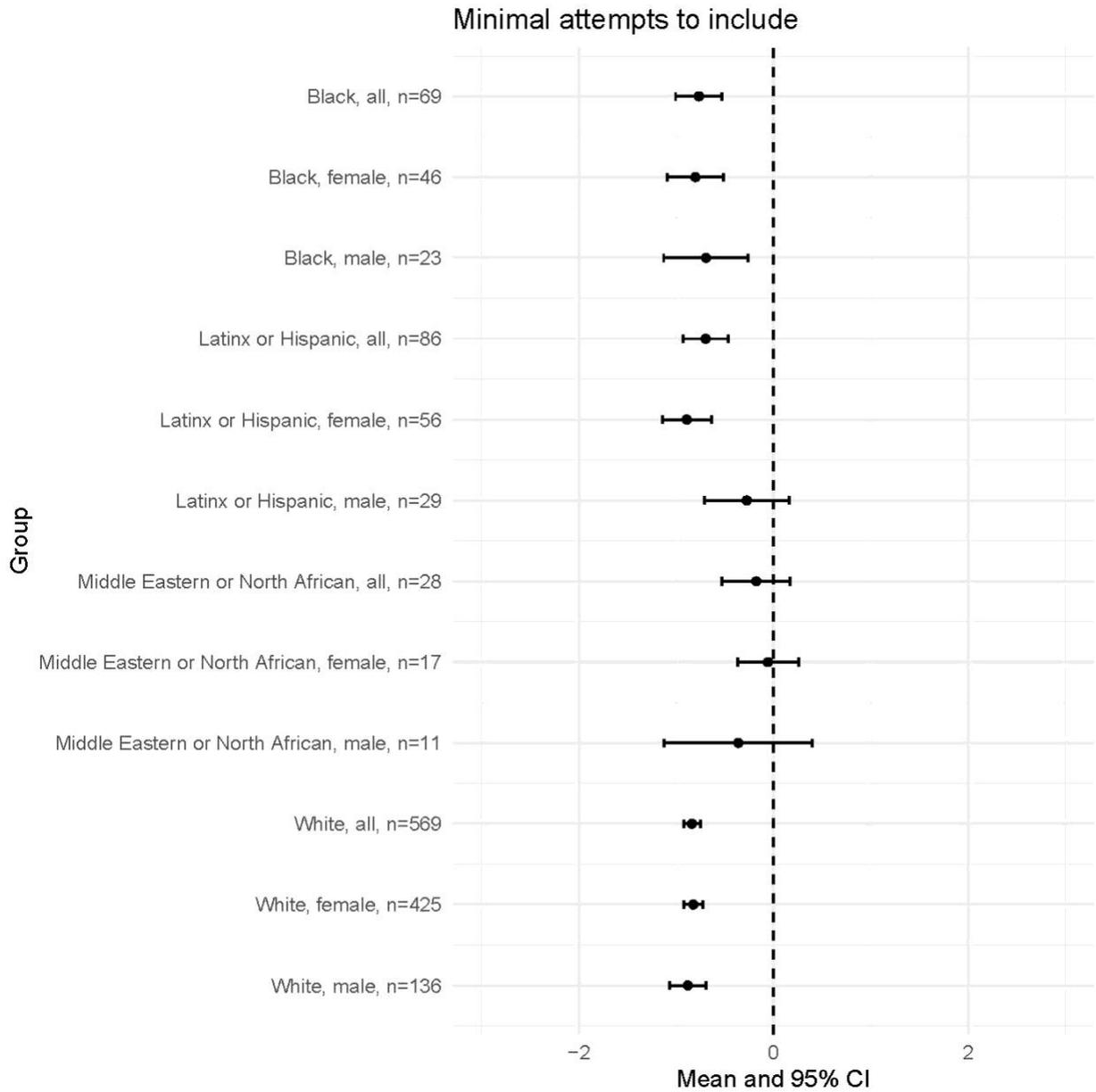


Figure S2. Indicators of Inclusion: Institutions are diverse by race, ethnicity, and gender

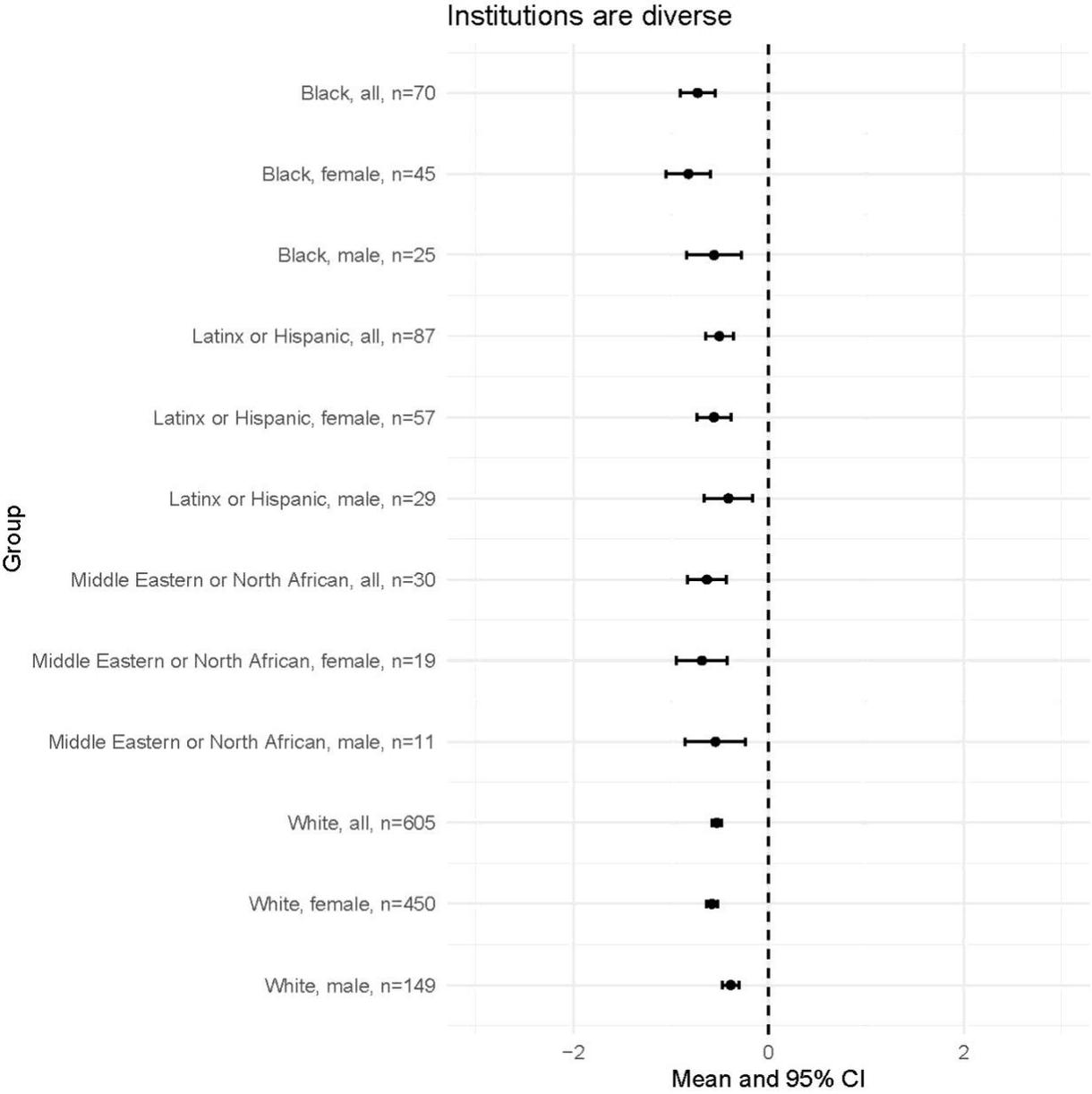


Figure S3. Indicators of Inclusion: Diversity of ideas by race, ethnicity, and gender

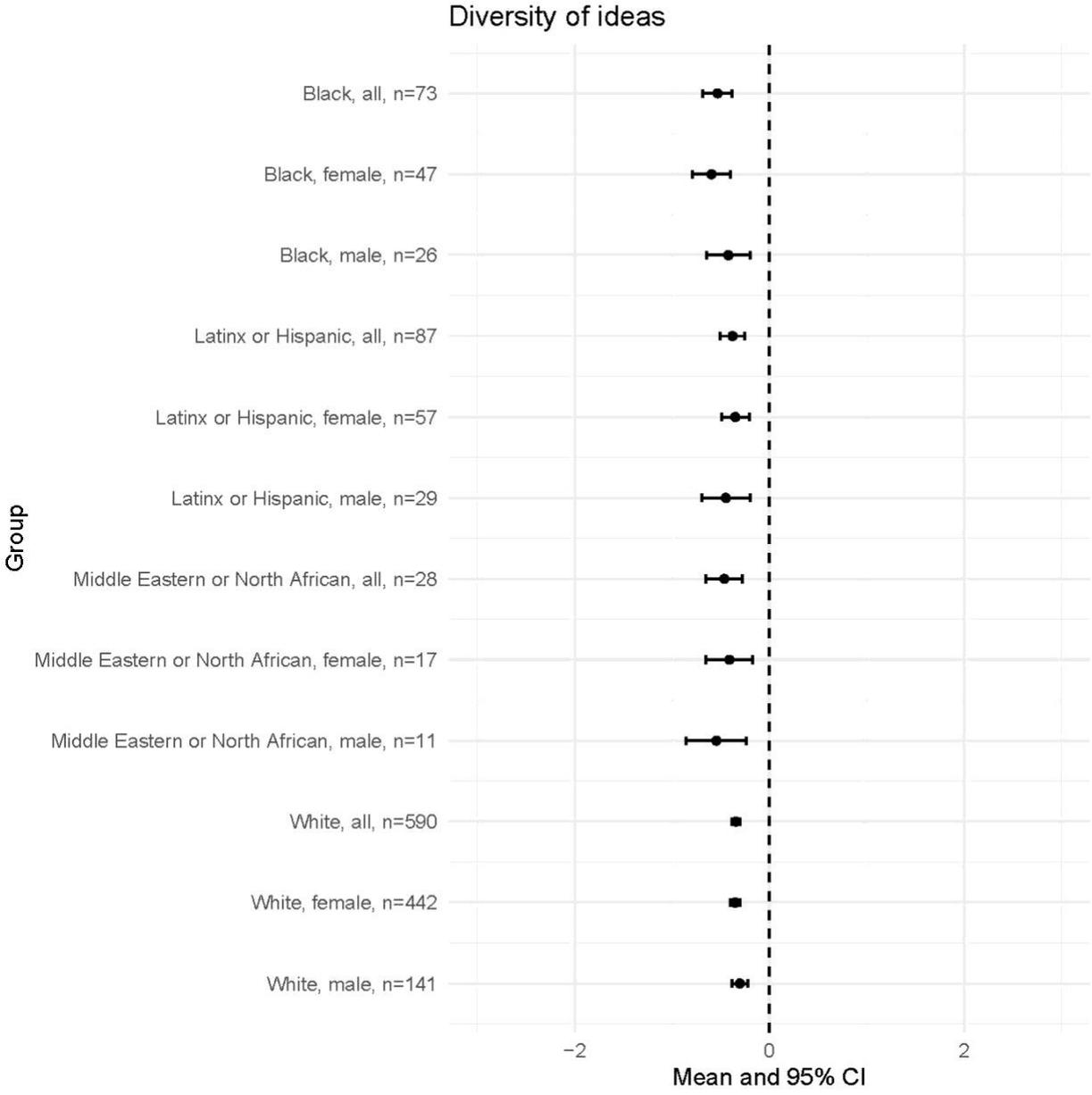


Figure S4. Indicators of Inclusion: Extend feel welcomed by race, ethnicity, and gender

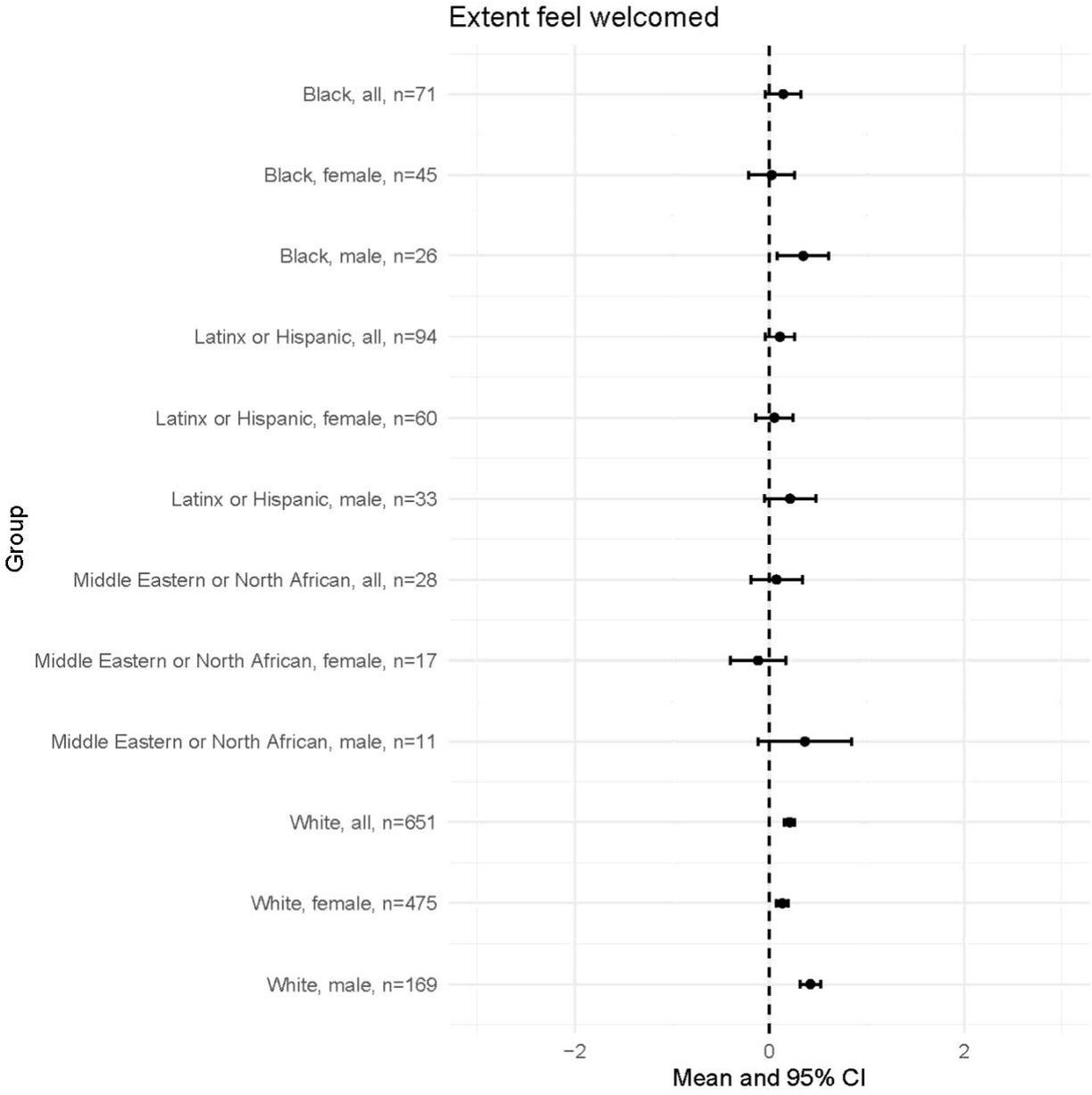


Figure S5. Indicators of Inclusion: Extent environment inclusive by race, ethnicity, and gender

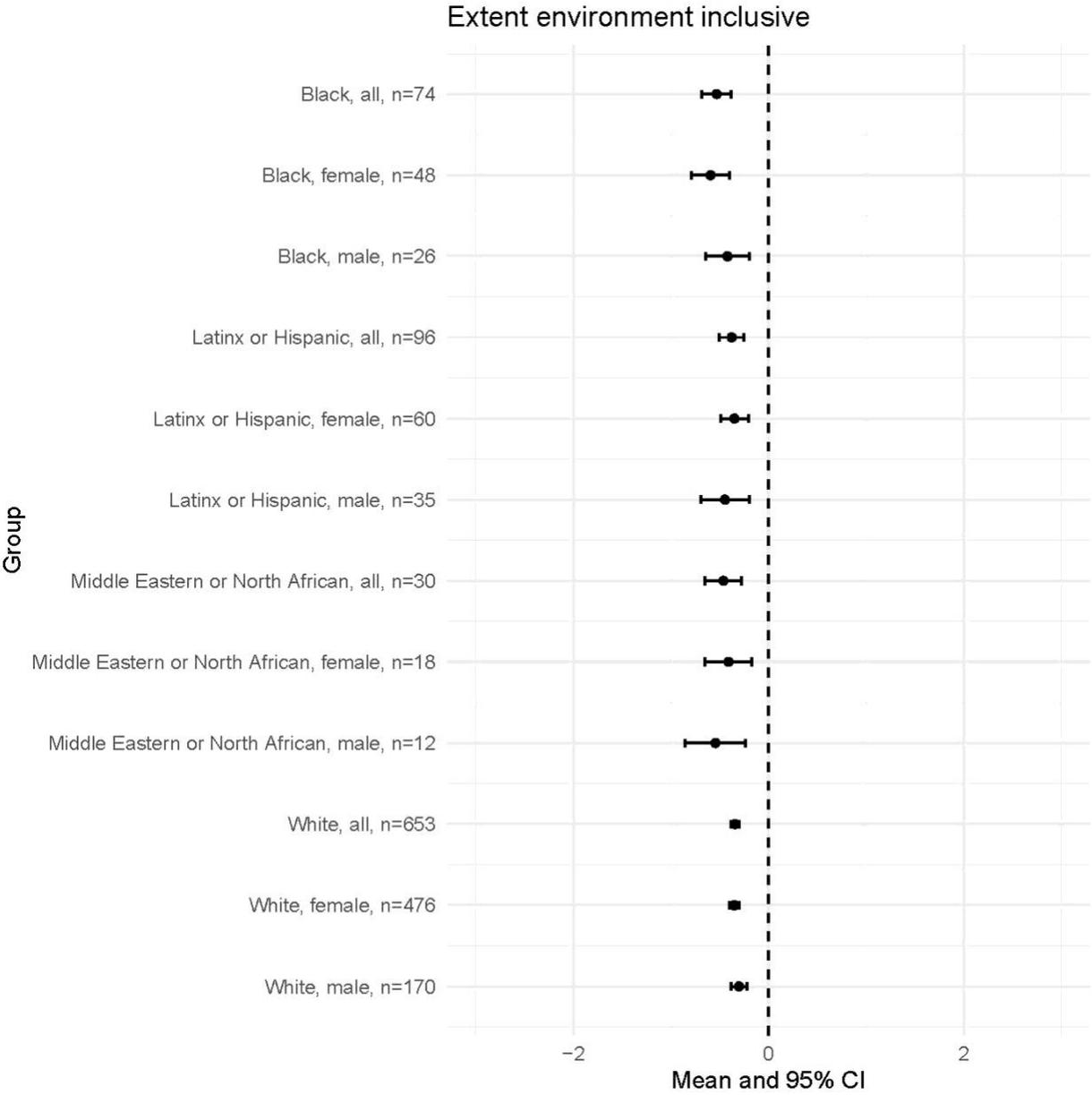


Figure S6. Indicators of Inclusion: Opportunities for collaboration by race, ethnicity, and gender

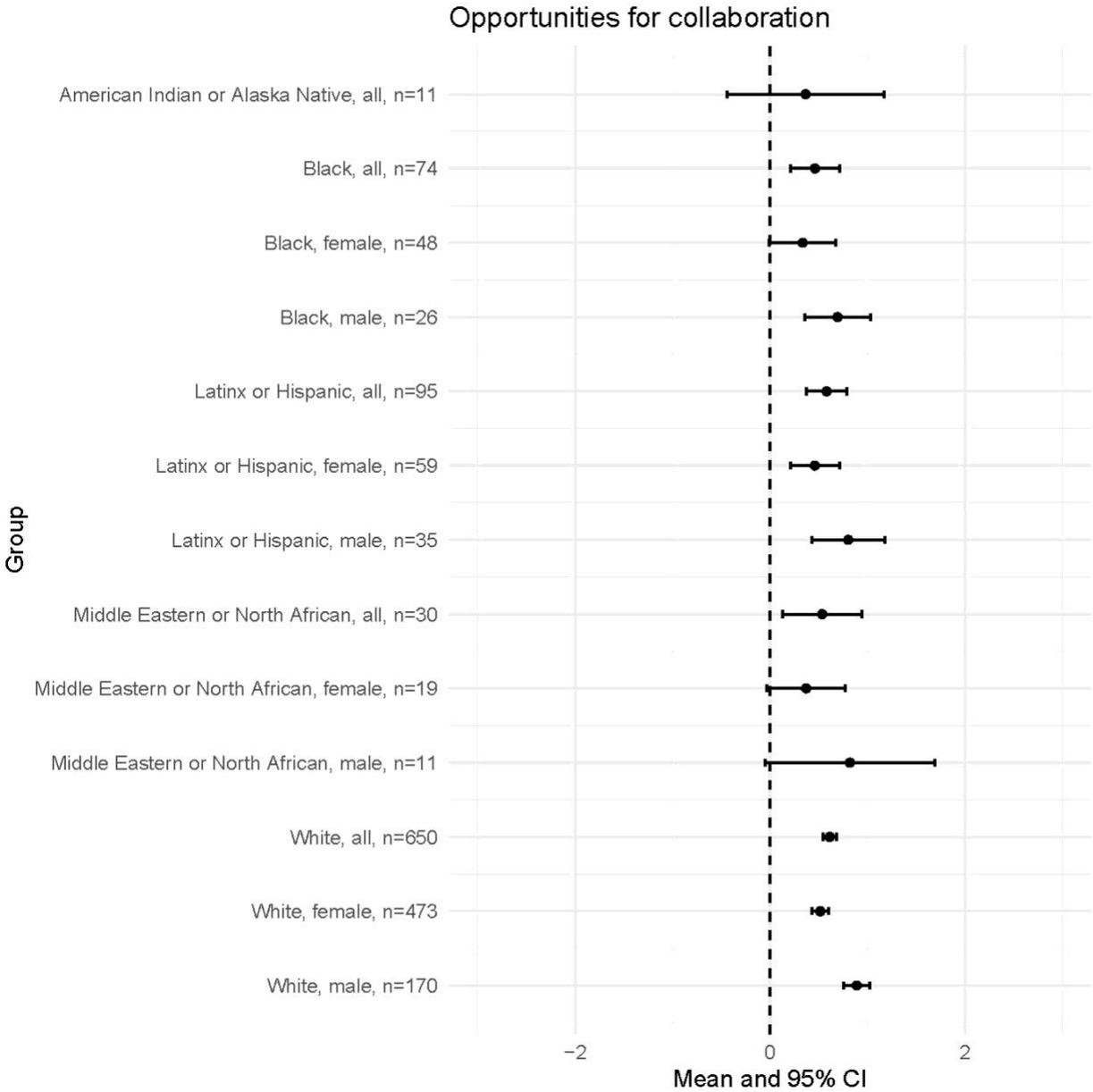


Figure S7. Indicators of Inclusion: SER diversity changes past year by race, ethnicity, and gender

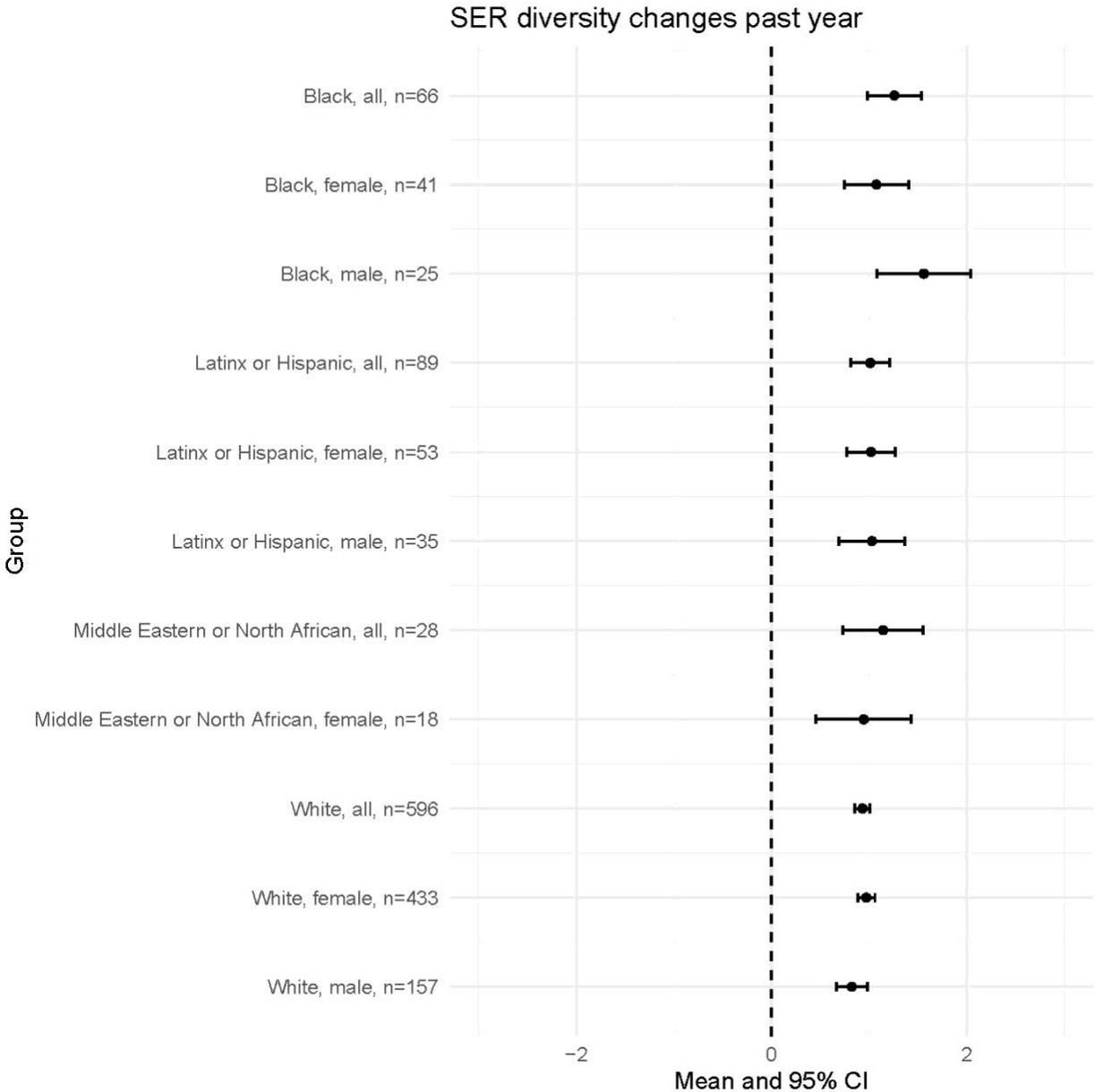


Figure S8. Indicators of Inclusion: Felt particularly welcomed by race, ethnicity, and gender

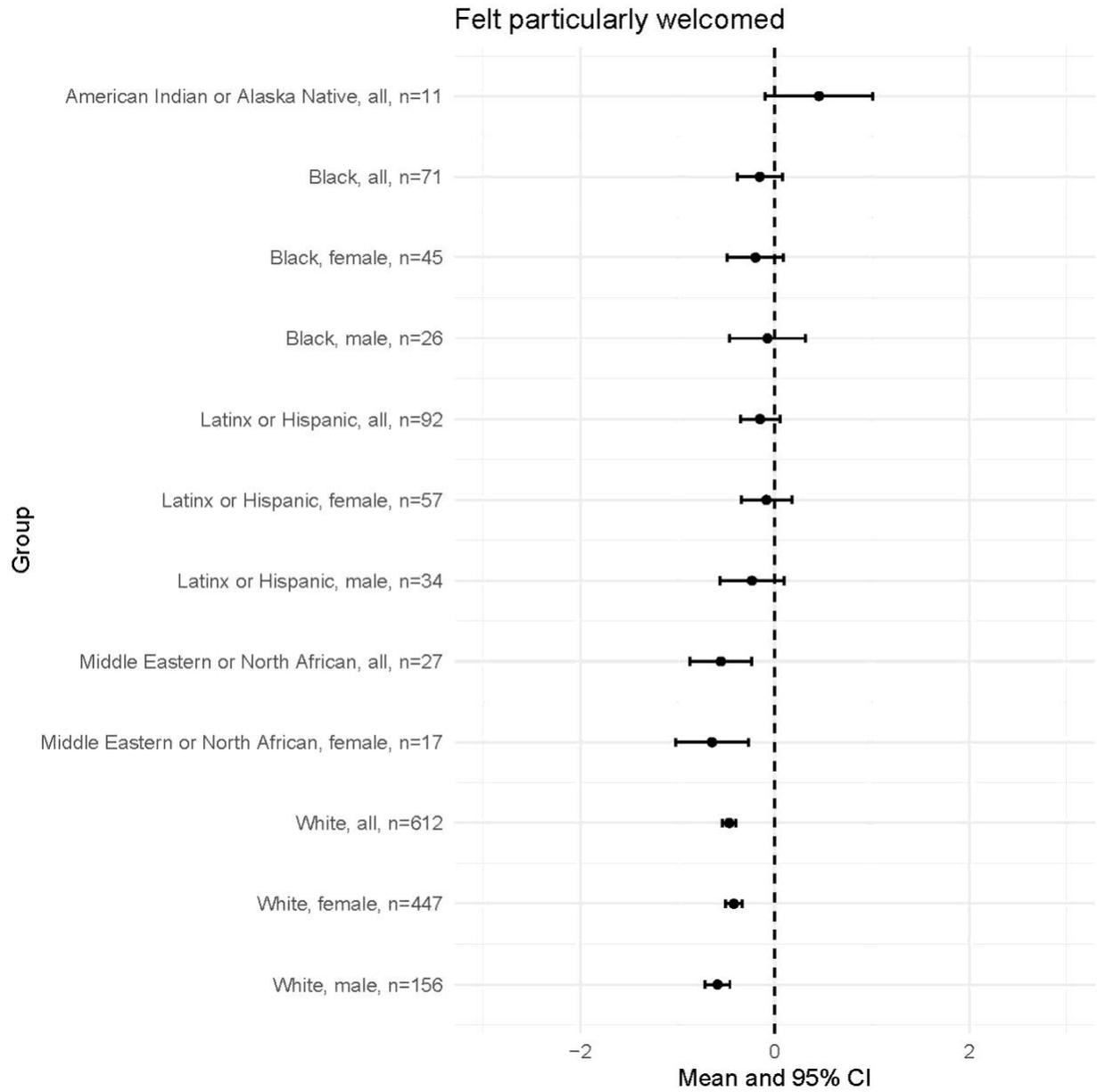


Figure S9. Indicators of Inclusion: Felt particularly unwelcomed by race, ethnicity, and gender

### Felt particularly unwelcomed

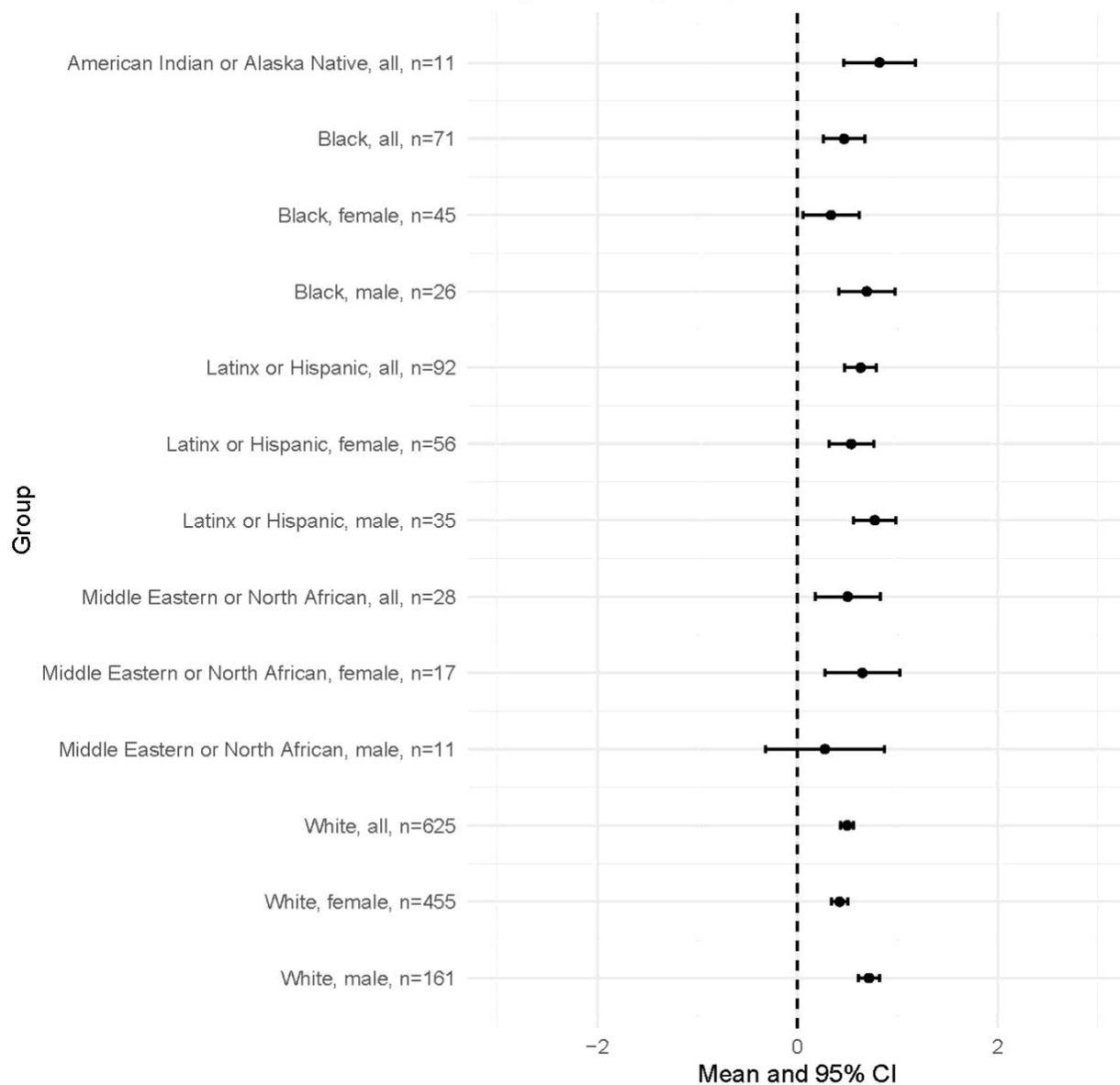


Figure S10. Indicators of Inclusion: Comfortable sharing opinion by race, ethnicity, and gender

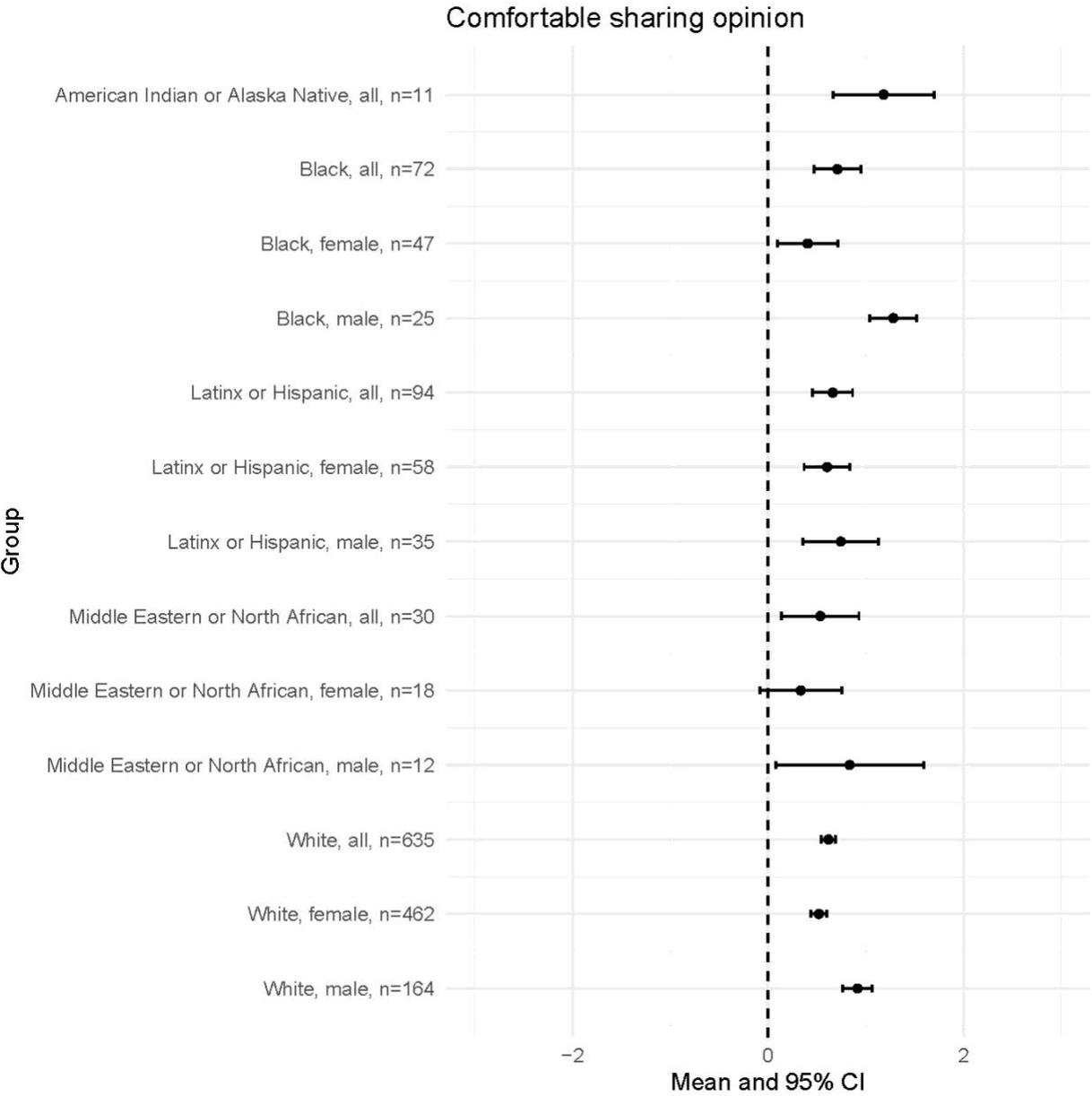


Figure S11. Indicators of Inclusion: Member accept diversity by race, ethnicity, and gender

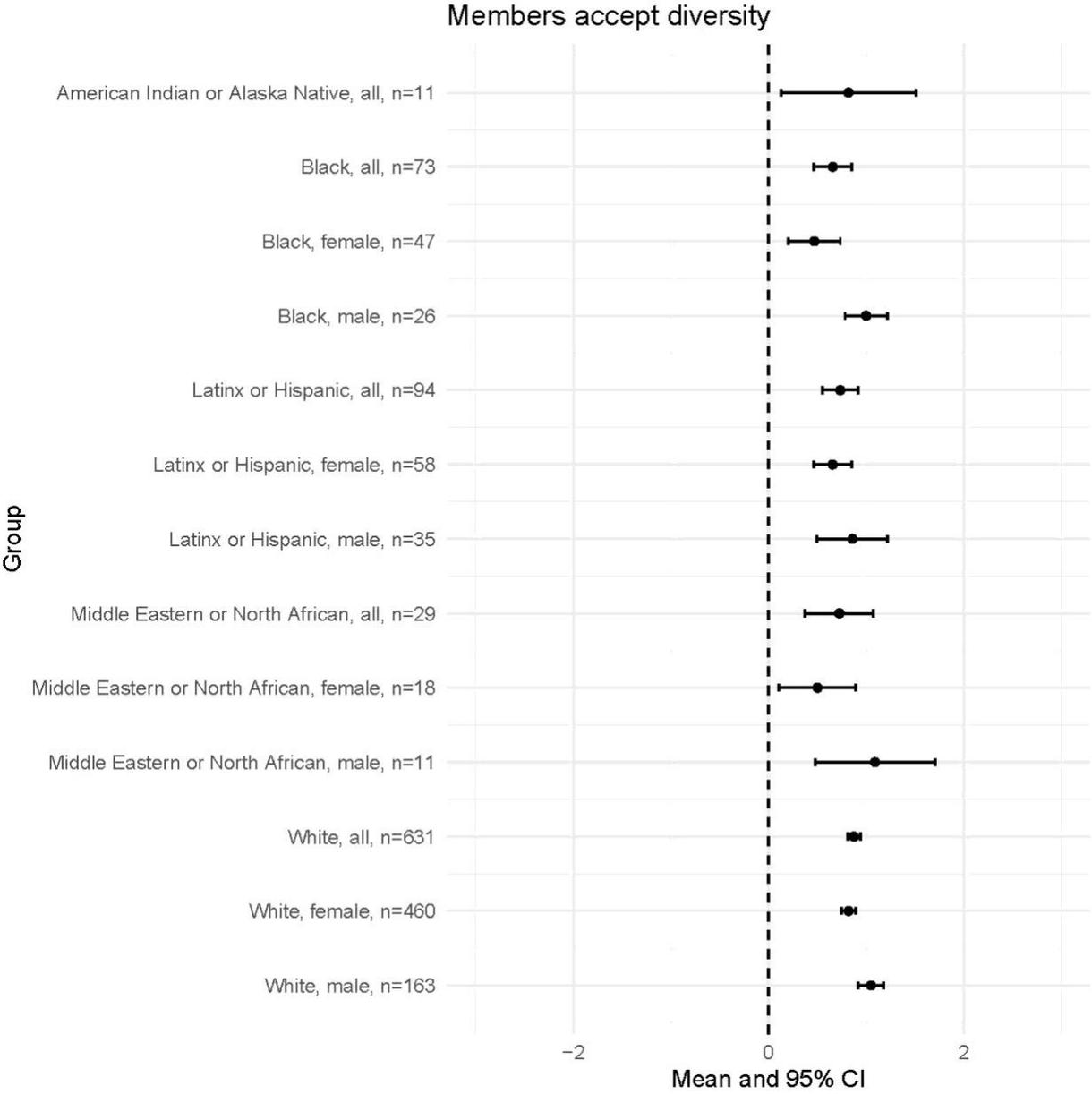


Figure S12. Indicators of Inclusion: Member communicate respectfully by race, ethnicity, and gender

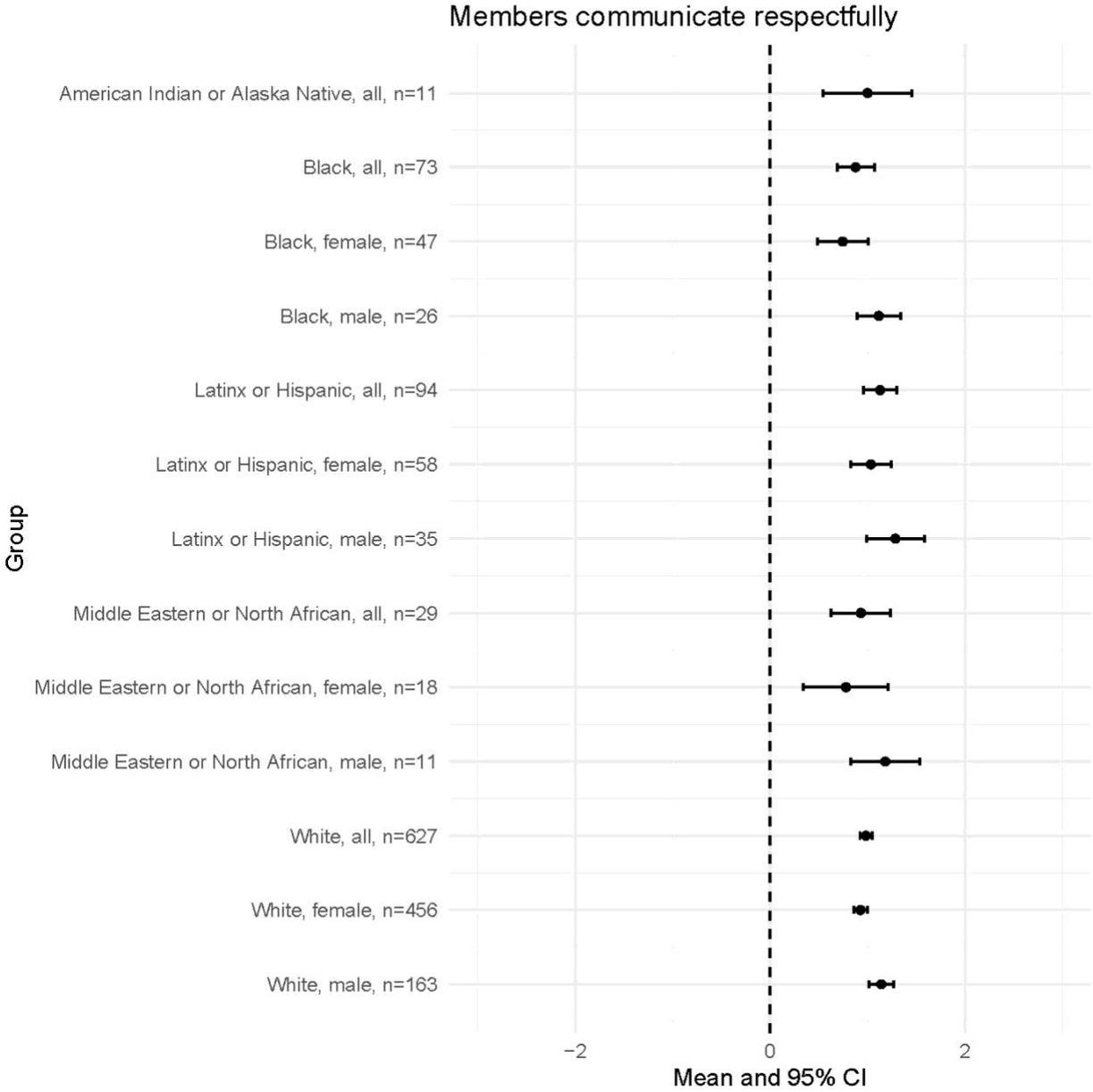


Figure S13. Indicators of Inclusion: Members feel comfortable sharing by race, ethnicity, and gender

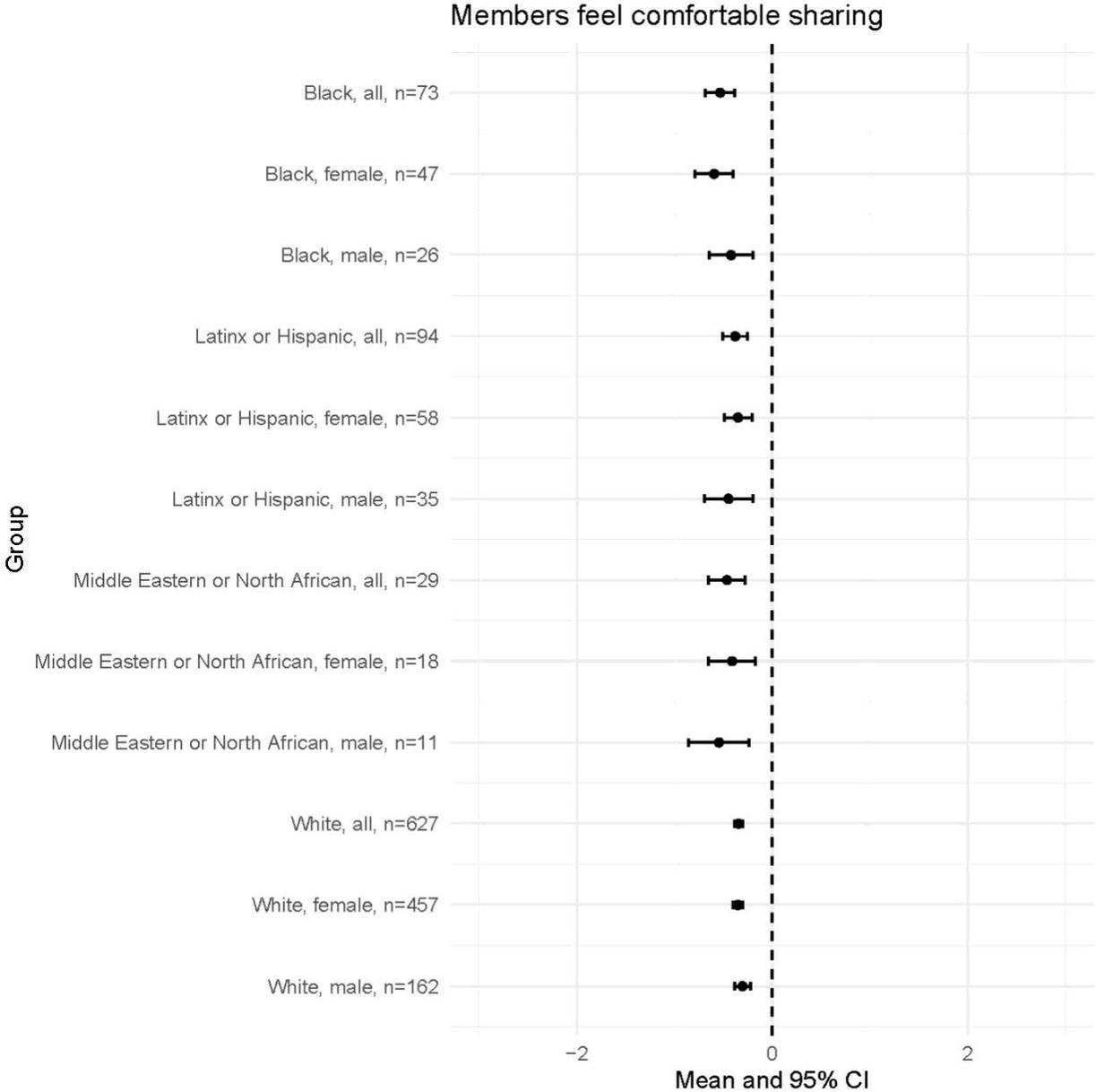


Figure S14. Indicators of Inclusion: Attempts to include ECRs by race, ethnicity, and gender

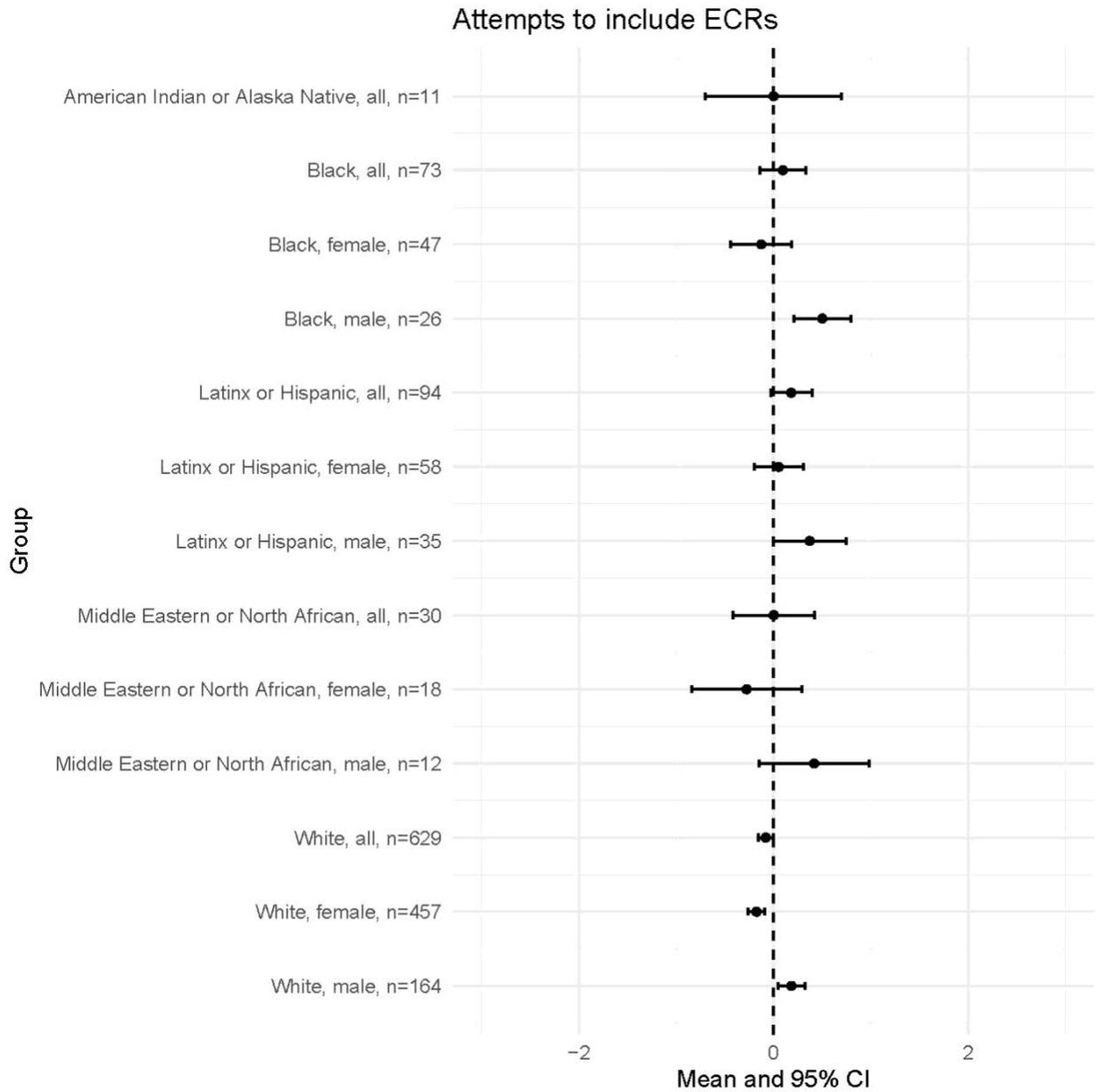


Figure S15. Indicators of Inclusion: Minimal attempts to include by religion

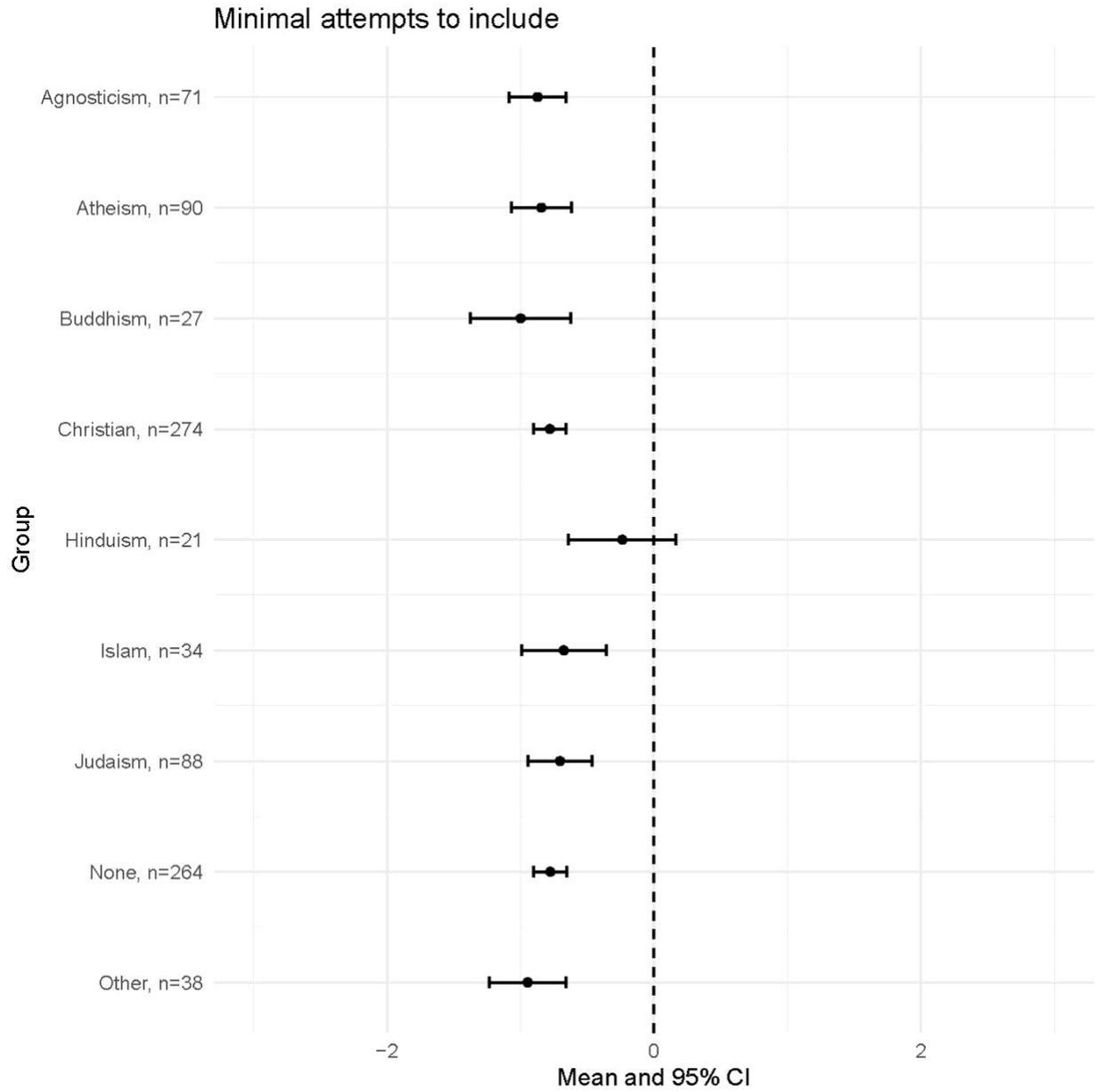


Figure S16. Indicators of Inclusion: Institutions are diverse by religion

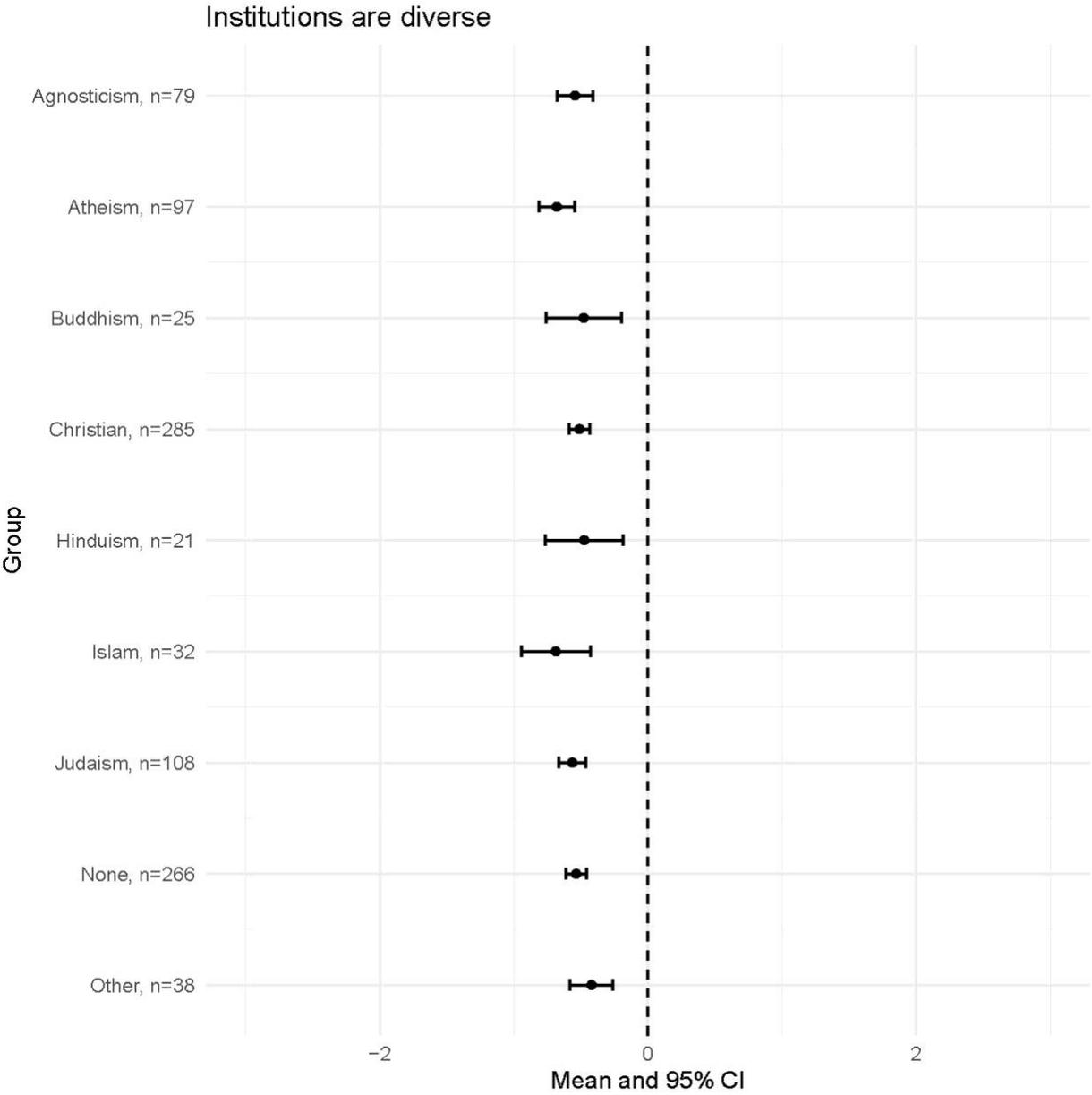


Figure S17. Indicators of Inclusion: Diversity of ideas by religion

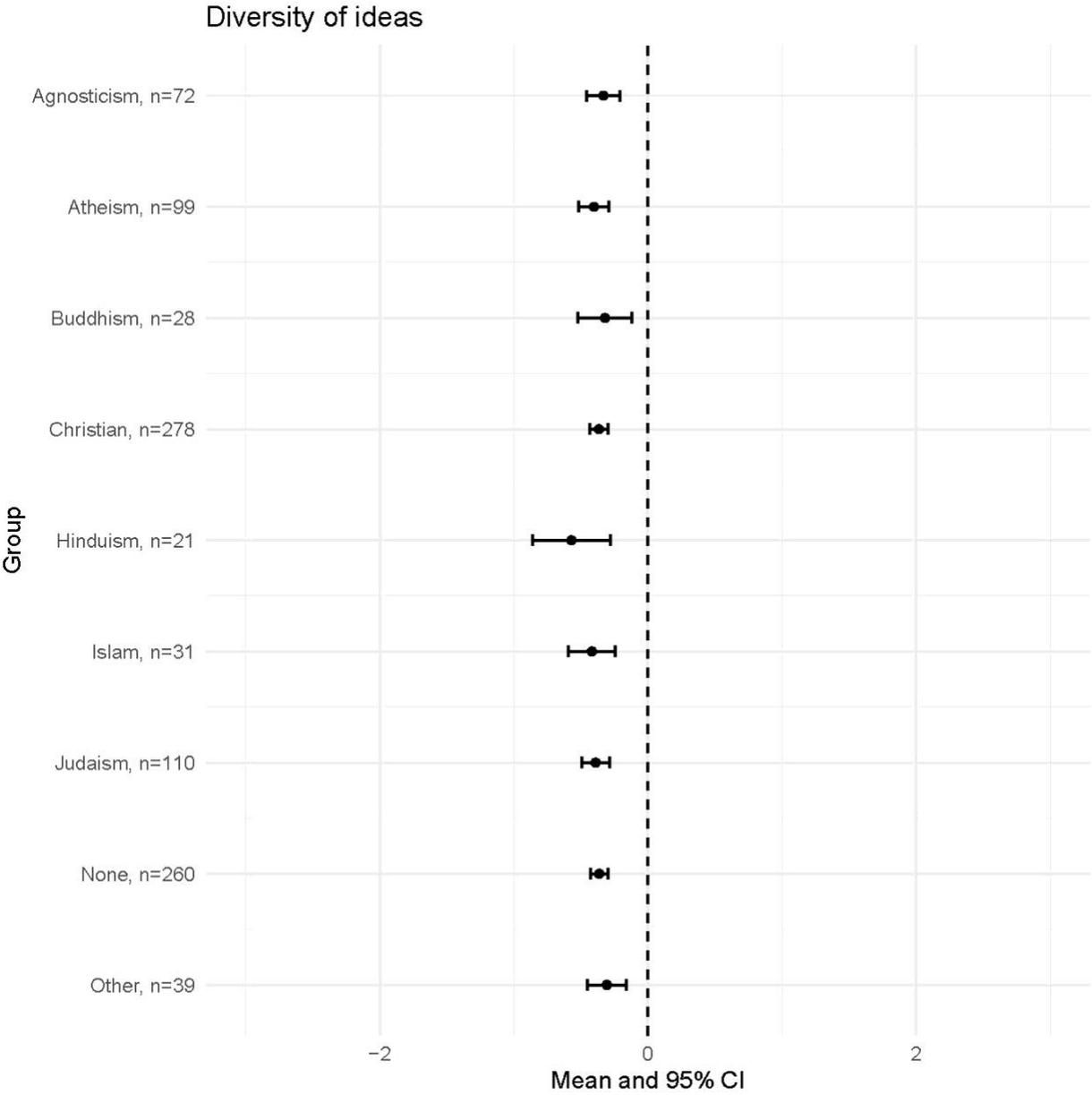


Figure S18. Indicators of Inclusion: Extent feel welcomed by religion

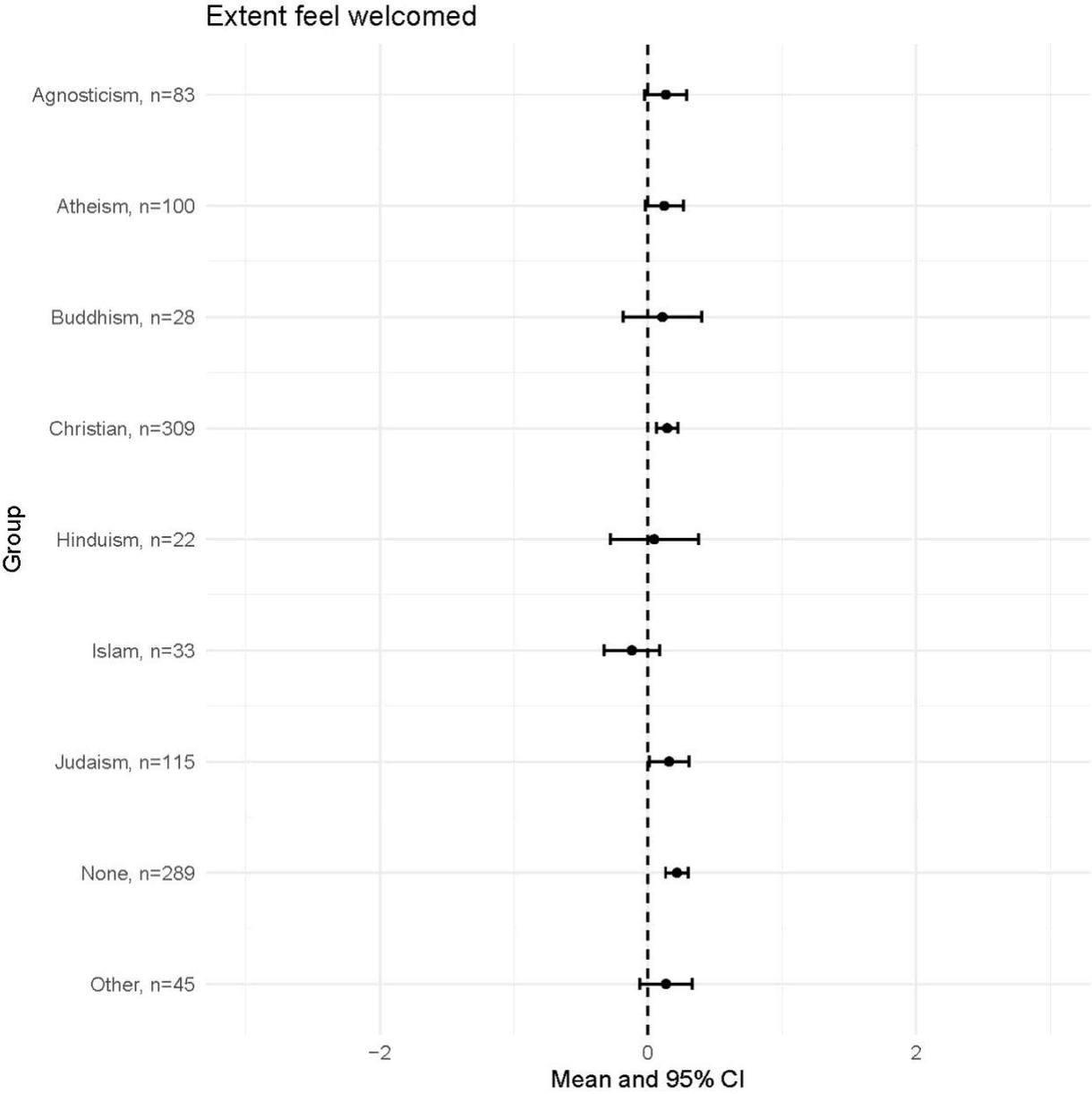


Figure S19. Indicators of Inclusion: Extent environment inclusive by religion

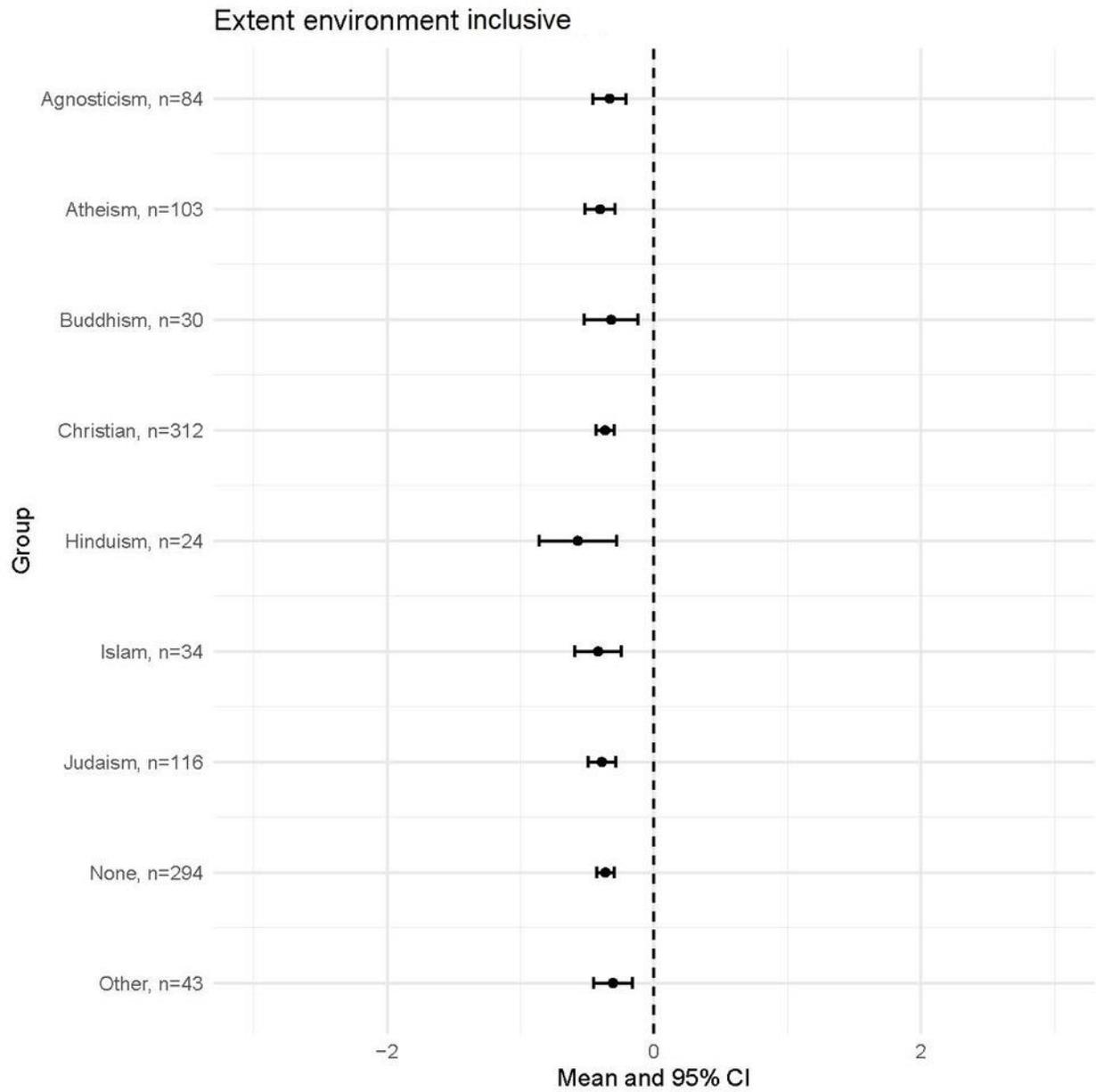


Figure S20. Indicators of Inclusion: Opportunities for collaboration by religion

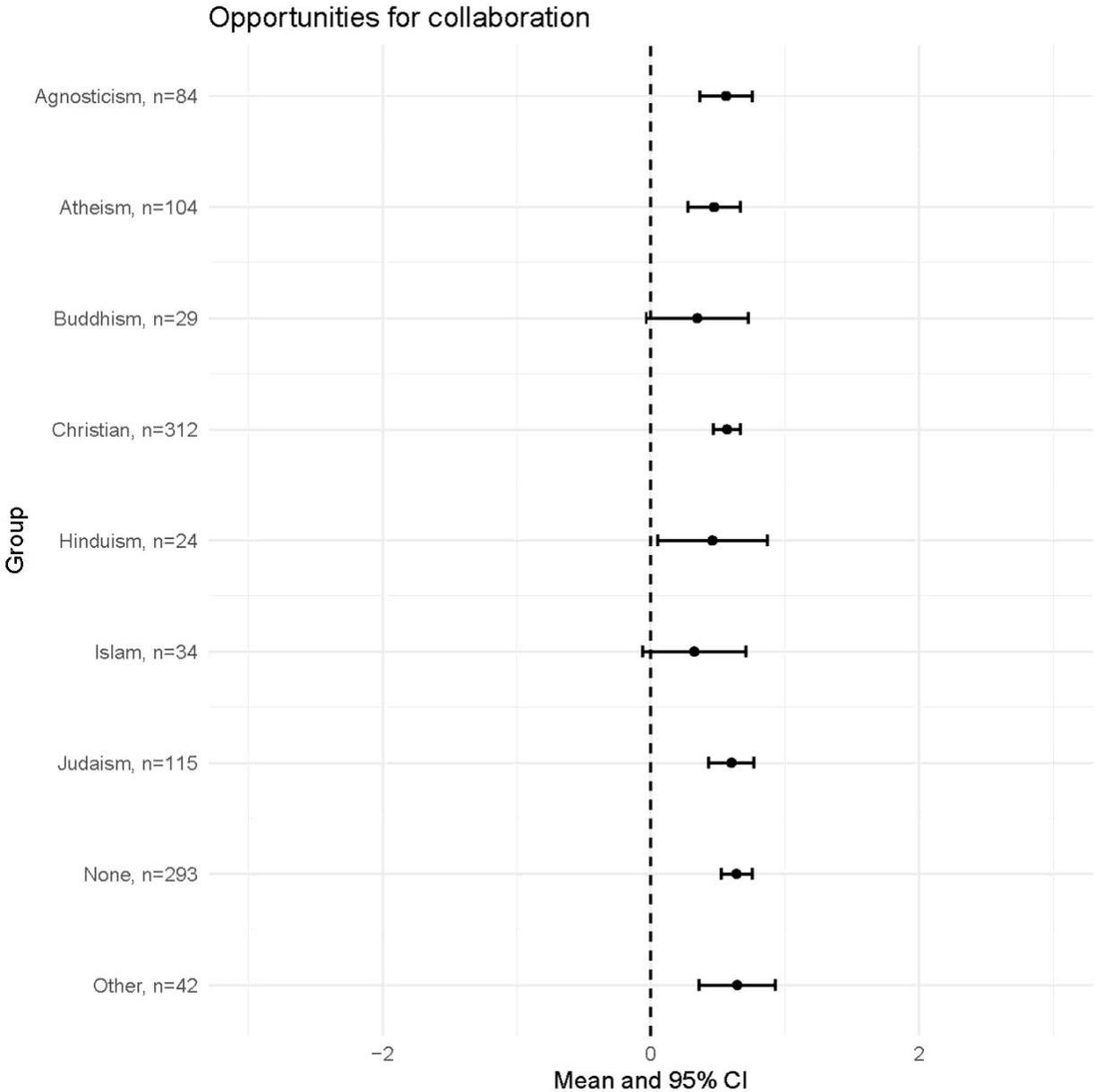


Figure S21. Indicators of Inclusion: SER diversity changes past year by religion

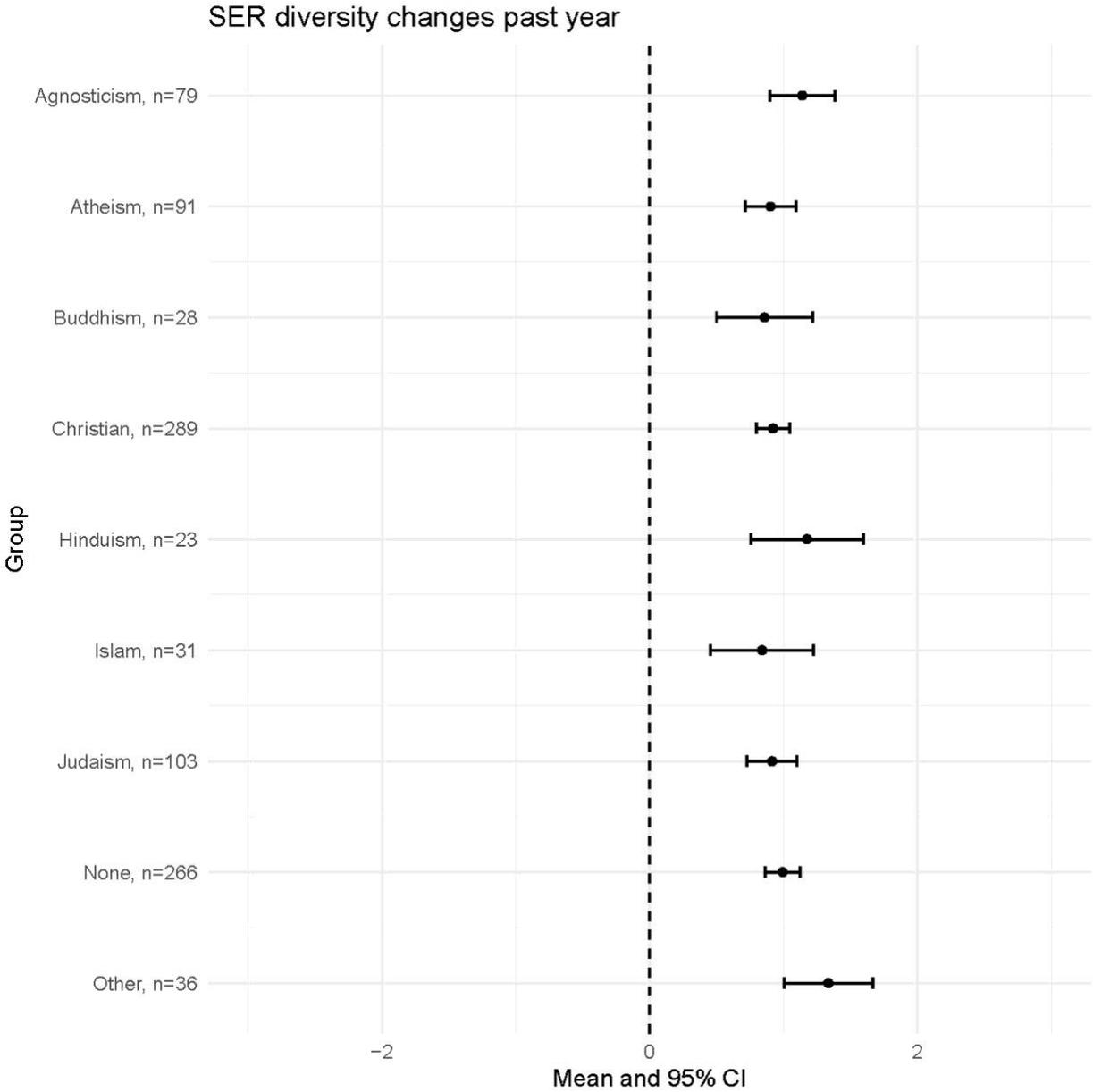


Figure S22. Indicators of Inclusion: Felt particularly welcomed by religion

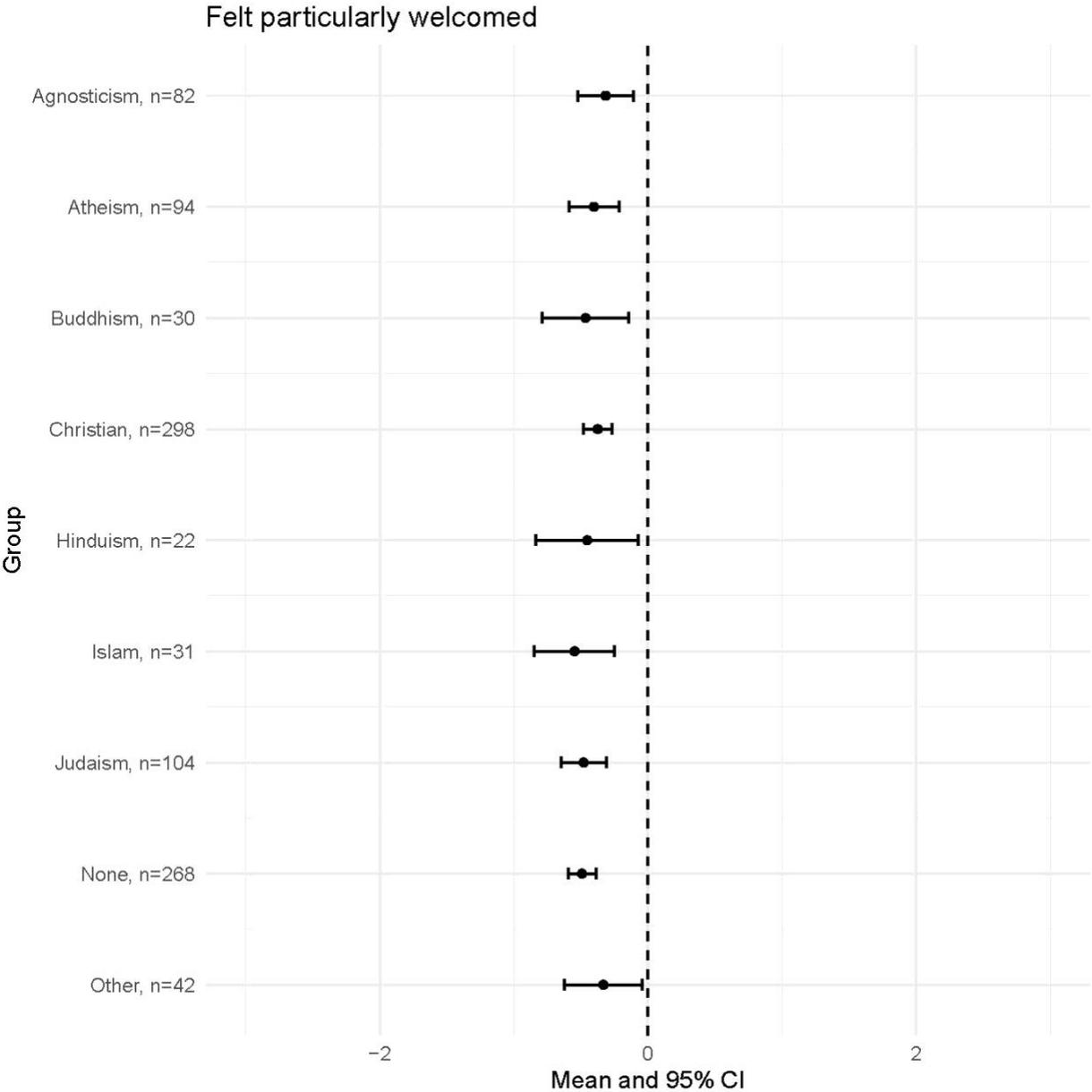


Figure S23. Indicators of Inclusion: Felt particularly unwelcomed by religion

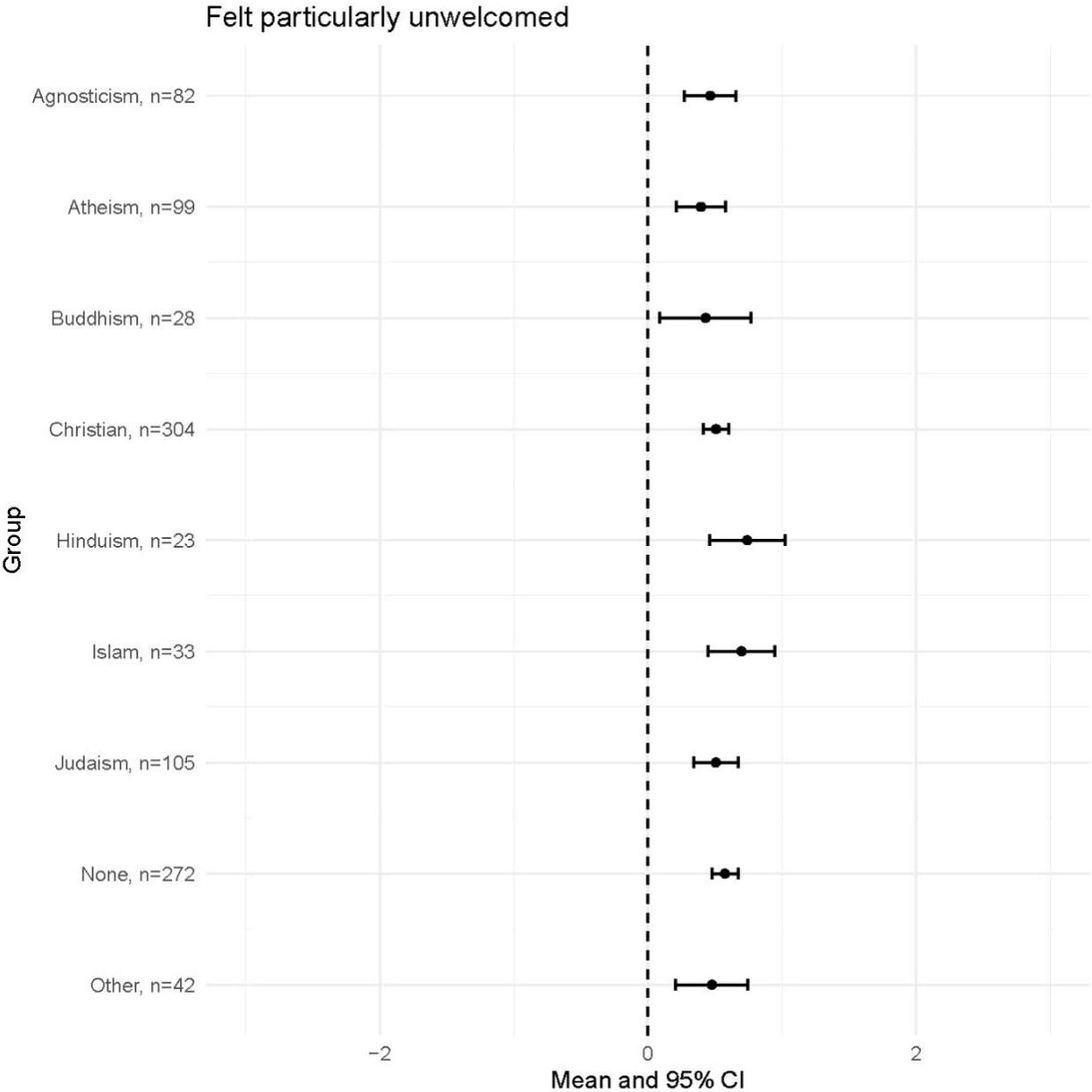


Figure S24. Indicators of Inclusion: Comfortable sharing opinion by religion

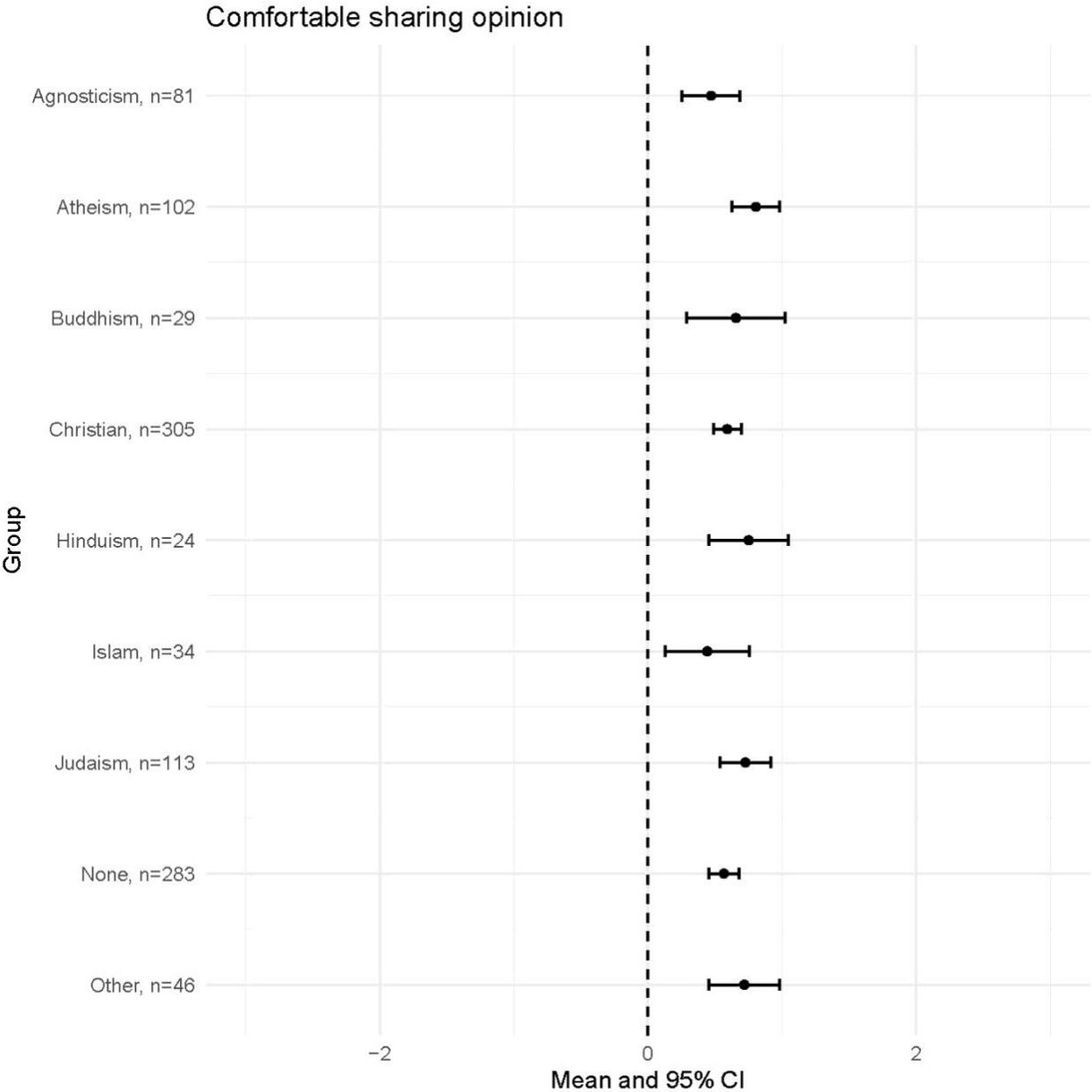


Figure S25. Indicators of Inclusion: Members accept diversity by religion

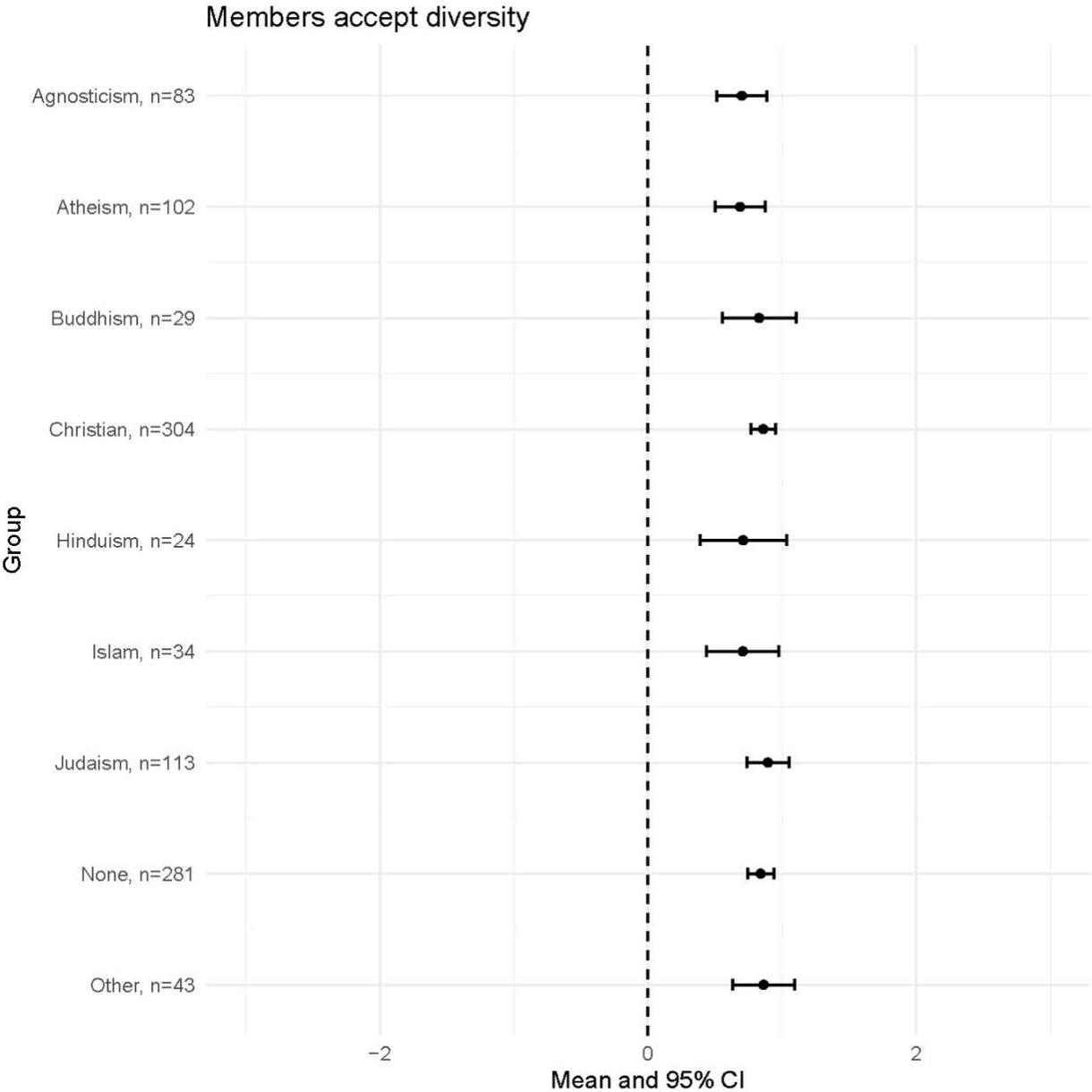


Figure S26. Indicators of Inclusion: Members communicate respectfully by religion

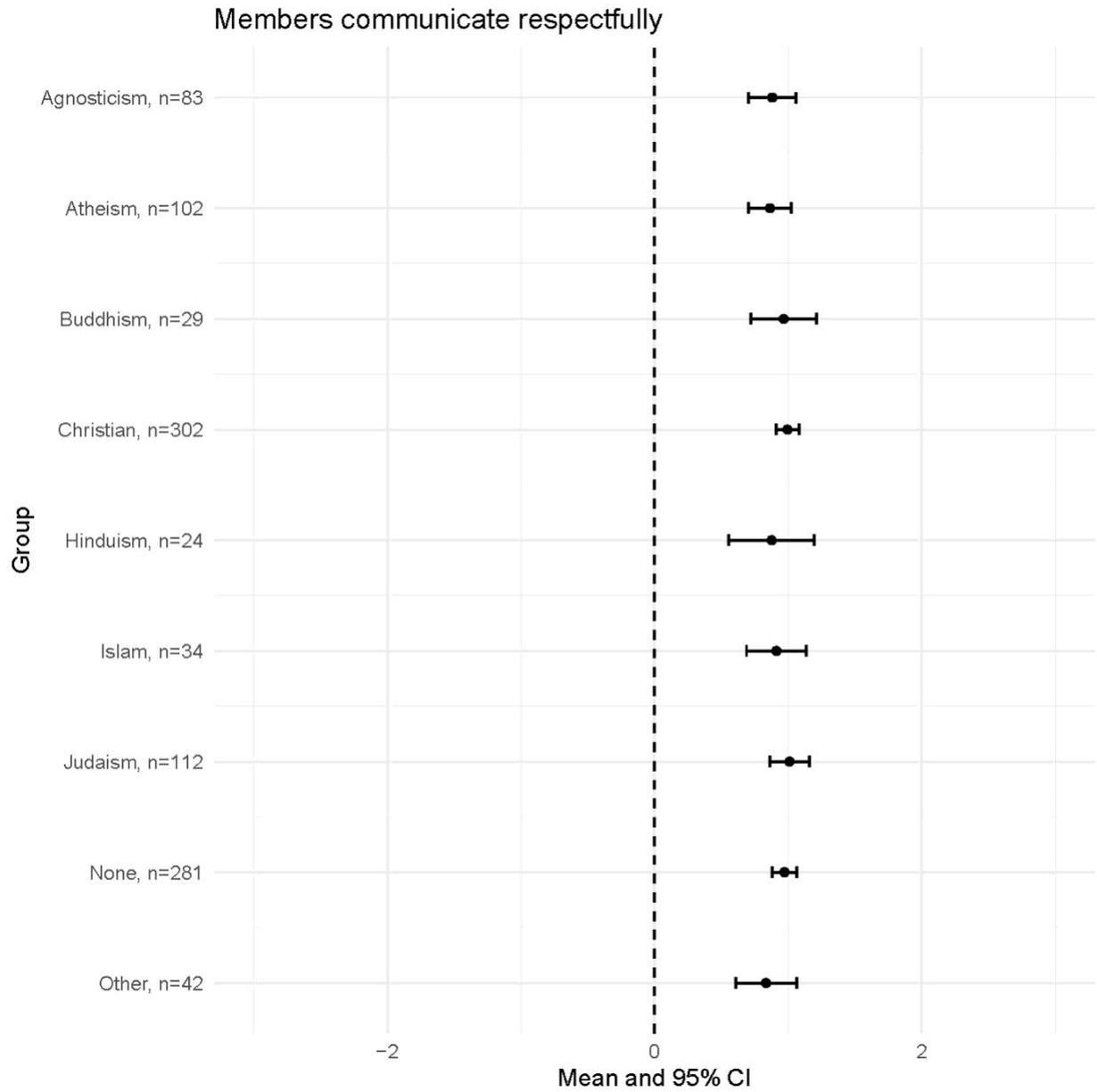


Figure S27. Indicators of Inclusion: Members feel comfortable sharing by religion

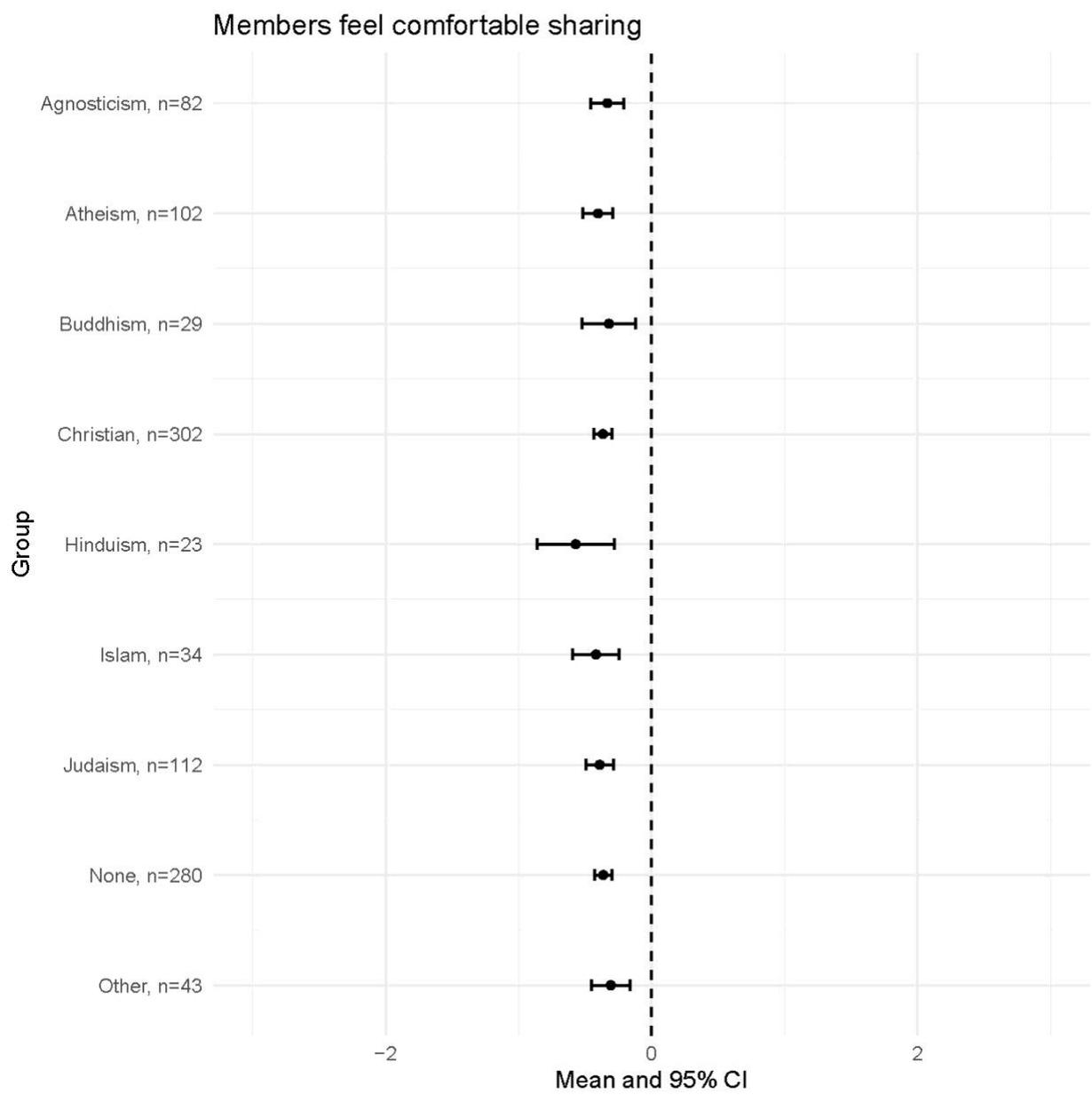


Figure S28. Indicators of Inclusion: Attempts to include ECRs by religion

### Attempts to include ECRs

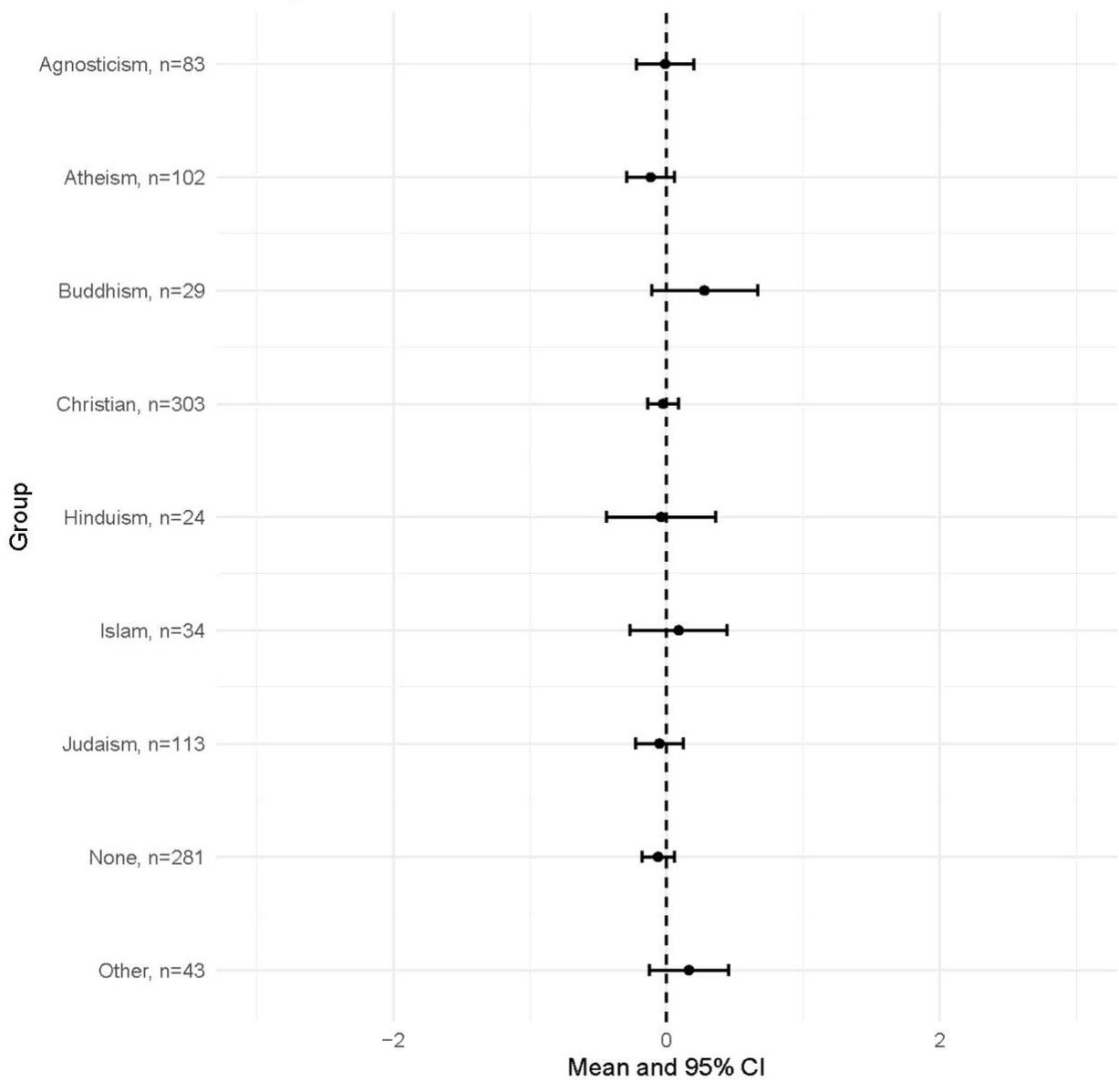


Figure S29. Indicators of Inclusion 2018?: Institutions are diverse by race, ethnicity, and gender

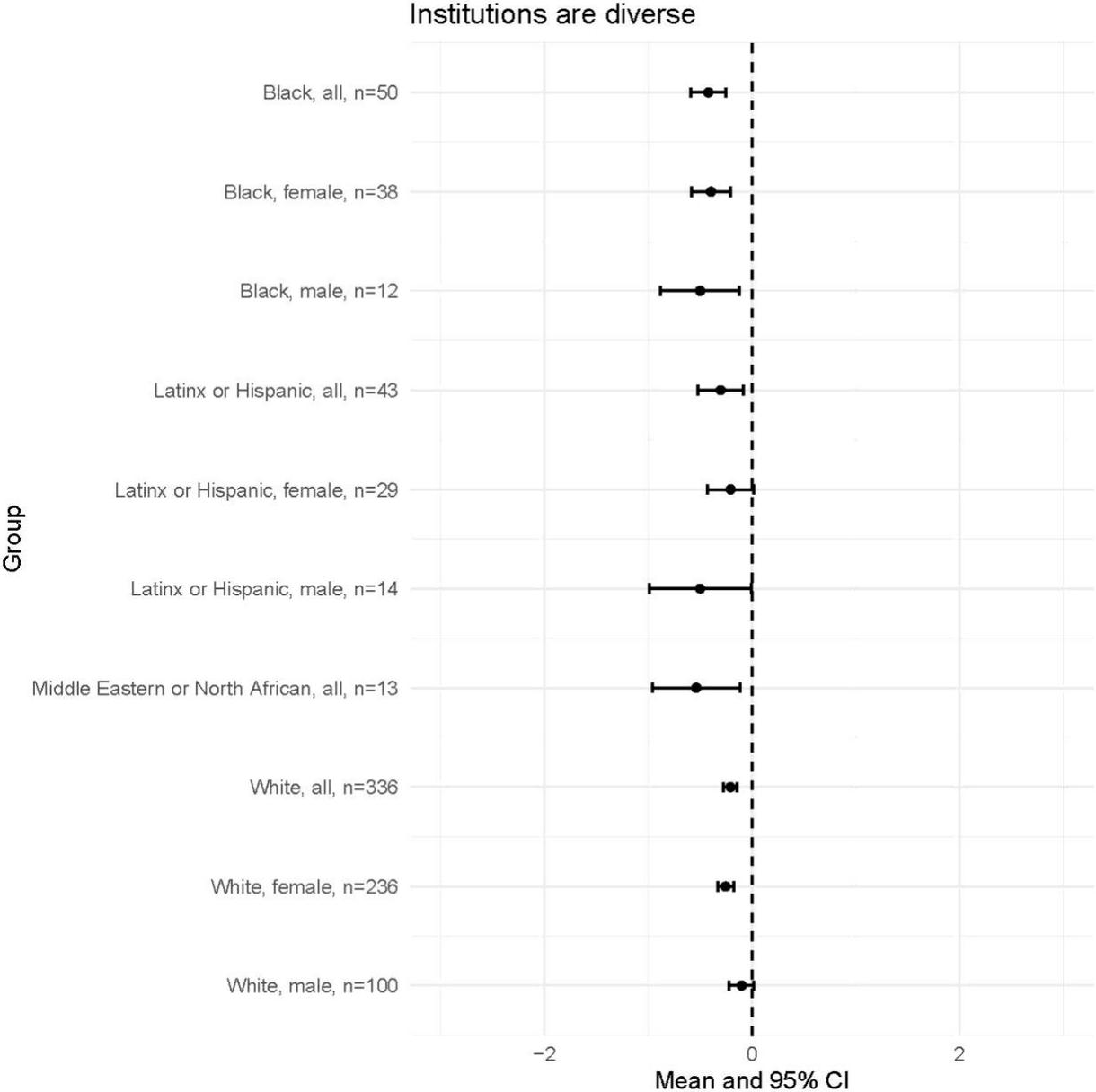


Figure S30. Indicators of Inclusion: Diversity of ideas by race, ethnicity, and gender

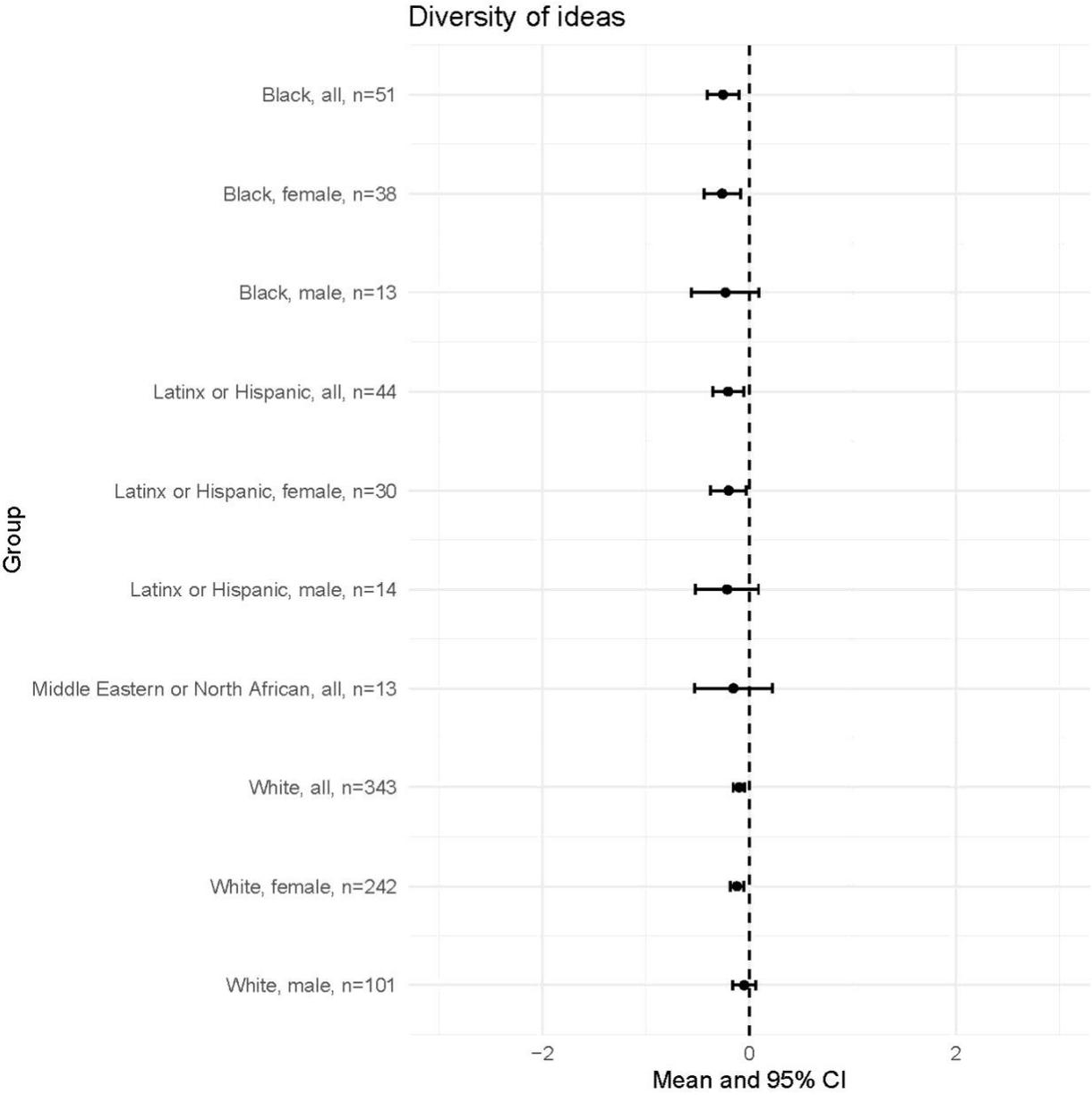


Figure S31. Indicators of Inclusion: Extend feel welcomed by race, ethnicity, and gender

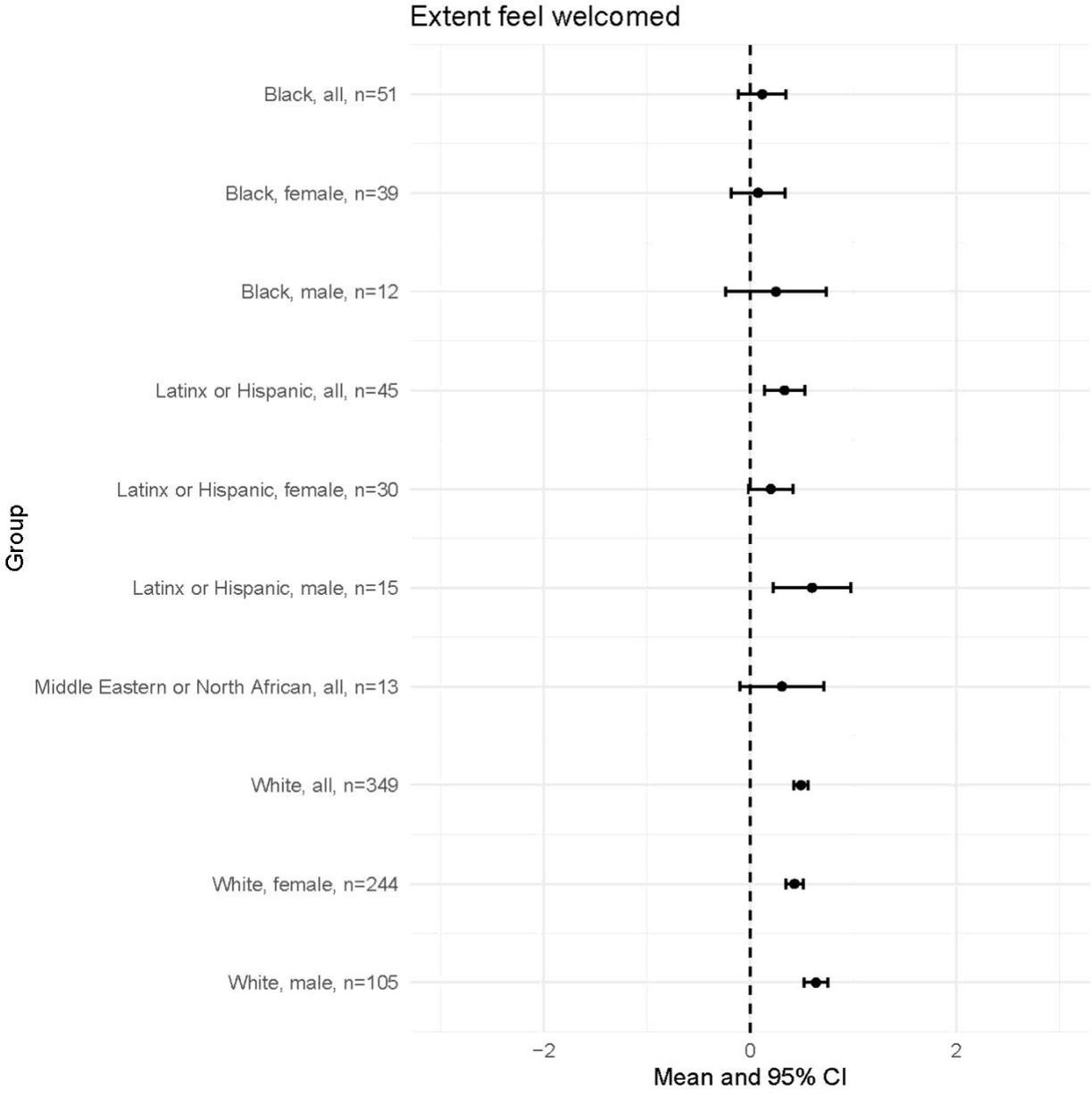


Figure S32. Indicators of Inclusion: Extent feel inclusive by race, ethnicity, and gender

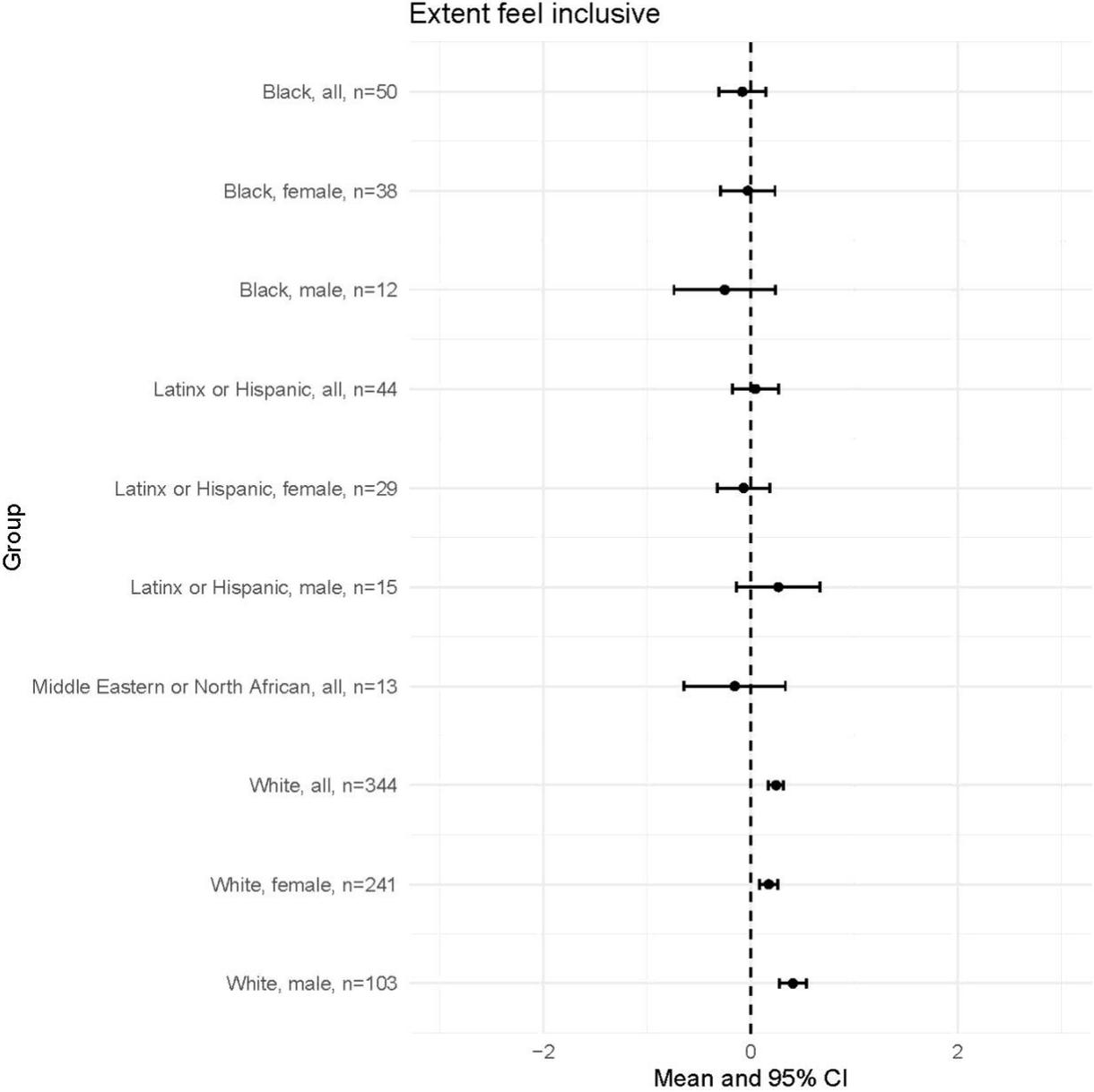


Figure S33. Indicators of Inclusion: Institutions are diverse by religion

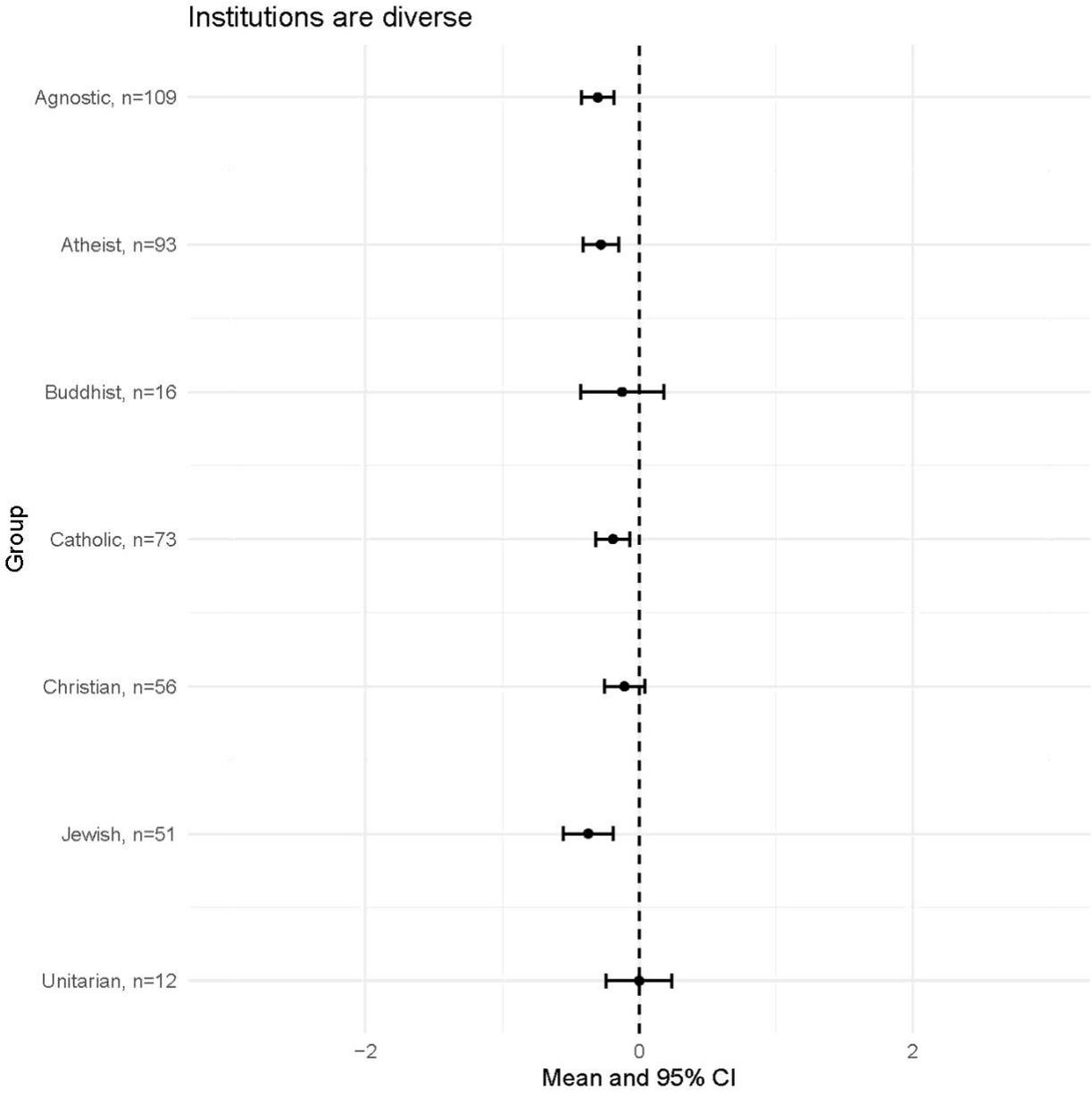


Figure S34. Indicators of Inclusion: Diversity of ideas by religion

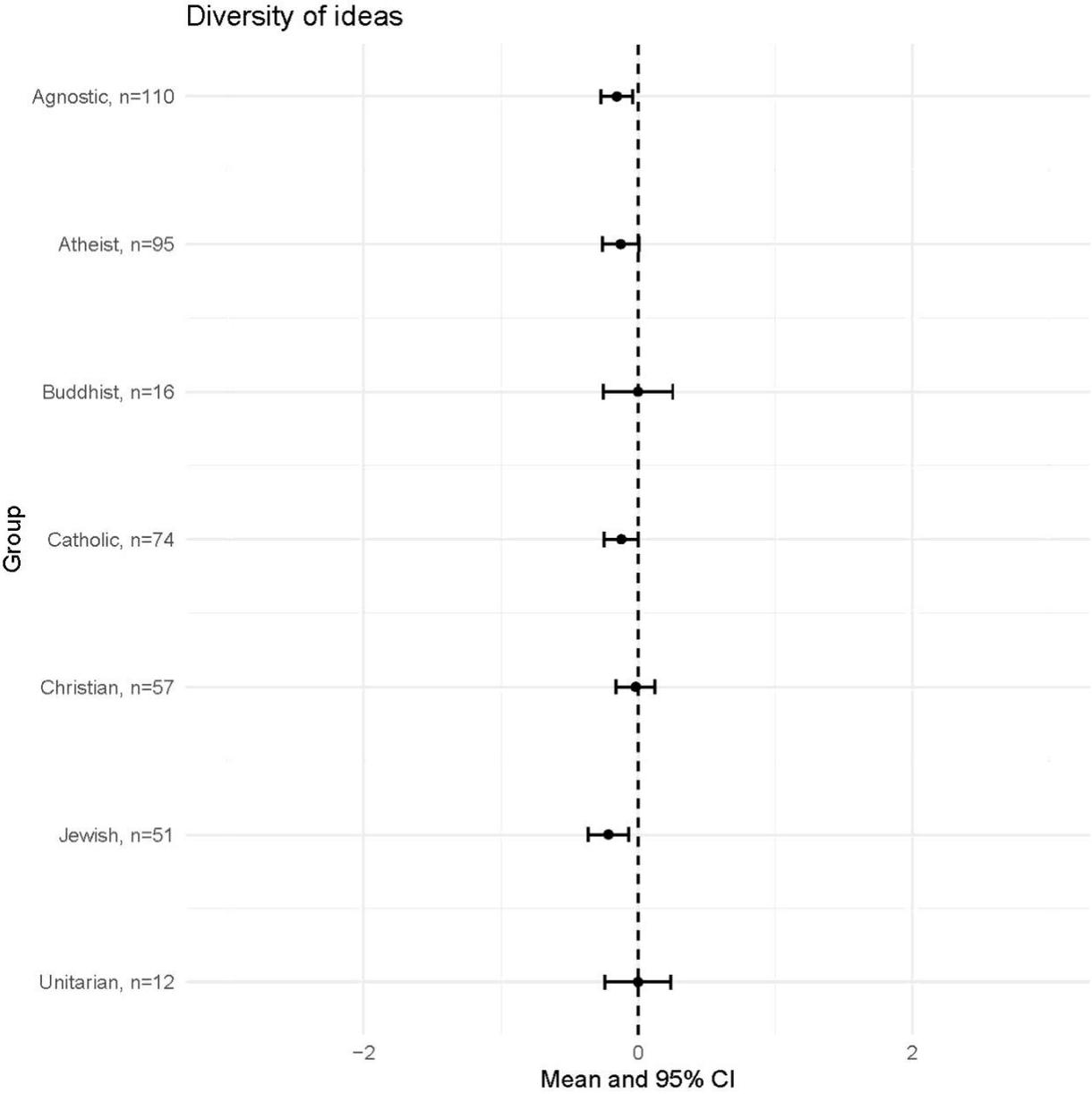


Figure S35. Indicators of Inclusion: Extent feel welcomed by religion

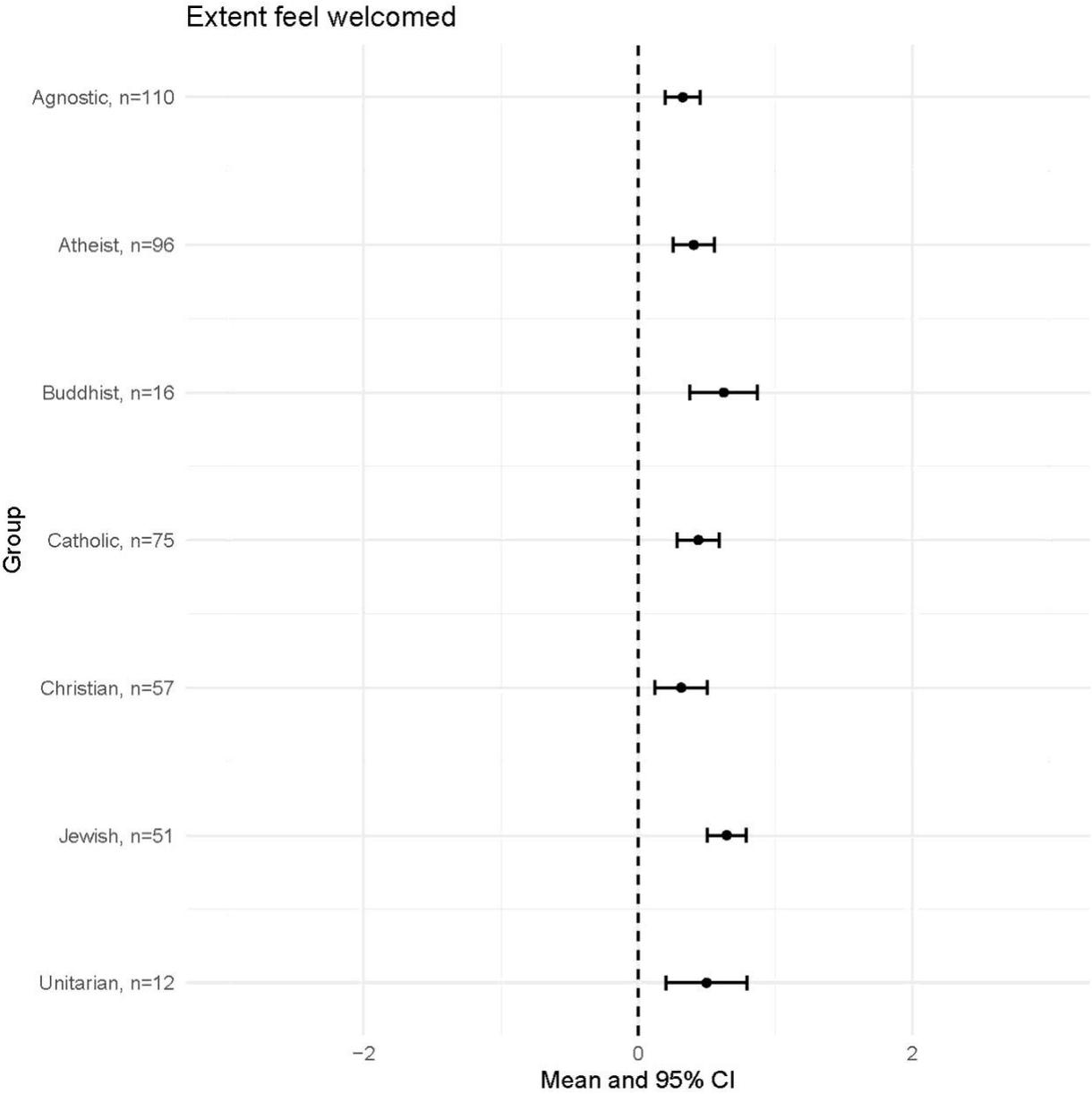


Figure S36. Indicators of Inclusion: Extent feel inclusive by religion

