Analysis of the 2020 - 2023 RMBL Diversity Survey and Diversity Benchmarks

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May 29, 2024

Abstract

This is an updated analysis of responses to the Diversity Survey administered to the RMBL community in 2020 - 2023, along with a comparison of the demographic characteristics of the community with national benchmarks. Survey responses were anonymous, and were solicited with messages to the RMBL email distribution list. The survey attracted 113 responses in 2020, 70 responses in 2021, 21 responses in 2022, and 80 responses in 2023. The survey had 121 response items and collected detailed data on the demographics, experiences, and attitudes of members of the RMBL community. In this report, I describe the major patterns present in the survey responses, with a particular focus on responses expressing negative sentiment or experiences. In subsequent sections, I compare the distribution of negative experiences by different segments of the RMBL community, focusing on categories of race / ethnicity, sexual orientation, gender identity, the educational attainment of parents, perceived family income, and role within the RMBL community. To diagnose which common experiences and sentiments are driving negative responses, I summarize the most common responses expressing negative sentiment across the entire respondent community and in several subgroups. I compare demographic characteristics of the RMBL community to national benchmarks for undergraduates, graduate students, postdocs, and faculty, including comparisons of demographic data for 2021 - 2023 harvested from the RMBL Community Portal. Finally, I summarise results from questions about potential anti-colonial actions added to the 2023 community survey. Major findings of my analysis are these:

- In 2023, survey respondents were overwhelmingly non-hispanic white (76%), heterosexual (70%), and cis-gendered (88%). They come from families where parents are college educated (85%), and that have average or above-average income (87%).
- Overall, the full pool of 2020 - 2023 survey respondents were broadly demographically similar to the RMBL community at large (as judged by comparing respondents' demographic profile to that of scientists and students registered on the RMBL Portal from 2021 - 2023) with a few key differences (see Figure 3).
- A large majority of respondents to the survey in 2023 described largely positive experiences at RMBL, with 79% of respondents expressing positive sentiment on 90% or greater of the 40 potential items that could be coded according to sentiment. This was an increase from the 2020 - 2022 mean of 72% (see Figure 4).
- Non-white respondents, and sexual orientation and gender minorities still expressed negative sentiment and experiences at higher rates than respondents not in those categories in 2023, similar to the results from 2020 - 2022 (see Figure 5). Unlike in 2020-2022, cis-gendered women did not express excess negative sentiment.
- Respondents with lower levels of parental education and from families with lower than average perceived income expressed negative sentiment and experiences at higher rates than respondents not in those categories. There is modest evidence that the gap in negative experiences is smaller for these categories in 2023 than in 2020 - 2022 (see Figure 6).

- Differences in negative sentiment and experiences between demographic groups persisted after accounting for respondent age (a potential confounder) using multiple linear regression (see Figure 13).
- The top 3 reported experiences that made respondents Uncomfortable or Very Uncomfortable were spending time in the Crested Butte community, and attending RMBL-organized social activities, and eating in the dining hall. This was true for respondents overall, and also for those in at least one uncommon demographic group and those expressing a large number of negative responses.
- In 2023, 12-15% of respondents expressed that they had experienced or witnessed sexist remarks, inappropriate jokes, and microagressions. The proportion of respondents reporting inappropriate or sexist remarks and microagressions decreased considerably in 2023 compared to 2020 - 2022. In 2020 - 2023, a very small proportion of respondents (less than 10%) reported discrimination based on their race, gender, disability, or LGBTQ status, feared for their physical safety, or were touched without their permission.
- Demographic "outsiders" reported fewer negative experiences in 2023 (compared to 2020 - 2022) across some categories of experience, including reduced rates of reporting microagressions, inappropriate jokes, and sexist remarks, but still reported those experiences at greater rates than their peers in more common demographic categories (see Figure 14).
- According to data from the RMBL portal, the undergraduate and graduate student population has become modestly more diverse from 2020 - 2023. In 2020, 65% of RMBL undergraduates identified as non-Hispanic White. In 2023, this had fallen to 50%. For graduate students this change was from 74 to 67%. For both groups, this is now a smaller percentage of non-Hispanic Whites than in national benchmarks.
- Community members with Black or African American identities continue to be underrepresented in the RMBL undergraduate community in 2023 (6%) compared to all US undergrads enrolled in 2-year or 4-year degree programs (13.7%), and are completely absent from professor roles. Similar to 2020 - 2022, in 2023 there were zero Black or African American professors at RMBL.
- Community members with Hispanic or Latino ethnicity are better represented in 2023 than 2020 - 2022, but still remain underrepresented in the Graduate Student segment of the RMBL community compared to national benchmarks. This group accounted for 25% of RMBL Undergraduates in 2023, but only 9% of graduate students.
- Women are underrepresented in more senior career roles in the RMBL community at large, but this is caused by a male-biased population of visiting scientists. Women account for 39% of RMBL professors in 2023, compared to 47 to 50% in national benchmarks. Women are better-represented among PIs with registered research plans (50%), in line with national benchmarks.
- The undergraduate population at RMBL is heavily female-skewed, with cis-gendered male participants accounting for only 32% of undergrads in 2023, compared to 44% of US undergrads. In 2023, the proportion of female community members declined steeply with career stage: undergrads-67%, grads - 56%, postdocs - 50%, professors - 39%.
- There is limited awareness of the anti-colonial actions RMBL has undertaken. For 4 out of 7 actions, only a minority of respondents indicated "Yes, I was aware of this action". Actions with the poorest awareness within the community were (1) teaching Ute STEM educational modules with elementary-aged children in RMBL summer and school year programs, and (2) offering Utes free housing and access to RMBL land during hunting season (see Figure 20).
- There is broad support among survey respondents for additional anti-colonial actions by RMBL, and majorities of respondents indicated that all proposed actions were either a 4 or 5 on a five-point importance scale. Top priority actions for respondents were (1) soliciting feedback from Indigenous communities on land acknowledgement, educational materials, and other anti-colonial actions, and (2) creating scholarships and fellowships for indigenous scholars (see Figure 21).

What is the demographic makeup of the survey respondents?

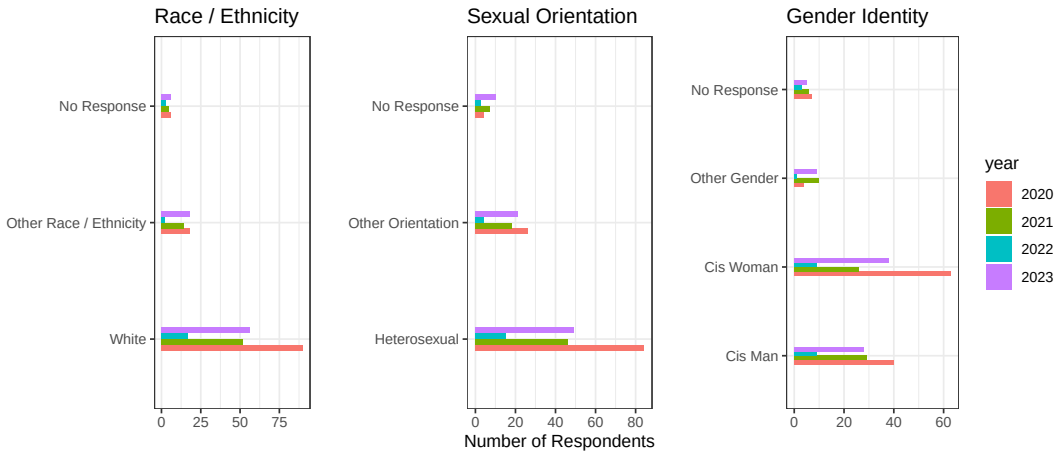


Figure 1: Overall makeup of survey respondents by reported Race / Ethnicity, Sexual Orientation, and Gender Identity. Categories with less than 4 respondents have been aggregated to protect the anonymity of participants. Race / Ethnicity responses included in the "Other Race / Ethnicity" group include "Hispanic / Latinx", "Asian", "American Indian or Alaska Native", "Black for African American", and "Some other race, ethnicity, or origin". Responses included in the "Other Orientation" group include "Bisexual", "Queer","Questioning","Gay", "Asexual", "Lesbian", and "Pan". Responses included in the "Other Gender" category include "Nonbinary" responses and those that responded "Yes" to the question "Do you have a transgender identity, history, or status?".

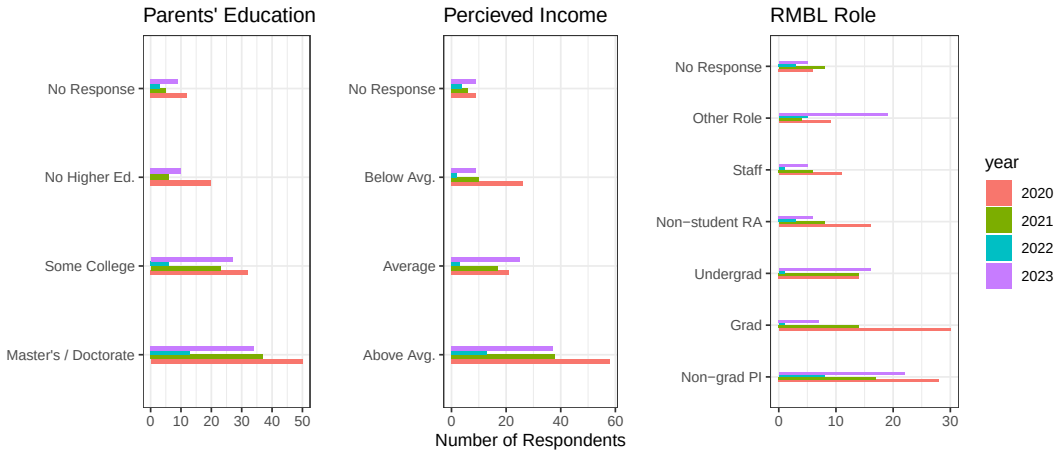


Figure 2: Overall makeup of survey respondents by reported parents' level of education, perceived income, and role in the RMBL community. Categories with less than 4 respondents have been aggregated to protect the anonymity of participants. For RMBL role, respondents could select more than one role, and multiple responses were combined using a hierarchy of roles, with "Staff" superseding "PI (non-graduate student)" superseding "Graduate Student" superseding "Undergraduate Student" superseding "Research Technician / Research Assistant". The "Other Role" category includes "Volunteer", "Board Member" "Postdoc" (excluding those that selected a PI role), and other write-in roles.

How do survey respondents differ from the RMBL community at large?

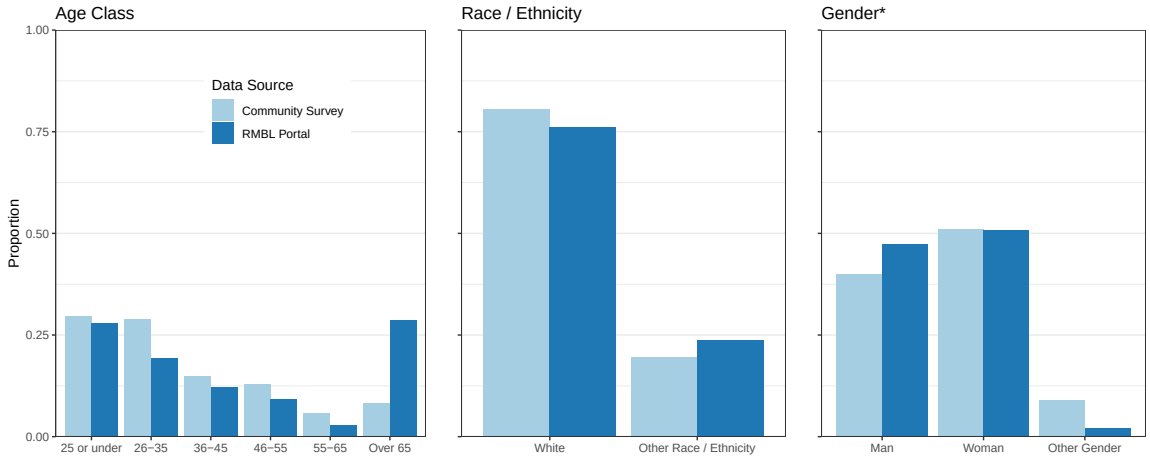


Figure 3: Survey respondents in 2020 - 2023 were demographically similar to the community at large, with a few key differences. All scientists and students working at RMBL were required to register in the RMBL portal starting in 2021, so their registration provides some basic demographic information that can be compared to survey respondents. For Age Class, reported dates of birth in the RMBL portal were converted to age categories matching the categories present on the survey assuming a current date of July 1st. For Race / Ethnicity, respondents in both the Community Survey and RMBL Portal who identified any non-white racial or ethnic category were placed in the "Other Race / Ethnicity" category. *Gender responses were solicited as an open-ended question in the RMBL portal, with no explicit question about transgender status. This differs from the Community Survey, which asked about both gender identity and transgender status. This means that we can only compare reported gender, placing Portal respondents reporting their non-binary, gender queer, or trans status in the "Other Gender" category.

What is the overall distribution of negative sentiment and experiences among survey respondents?

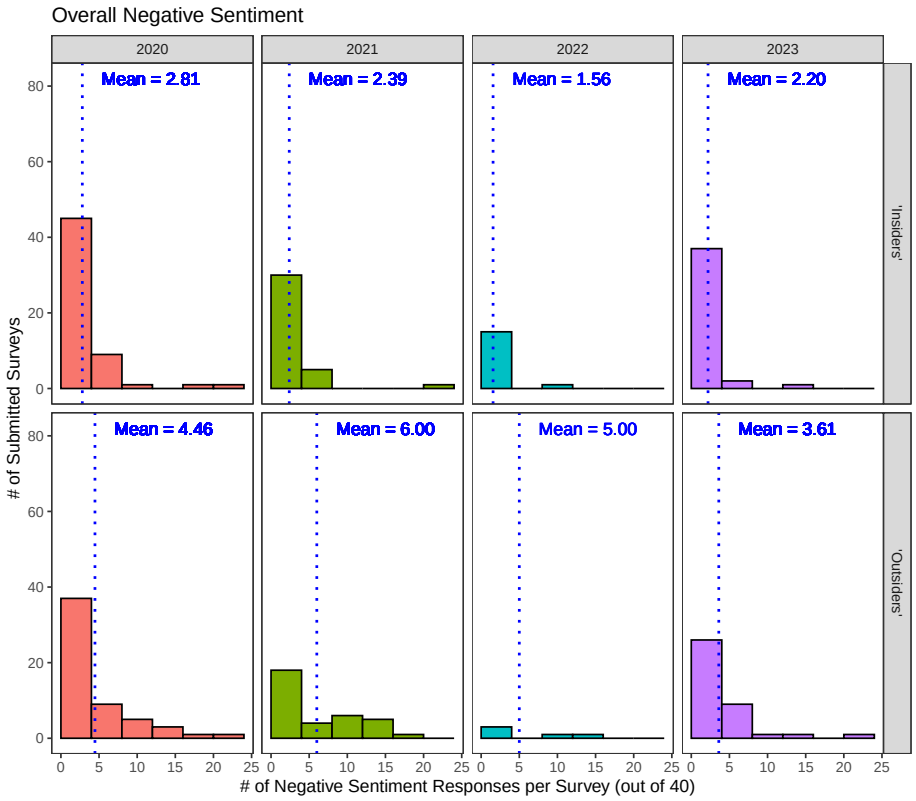


Figure 4: Overall distribution of negative sentiment responses in the 2020 - 2023 RMBL Community Survey. The x-axis represents the total number of response items in each completed survey that express negative sentiment (e.g. "Uncomfortable / Very Uncomfortable", or "Disagree / Strongly Disagree" with a positive statement) broken into 6 bins (0-3, 4-7, 8-11, 12-15, 16-19, and 20-24 negative response items, respectively). There are a maximum of 40 such items on the survey that could be coded according to sentiment. The y-axis represents the number of submitted surveys in each sentiment category. The mean number of negative-sentiment items in each category is represented by the dotted vertical blue line. The three categories of questions that were included are those in the section "Reflecting on the following activities that are part of life at RMBL, please indicate your level of comfort doing each on this scale of very uncomfortable to very comfortable", "Reflecting on your time at RMBL, how much do you agree with the following statements?" and "Which of the following have you experienced or witnessed while at RMBL or in a RMBL-related context? While at RMBL, someone...". Demographic 'Outsiders' are defined as respondents in at least one minority group according to race, sexual orientation, gender identity, family income, or family educational attainment.

How does negative sentiment vary across categories of race, sexual orientation, and gender?

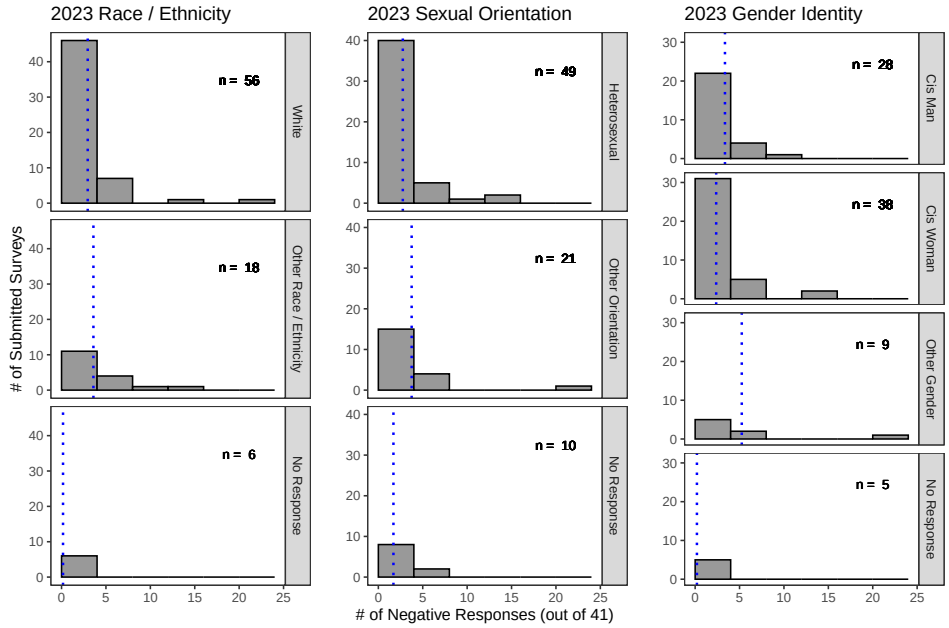


Figure 5: Histograms of negative sentiment from the 2023 RMBL community survey by Race / Ethnicity, Sexual Orientation, and Gender Identity. Race / Ethnicity responses included in the "Other Race / Ethnicity" group include "Hispanic / Latinx", "Asian", "American Indian or Alaska Native", "Black for African American", and "Some other race, ethnicity, or origin". Responses included in the "Other Orientation" group include "Bisexual", "Queer","Questioning","Gay", "Asexual", "Lesbian", and "Pan". Responses included in the "Other Gender" category include "Nonbinary" responses and those that responded "Yes" to the question "Do you have a transgender identity, history, or status?".

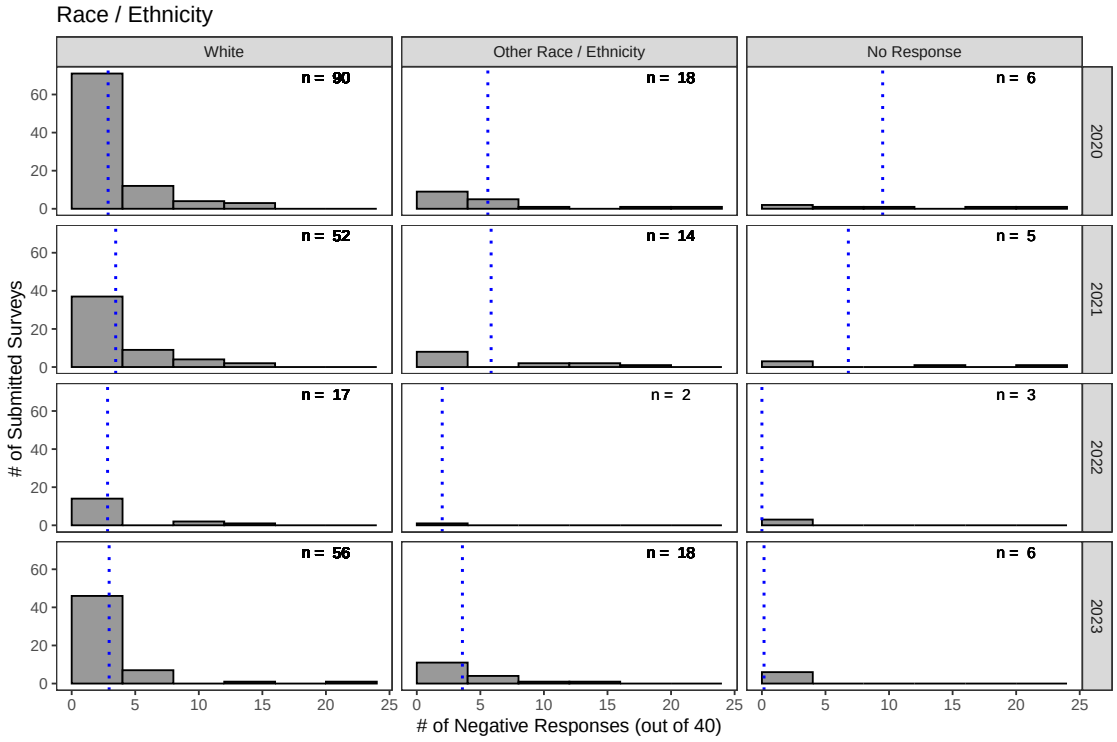


Figure 6: 2020 to 2023 distribution of negative sentiment by Race / Ethnicity. The x-axis represents the number of response items in each survey that expressed negative sentiment (out of a total of 40 response items per survey. Race / Ethnicity responses included in the "Other Race / Ethnicity" group include "Hispanic / Latinx", "Asian", "American Indian or Alaska Native", "Black for African American", and "Some other race, ethnicity, or origin".

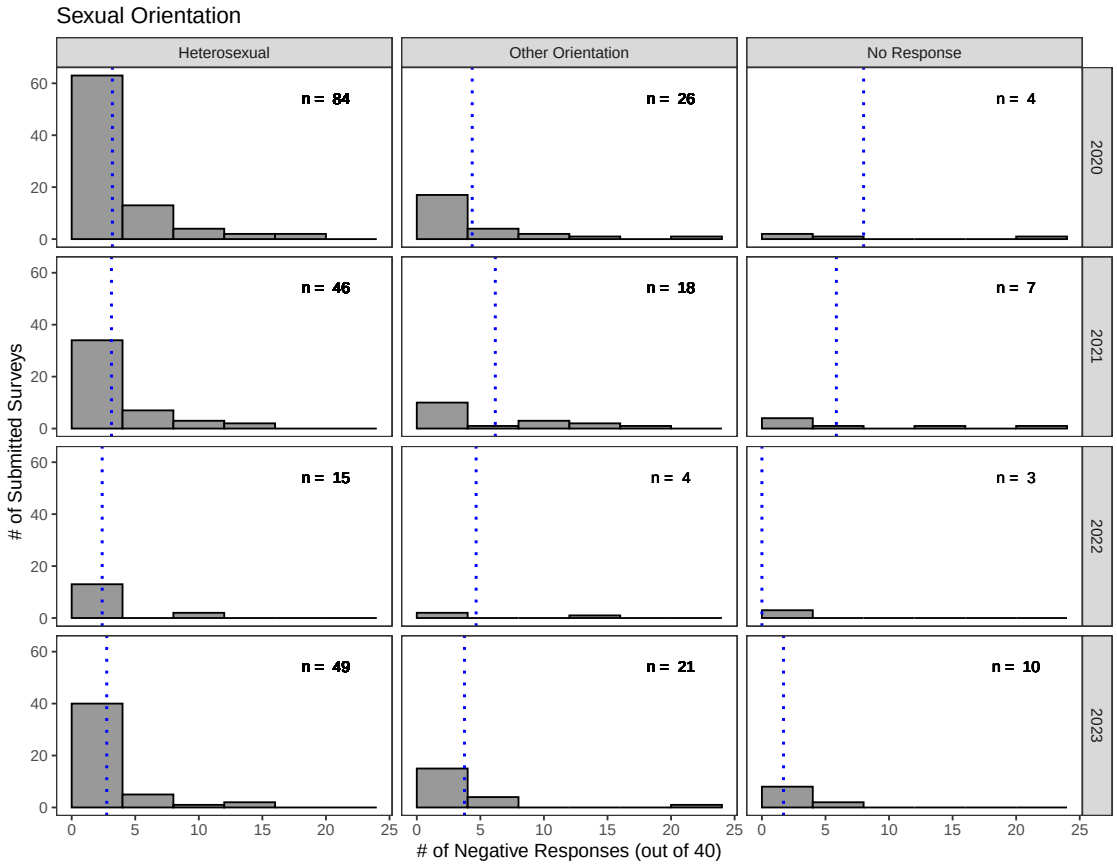


Figure 7: 2020 to 2023 distribution of negative sentiment by sexual orientation. The x-axis represents the number of response items in each survey that expressed negative sentiment (out of a total of 40 response items per survey. Responses included in the "Other Orientation" group include "Bisexual", "Queer","Questioning","Gay", "Asexual", "Lesbian", and "Pan".

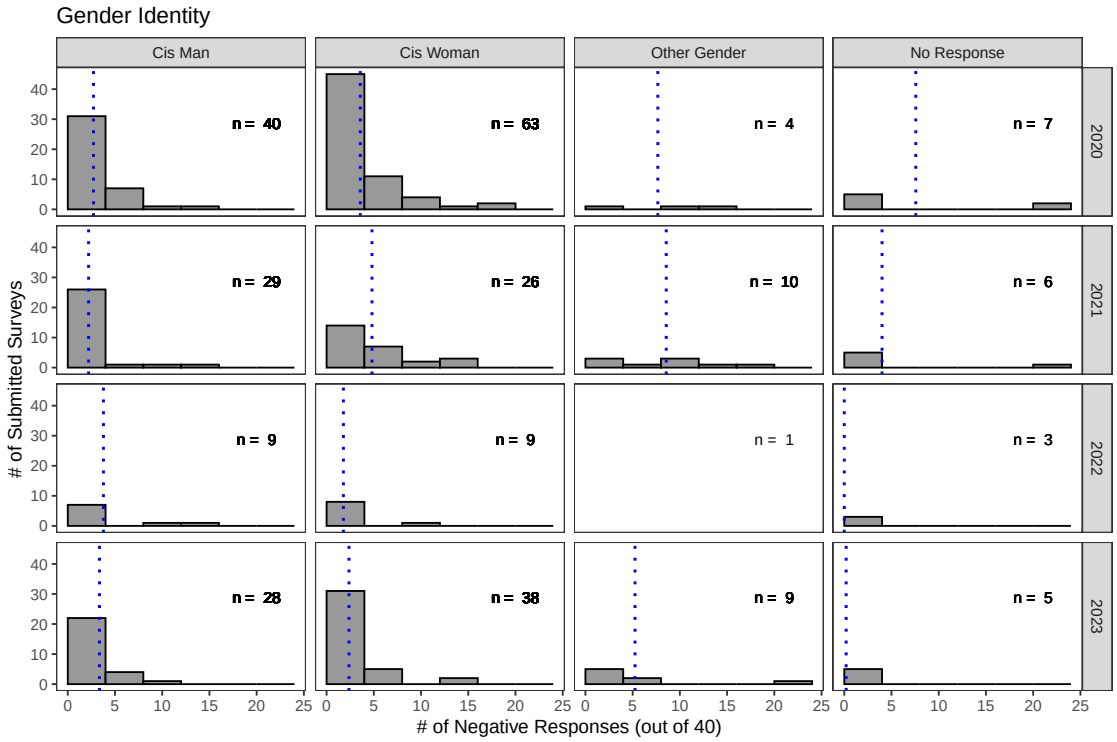


Figure 8: 2020 to 2023 distribution of negative sentiment by Gender Identity. The x-axis represents the number of response items in each survey that expressed negative sentiment (out of a total of 40 response items per survey. Responses included in the "Other Gender" category include "Nonbinary" responses and those that responded "Yes" to the question "Do you have a transgender identity, history, or status?".

How does negative sentiment vary across categories of parents' education, income, and RMBL Role?

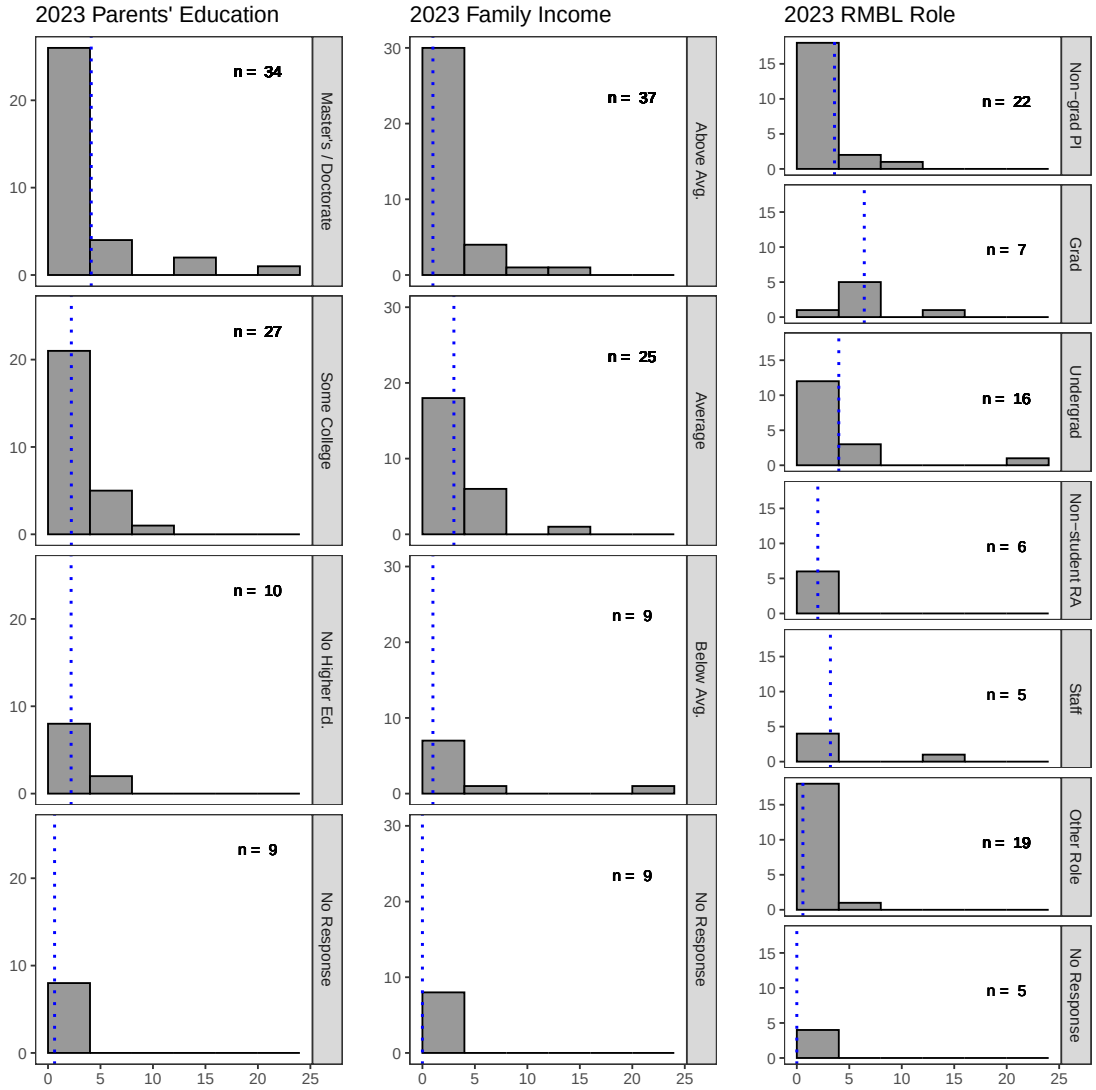


Figure 9: 2023 distribution of negative sentiment by parent's education, perceived family income, and RMBL Role. The x-axis represents the number of response items in each survey that expressed negative sentiment (out of a total of 40 response items per survey. Education categories grouped in the "Some College" group include those who's parents completed a Batchelor's Degree or other professional degree. Income categories are derived from the prompt "Compared with American families in the US in general, would you say that your family income is:". Income responses of "Above Average" and "Far Above Average" were grouped to form the "Above Average" category, and responses of "Below Average", and "Far Below Average" were grouped into the "Below Average" category. For RMBL Role, respondents could select more than one role, and multiple responses were combined using a hierarchy of roles, with "Staff" superseding "PI (non-graduate student)" superseding "Graduate Student" superseding "Undergraduate Student" superseding "Research Technician / Research Assistant". The "Other Role" category includes "Volunteer", "Board Member" "Postdoc" (excluding those that selected a PI role), and other write-in roles. There was not enough data from 2022 to include in this analysis.

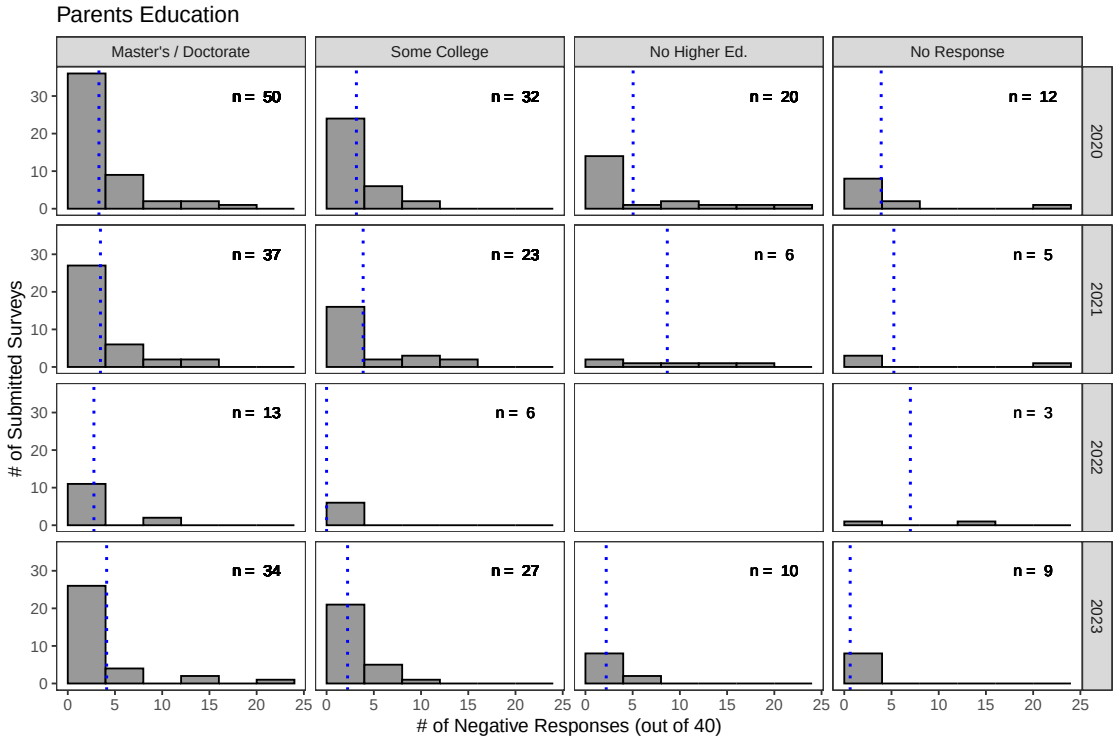


Figure 10: 2020 through 2023 distribution of negative sentiment by reported Parents' Education. The x-axis represents the number of response items in each survey that expressed negative sentiment (out of a total of 40 response items per survey. Education categories grouped in the "Some College" group include those who's parents completed a Batchelor's Degree or other professional degree.

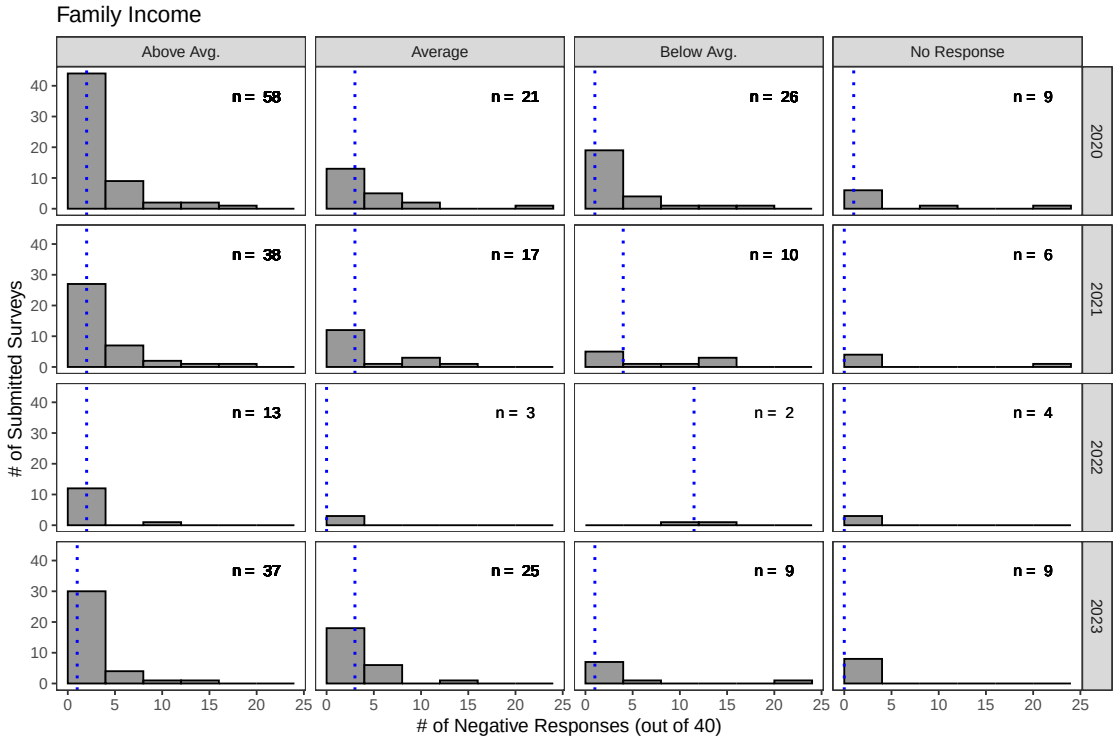


Figure 11: 2020 through 2023 distribution of negative sentiment by perceived family income. Income categories are derived from the prompt "Compared with American families in the US in general, would you say that your family income is:". Income responses of "Above Average" and "Far Above Average" were grouped to form the "Above Average" category, and responses of "Below Average", and "Far Below Average" were grouped into the "Below Average" category.

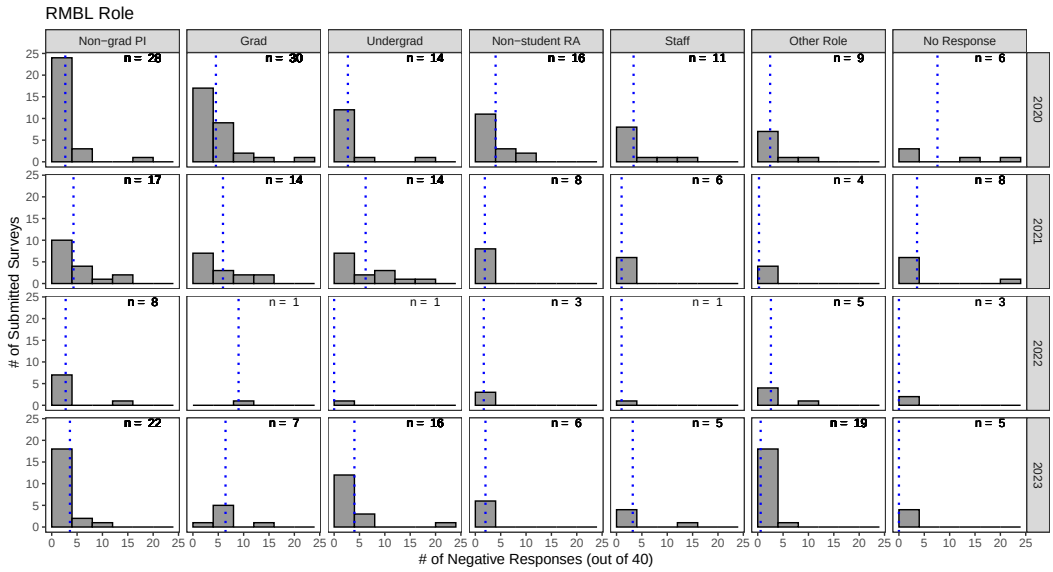


Figure 12: 2020 through 2023 distribution of negative sentiment by RMBL Role. Roles were derived from the prompt: "What was your most recent role at the RMBL". Respondents could select more than one role, and multiple responses were combined using a hierarchy of roles, with "Staff" superseding "PI (non-graduate student)" superseding "Graduate Student" superseding "Undergraduate Student" superseding "Research Technician / Research Assistant". The "Other Role" category includes "Volunteer", "Board Member" "Postdoc" (excluding those that selected a PI role), and other write-in roles.

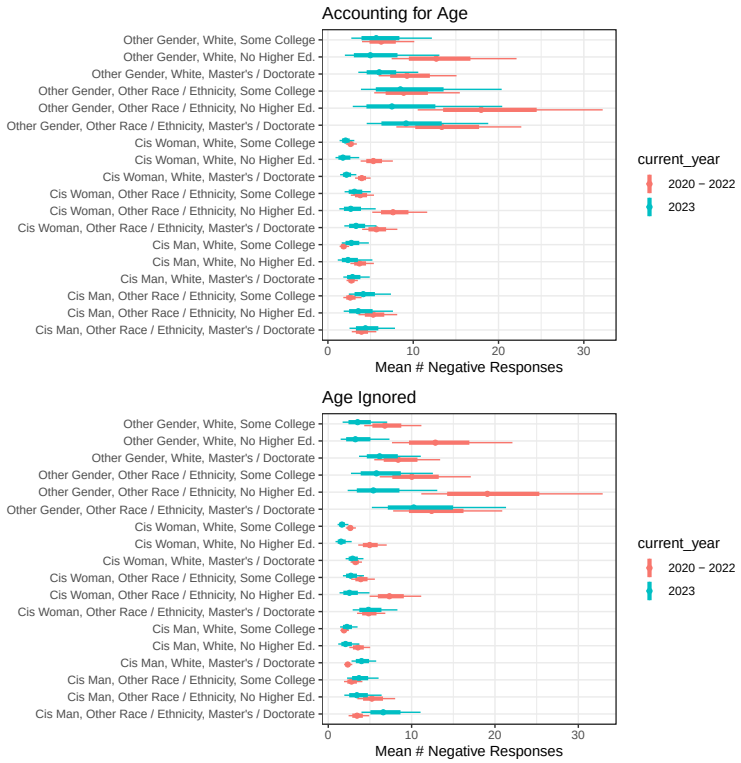


Figure 13: Predicted mean number of negative responses by demographic category in 2023 compared to 2020 - 2022, using the best regression models describing negative sentiment. The models are Bayesian generalized linear model with a negative binomial error distribution fit using the stan_glm() function in the R package rstanarm. Model selection was performed using the ELPD criterion as calculated using the loo_compare() function in the R package loo. For both models, the linear predictor includes terms Total Negative Responses ~ year + race + sex + college + year:race + year:sew + year:college. Predictions in the top panel also include respondent age as a continuous predictor.

What are the most common negative experiences and sentiments expressed in the RMBL community survey?

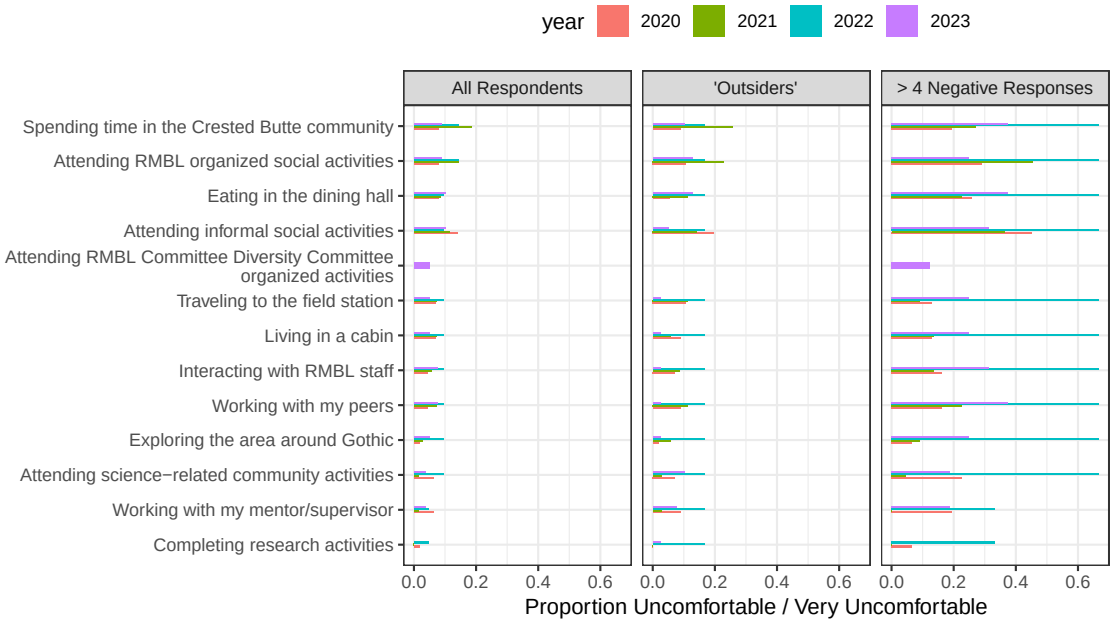


Figure 14: Proportion of "Uncomfortable / Very Uncomfortable" responses across activities listed under the prompt "Reflecting on the following activities that are part of life at RMBL, please indicate your level of comfort doing each on this scale of very uncomfortable to very comfortable." Responses are ranked according the average proportion of "Uncomfortable / Very Uncomfortable" ratings in 2020 to 2022 across all respondents. The left panel displays ratings from all respondents. The center panel displays ratings from "Outsiders", respondents that were grouped into at least one minority category according to Race / Ethnicity, Sexual Orientation, Gender Identity, Family Income, or Parents Education (representing 49.7% of respondents). The right panel displays rating from respondents that reported more than 4 items with negative sentiment (e.g. "Uncomfortable / Very Uncomfortable", "Disagree / Strongly Disagree" with a positive statement). This category accounts for 29.0% of respondents.

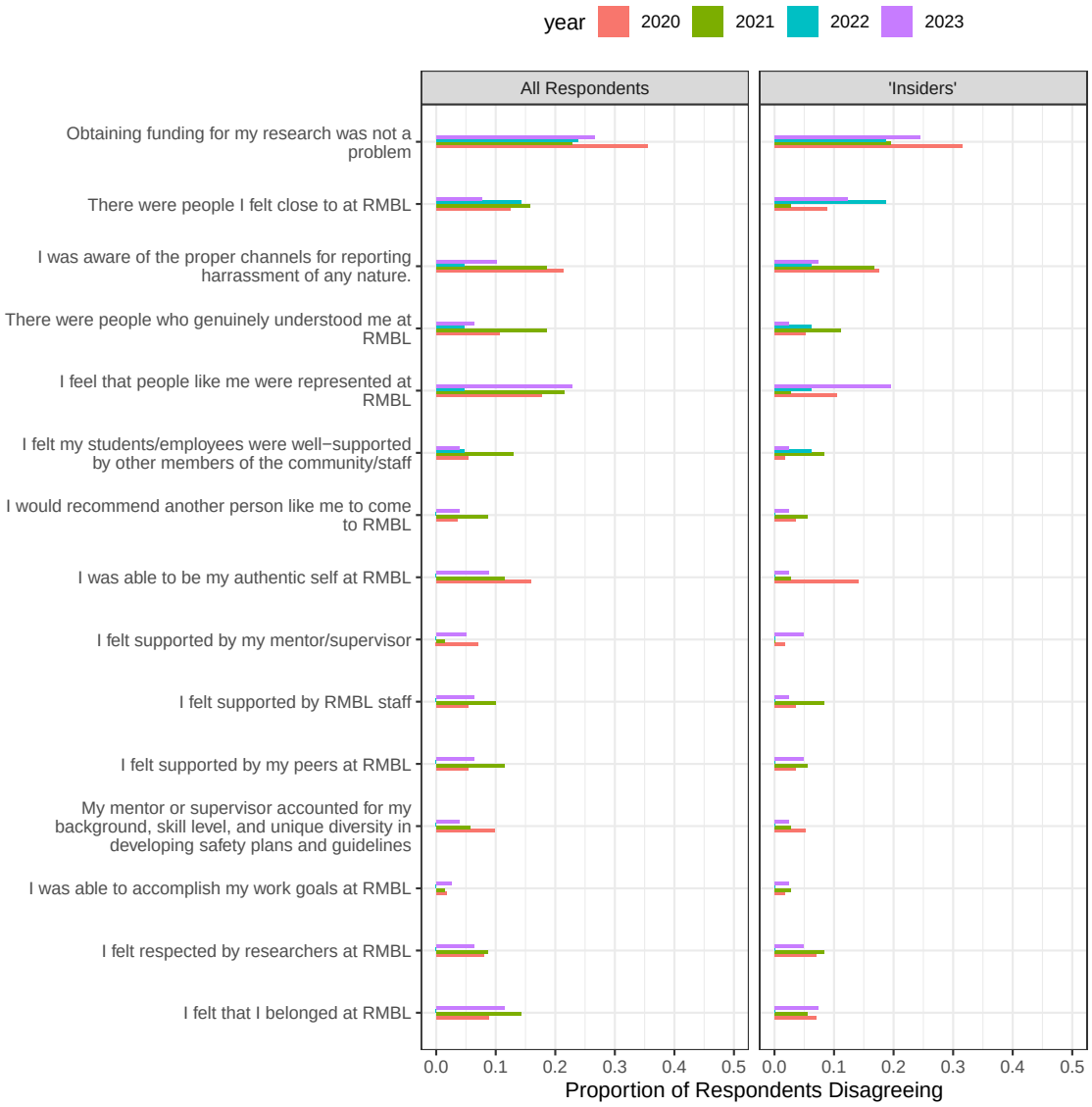


Figure 15: Proportion of "Disagree / Strongly Disagree" responses across activities listed under the prompt "Reflecting on your time at RMBL, how much do you agree with the following statements?" Responses are ranked according the average proportion of "Disagree / Strongly Disagree" ratings in 2020 and 2021 across all respondents. The left panel displays ratings from all respondents. The center panel displays ratings from "Outsiders", respondents that were grouped into at least one minority category according to Race / Ethnicity, Sexual Orientation, Gender Identity, Family Income, or Parents Education (representing 49.7% of respondents). The right panel displays rating from respondents that reported more than 4 items with negative sentiment (e.g. "Uncomfortable / Very Uncomfortable", "Disagree / Strongly Disagree" with a positive statement). This category accounts for 29.0% of respondents. Two statements were altered for display to be consistent with the others (e.g. "Disagree / Strongly Disagree" consistent with negative sentiment). The two original statements were "I feel that people like me were NOT represented at RMBL" and "There was no one I felt close to at RMBL".

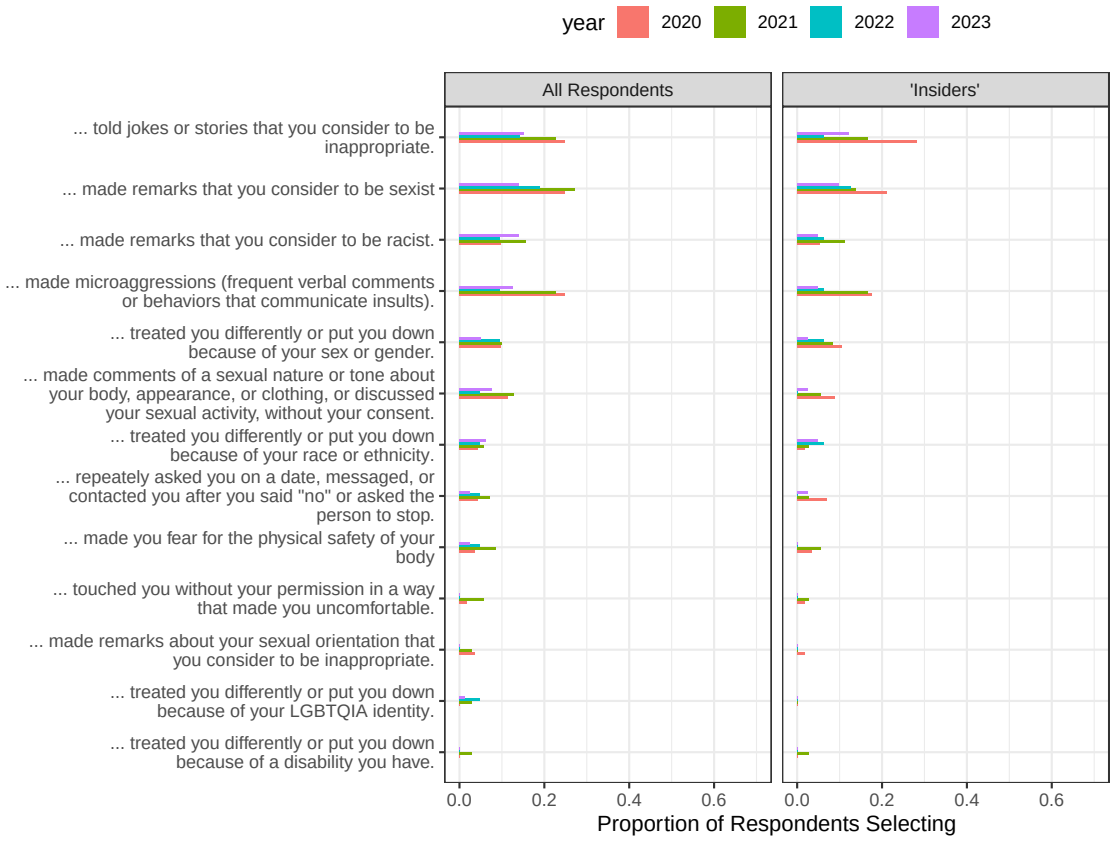


Figure 16: Proportion of respondents selecting statements with the prompt "Which of the following have you experienced or witnessed while at RMBL or in a RMBL-related context? While at RMBL, someone...". Responses are ranked according the average proportion of respondents selecting these statements in 2020 - 2023 across all respondents. The left panel displays ratings from all respondents. The center panel displays ratings from "Outsiders", respondents that were grouped into at least one minority category according to Race / Ethnicity, Sexual Orientation, Gender Identity, Family Income, or Parents Education (representing 49.7% of respondents). The right panel displays rating from respondents that reported more than 4 items with negative sentiment (e.g. "Uncomfortable / Very Uncomfortable", "Disagree / Strongly Disagree" with a positive statement). This category accounts for 29.0% of respondents.

How do the demographics of the RMBL community differ from national benchmarks?

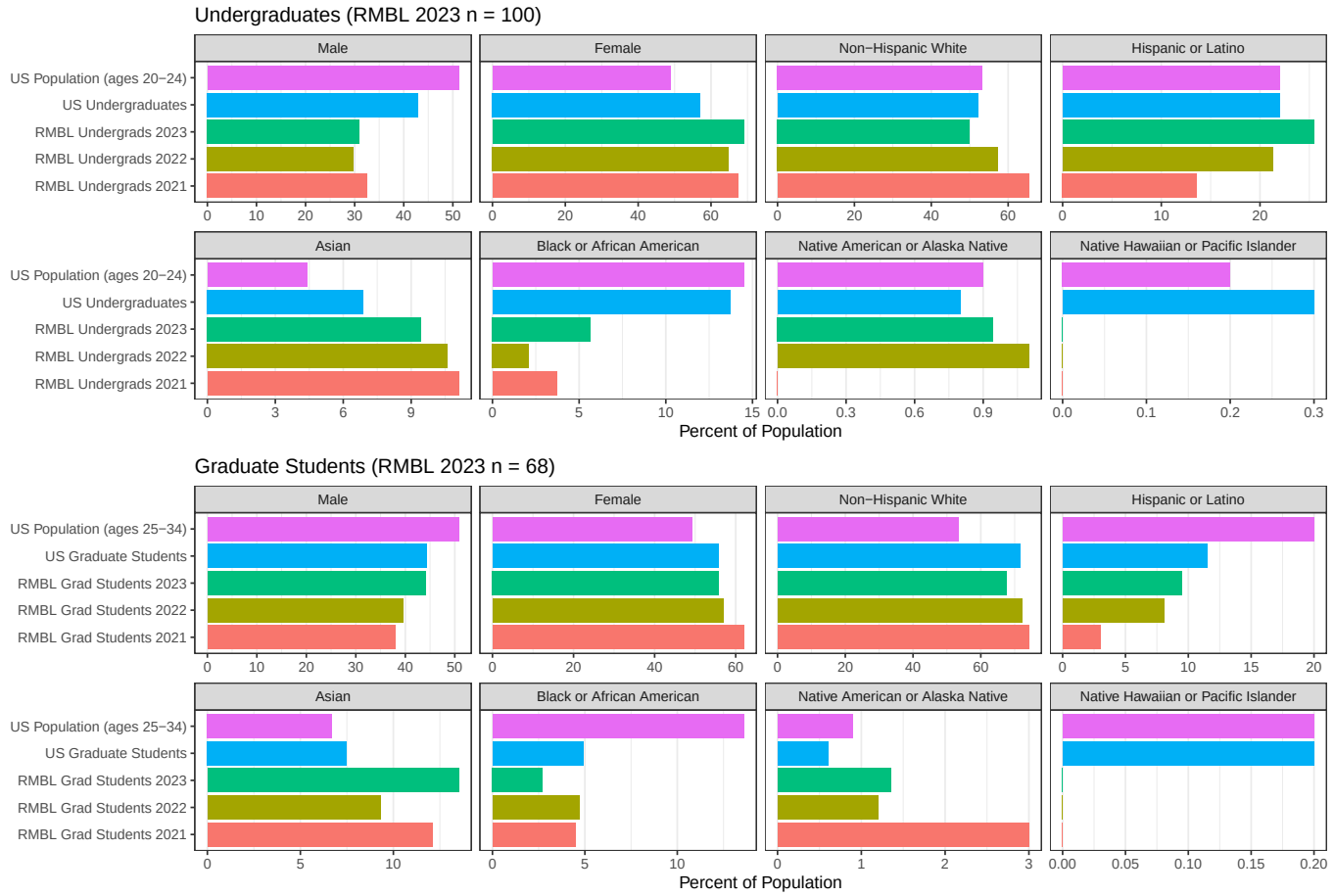


Figure 17: Demographic profile of RMBL undergraduate and graduate students compared to national benchmarks. RMBL data is from responses recorded in the RMBL Portal in 2021 and 2022. US Undergraduate data is from the National Center for Education Statistics collected in fall 2019 (the latest data available) and represents all students enrolled in 2-year and 4-year postsecondary degree programs at US colleges and universities that are eligible for federal student aid (Title IV institutions). US graduate student data is from the National Center for Science and Engineering Statistics (NCSES). Race and Ethnicity data in the NCSES survey is only recorded for US Citizens and Permanent Residents. The NCSES data was subset to students in 13 scientific disciplines represented in the RMBL scientist community: Biology, Biophysics, Biostatistics and bioinformatics, Botany and plant biology, Ecology and population biology, Genetics, Zoology and animal biology, Atmospheric sciences and meteorology, Geological and earth sciences, Environmental science and studies, Forestry, natural resources, and conservation. Data from respondents who listed more than one race and those that did not respond to race or ethnicity questions in the Portal are not shown.

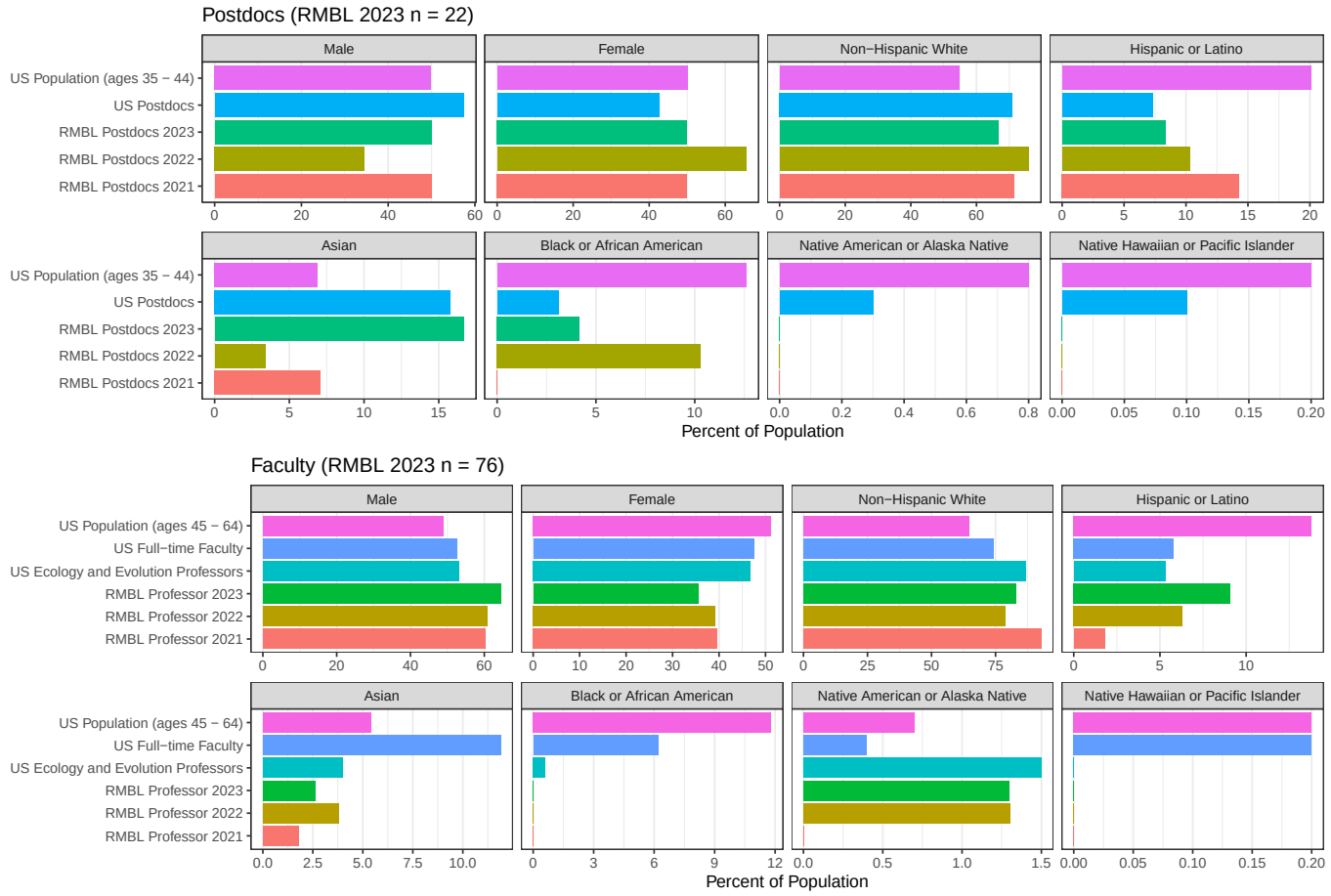


Figure 18: Demographic profile of RMBL postdocs and university faculty compared to national benchmarks. RMBL data is from responses recorded in the RMBL Portal in 2021 and 2022. US postdoc data is from the National Center for Science and Engineering Statistics (NCSES). Race and Ethnicity data in the NCSES survey is only recorded for US Citizens and Permanent Residents. The NCSES data was subset to students in 13 scientific disciplines represented in the RMBL scientist community: Biology, Biophysics, Biostatistics and bioinformatics, Botany and plant biology, Ecology and population biology, Genetics, Zoology and animal biology, Atmospheric sciences and meteorology, Geological and earth sciences, Environmental science and studies, Forestry, natural resources, and conservation. Data on RMBL professors is from the 58 people who listed "Associate Professor", "Assistant Professor", or "Full Professor" as their RMBL role in the Portal. Data on US full-time university faculty is from the National Center for Education Statistics (NCES) Digest of Education Statistics. Data from US Ecology and Evolution professors is from a 2018 survey of faculty that are associated with 94 doctoral programs in Ecology and Evolution that are recognized by the National Research Council and described in Jimenez et al., Nat Ecol Evol 3, 1030–1033 (2019). https://doi.org/10.1038/s41559-019-0911-5. Data from respondents who listed more than one race and those that did not respond to race or ethnicity questions in the Portal are not shown.

* Note that although women made up only 40% of professor-level members of the RMBL community in 2021 and 2022 (as captured by the RMBL Portal), they represent a larger share (50%) of primary investigators with a registered research plan, indicating that a larger number of faculty-level men than women came to RMBL as visitors.

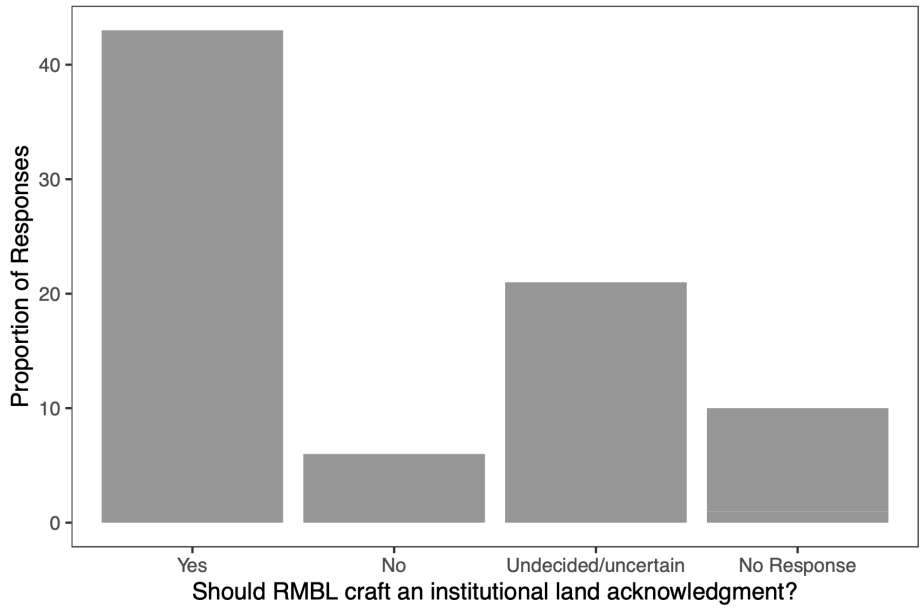


Figure 19: 2023 responses to the question "Should RMBL craft an institutional land acknowledgement?

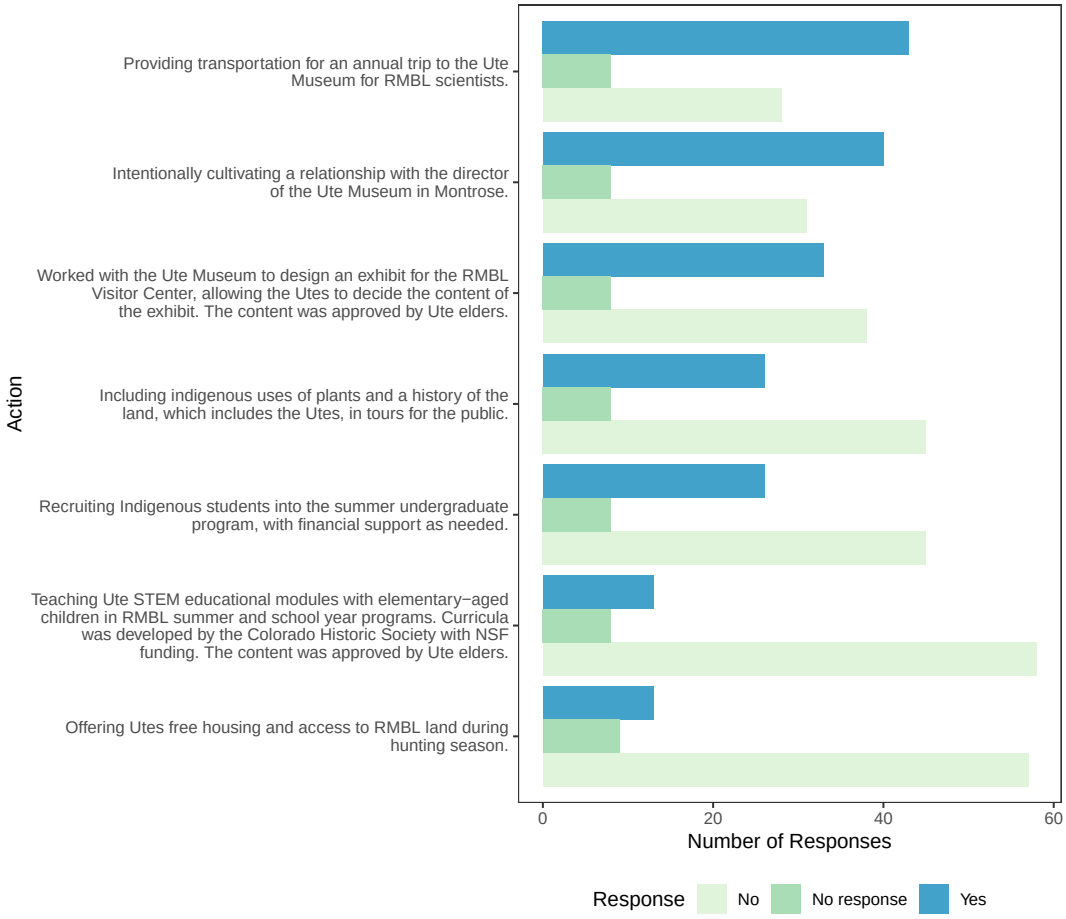


Figure 20: 2023 responses to the question "RMBL is currently engaging in the following anti-colonial actions. Please indicate whether you were aware of each activity (yes, I was aware of this action/no, I was unaware of this action)." Actions are ordered by the proportion of respondents selecting "yes, I was aware of this action).

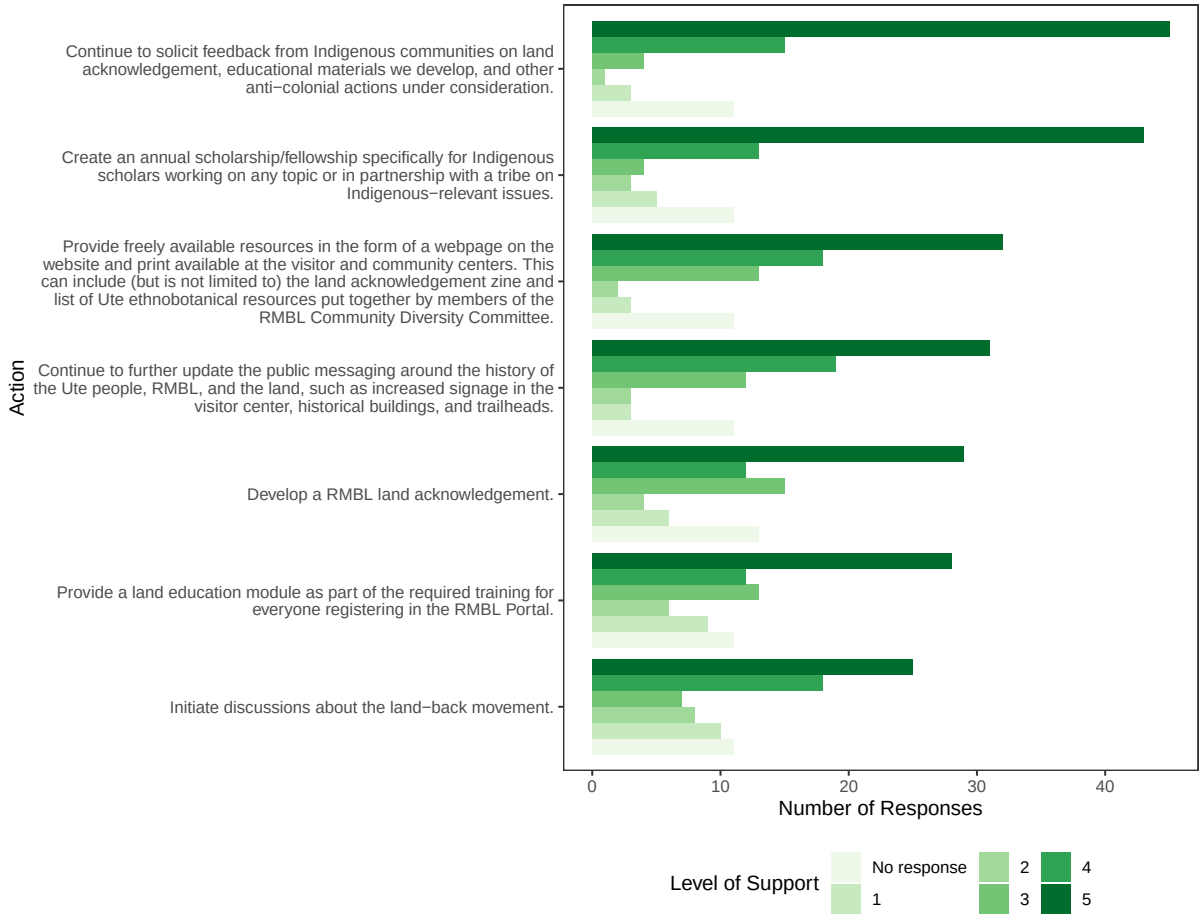


Figure 21: 2023 responses to the question "The following is a list of additional anti-colonial actions. Please evaluate the importance of these, additional anti-colonial actions, on a scale of 1–5, with 1 being not at all important and 5 being very important." Actions are ordered by the proportion of respondents selecting "5 - very important".