Dear Editor Beyer,

This letter accompanies our revised manuscript, titled, *“Maybe These Fields Just Don’t Interest Them.” Gender and Ethnic Differences in Attributions about STEM Inequities* (667-4370-RV). We are grateful for the thoughtful and constructive feedback provided by the reviewers and agree with all of the points raised.

We would also like to thank you for your suggestion regarding communal and agentic values. We have restructured our brief literature review of communal and agentic values so that these constructs are more clearly connected to gender stereotypes and role expectations. It is certainly possible that participants were incorporating stereotypes about agency and communion into their reasoning about who is interested (or not) in STEM. Participant responses and our coding process did not reveal any themes that directly pertain to agency or communion. This has been added to the Overview of Key Findings section on page 14. However, it is possible that these constructs were guiding some participants’ responses. As such, we have also noted this in the Limitations and Future Directions section on page 17.

Below, we detail how the suggestions from each reviewer were addressed.

**Reviewer F:** This manuscript investigates undergraduate students’ attributions about gender and racial-ethnic disparities in STEM participation. The authors find a range of attributions that fall into two broad themes: inequity is a problem vs. not a problem. The authors also find gender and ethnic differences in the types of attributions made, with women and Latinx participants more likely to mention stereotyping, men more likely to mention drive, and women more likely to mention confidence. There is much to like about this manuscript. The manuscript is generally well-written and easy to follow, and the topic is very relevant to the journal and will likely be of great interest to readers. The manuscript also has the potential to make a significant contribution to the literature regarding inequity in STEM, as very little research has explored students’ attributions for STEM inequities. However, I do have some comments and suggestions to improve the manuscript:

* *We appreciate this constructive feedback. The reviewer’s recommendations provided a great framework for clarifying our methodology and results.*

The authors mention in the intro and discussion that understanding students’ attributions will help inform interventions and targeted outreach efforts. Can the authors explain how? I’m not sure I understand how knowing students’ attributions for STEM inequities help inform interventions. The authors found that a large proportion of respondents think that gender and ethnic disparities in STEM are unfair and that stereotypes contribute to the problem. But how does that info inform interventions? The authors also found that a minority of respondents blame the problem on lack of interest and fail to acknowledge the role of bias and

stereotypes. I could see how attributions that deny bias could lend themselves to interventions focused on increasing awareness of bias in STEM. But I’m having a hard time seeing how attributions that recognize bias and stereotypes lend themselves to interventions. It might be helpful if the authors could discuss how attributions are linked to career interest. It would also be helpful to discuss the focus of potential interventions – would it be to change attributions? Or to give students resources to cope with attributions of bias? My main point here is that the authors need to be clearer about the implications of their findings and why attributions are important.

* *Thank you for pointing this out. We have added content that directly addresses this concern in the Developmental Context (pages 3 and 4) section. Specifically, we have expanded upon how the underlying theory behind sociopolitical development makes emerging adulthood a unique developmental period in which to explore people’s reasoning capabilities about important social issues, such as inequity. We also note that successful interventions should consider the stage of sociopolitical development in target audiences. More specifically, future interventions should be tailored to individual groups based on their experiences and reasoning capabilities, all of which are in flux during emerging adulthood. We have also added an Implications for Intervention section to the Discussion on page 16.*

Relatedly, the authors seem to assume that participants’ attributions are a reflection of personal experience, such that reporting low confidence as a reason for women’s underrepresentation implies that the reporter was deterred from STEM because of their own low confidence. For example, the authors state, “Our findings highlight the unique areas of concern for women and Latinx students”. However, attributions may not accurately reflect one’s own personal experience or self-concepts, but could instead merely reflect awareness of the research literature on STEM inequity that demonstrates the contributing role of bias and stereotypes.

* *We agree with this sentiment and appreciate the suggestion. We have added this point to the Limitations and Future Directions section on page 17. Specifically, we explain that participants’ responses are not necessarily based on their own personal experiences; at least some of them likely draw from friends, family, teachers, and the media. However, even subtle messages from these sources have been found to influence STEM participation at various points during development, and future research should consider how personal experiences as well as anecdotes about inequities in STEM might differentially impact pursuit of the field.*

There are a number of places where the authors could add relevant citations and discussion of related research. In particular, Cundiff & Vescio (2016, “Gender stereotypes influence how people explain gender disparities in the workplace”, Sex Roles) examined undergraduates’ attributions for gender disparities in STEM participation. They found that attributions varied as a function of stereotype endorsement, such that students who strongly endorsed gender stereotypes were less likely to attribute gender disparities in STEM to discrimination. Along these lines, the authors should also discuss literature on the factors that predict perceptions of discrimination. Multiple studies show that members of disadvantage groups are more likely to perceive discrimination than members of privileged groups (e.g., Inman & Baron, 1996; Brown & Bigler, 2004; Verkuyten, 2002; Rodin, Price, et al., 1990), likely because personal experience with discrimination increases awareness. This literature is relevant to the authors’ hypothesis that stereotyping may be a more salient explanation for women and persons of color than for white men.

* *Thank you for bringing our attention to these great articles! Cundiff and Vescio (2016) was added to the introduction on page 7, whereas Inman and Baron (1996), Brown and Bigler (2004), Verkuyten (2002), and Rodin et al. (1990) were used in the discussion (pages 14-15).*

The authors indicate that their research question focused on the extent to which participants mention stereotyping, bias, and confidence as reasons for disparities in STEM. But then the authors used thematic analysis to identify themes and patterns in the dataset. This made me wonder whether the themes of stereotyping, bias, and confidence were predetermined, or whether they emerged organically from the responses? More clarity here would be helpful.

* *We appreciate this point and have offered clarification in the Current Study section on page 8. Based on prior literature, we expected certain themes (namely stereotypes, bias, and confidence) to come through in participant responses. However, we also coded for emergent themes in an effort to fully characterize the array of responses that participants provided. As such, we used thematic analysis to clarify and deductively search for expected themes (e.g., stereotypes, bias, and confidence); this approach also allowed us to inductively code for emergent themes.*

The authors also mention that they suspected that some participants would reference factors that have little empirical support – it might be interesting to discuss in the discussion section the prevalence of empirically-supported vs. empirically-unsupported attributions. Alternatively, the authors could have framed the paper as examining the extent to which students’ attributions map onto empirically-supported vs. empirically-unsupported attributions.

* *Thank you for this comment. We have changed our wording and added some clarification on page 9. Specifically, we used a hybrid deductive-inductive approach to coding, which allowed us to code for expected themes while also inductively coding for any emergent themes that were not expected a priori. On page 14, we have also elaborated on which results we expected to find (with previous empirical support), in addition to those that were unexpected.*

If available, the authors should include information about participants’ majors.

* *We have added information on participants’ majors to the Participant section on page 9, as well as into Table 1.*

I found it curious that the authors asked respondents, “What do you think about this” rather than directly asking respondents to explain why there are gender and ethnic disparities in STEM. Can the authors explain their reason for using such a broad question when they were interested in attributions specifically?

* *We appreciate this point. The question was worded in such a way as to not be leading, and we have added clarification regarding this point on Page 9. More specifically, we wanted participants to have the freedom to express their opinion; using a more pointed question would likely have rested on the assumption that all participants believe that STEM inequity exists or is a problem. However, we have also noted the question wording as a possible limitation on page 17, as we understand that we could have obtained more specific information with a more directed question.*

The authors mentioned that 78% of responses were codable. Why were some responses not codable, and how was that determined?

* *We have clarified this point with participant examples on pages 9-10. Many responses were not easily interpretable (e.g., they did not address the posed question), or did not fall under one of the major coding categories.*

I wonder if the “lack of drive” subcategory might be referred to more accurately as “lack of interest”. Lack of drive implies a lack of ambition or lack of motivation to work hard, rather than lack of interest per se.

* *We agree with this sentiment and thank you for the suggestion. This has been changed throughout the manuscript.*

In the Discussion section, first paragraph, the authors need to add a citation for the sentence, “More specifically, failure to pursue occupational fields that are believed to align with one’s gender or ethnic identity result in stereotypes, bias, and a resulting erosion of confidence for individuals who pursue STEM in direct conflict with society’s expectations.”

* *This statement has been removed from the discussion and worked into the Common Explanations for Ethnic and Gender Disparities in STEM section on page 5. Supporting citations have been added.*

In the Discussion section, the authors mention that men were more likely than women to mention lack of drive as a reason for inequity in STEM. The authors could consider mentioning here that, although women do seem to express less interest in STEM than men (and so this explanation is somewhat accurate), it fails to acknowledge that interest and choices are not freely made but are constrained by stereotypes and other social-cultural and social-psychological factors.

* *This is a valuable point. We have clarified on pages 14-15 that career interest does not occur in a vacuum; it is constrained by a variety of socio-cultural factors, including role and value expectations (per SRT), system justification theory (SJT), and stereotypes.*

In this same section, the authors state that “the proportion of women in each field directly affects gender differences in interest”. But the article they cite (Su & Rounds, 2015) sounds like a correlation study, not an experiment. If that’s the case, then the authors should replace “affects” with “correlates with”.

* *This statement was removed from the discussion during revisions.*

In the Ethnic Variation subsection of the Discussion, the authors note that Latinx students were more likely to mention stereotyping than white and Asian students. The authors could consider expanding here by discussing possibilities for the ethnic difference in attributions, namely, the different stereotyping contexts that Latinx vs. Asian students face. Even though Latinx students and Asian students are collectively considered “people of color”, Latinx students are negatively stereotyped in STEM whereas Asian students are positively stereotyped. In addition, Latinxs are underrepresented in STEM relative to their proportional representation in the U.S. whereas Asians are overrepresented. These are important differences that should be discussed and could help explain the ethnic differences in attributions that the authors found.

* *This is an excellent point. Citations have been added on page 15 concerning the different stereotypes that Latinx groups and Asian Americans face in STEM, as well as their representation in STEM occupations when compared to their proportional representation in the U.S. population.*

**Reviewer H:** The paper was very clear and well-written. The introduction nicely sets up the issue of STEM inequity and uses social role theory as a framework. The study takes the unique route of employing qualitative methods to understand people’s justifications for STEM inequities.

* *We appreciate the positive feedback and helpful suggestions. They have helped us clarify important aspects of the manuscript.*

The Introduction does a good job of setting up a theoretical framework for Research Question 1 but does not really address Research Question 2. Social Role Theory doesn’t answer the question of why men and women or people of different ethnicities might generate different explanations for STEM inequities. One theory that could help explain gender/ethnicity differences in explanations for STEM inequities is system justification theory. When people are presented with social inequities they become motivated to rationalize them, especially if they are part of a high status group (according to social dominance theory) because justifying inequities maintains existing hierarchies. Thus, according to these two theories White people and men should be more motivated to generate merit-based rationalizations such as "lifestyle choices," "lack of drive," and "lack of aptitude," because these justifications legitimize STEM disparities. This is what your analyses reveal, and according to SJT and SDT these findings should be expected. Even if you do not choose to use SJT or SDT as a theoretical framework, it would be nice to see some sort of theoretical explanation for Research Question 2 set up in the Introduction and the implications presented in the Discussion.

* *It is true that social role theory does not answer the question of why men and women, or People of Color, might generate different explanations for STEM inequities. System Justification Theory [SJT], in particular, ties very well to our second research question, and more justification for RQ2 has been added to the manuscript, namely in the introduction and discussion sections. We try to convey that, according to SJT, White men may be more motivated to express merit-based attributions in order to maintain their current position of power in STEM.*

In the quantitative portion of the Results section, you only present specific comparisons (i.e., men were significantly more likely than women to reference a lack of drive) and don’t mention most of the themes you coded. I’m assuming you only present findings that yielded significance, which makes sense, but I would still like to see a table that presents the rest of your analyses/findings. I can’t really tell what you tested or didn’t test from how the Results are currently set up. Even though your analyses are exploratory, I still would like a better sense of your analysis plan and findings.

* *We agree that this could be more clearly presented. We have added Tables 3 and 4 to detail all of our chi-squares results, showing the prevalence of coding categories by gender and ethnicity.*

I had some questions about your coding decisions. Specifically, why “not unique to STEM” falls under “STEM inequity is not a problem.” The example you give states, “This reflects broader institutional racism and sexism, which is not particular to STEM fields.” This does not sound like the participant is conveying that STEM inequity is not a problem, but rather that racism and sexism are pervasive issues in STEM as well as other areas.

* *Thank you for this comment. We have added a bit of clarity to our overview of this category on pages 11-12. In the “not unique to STEM” responses, participants appeared to acknowledge that inequity is pervasive in STEM as well as other areas. The emotional tone of these responses was typically dismissive; inequity exists in all career fields and is therefore not worth trying to solve. Here is an example of one such response:*

*“If you mean that women and People of Color are not prevalent in the fields of science, technology, engineering, and math, then I see no problem with that. There are more women [than men] in the field of nursing, but should we complain about it? Not really.”*

Similar to comment #1, when you address your RQ2 findings in the discussion, you cite research about women being more interested in female-dominated fields and men being more interested in male-dominated fields. This still does not explain why women are more likely to generate stereotype/bias-based explanations for STEM inequities and why men are more likely to generate merit-based explanations like lack of drive. Then you bring up research on how value expectations predict gender differences in STEM career selection. Again, this does not really seem to fit with what RQ2 assessed.

* *This is a great point. In the discussion on page 15, we have added content surrounding pervasive gender stereotypes related to STEM and their consequences for performance and interest, explaining why women may be more likely to give stereotype and bias-based explanation for STEM inequities. Further, we have expanded on system justification theory, offering insight as to why men may be more likely than women to give merit-based explanations for STEM inequities.*

The Discussion section would benefit from the inclusion of the societal implications of your study. For example, why does it matter that men and women or White and Latinx participants generate different explanations for STEM inequities? What does this mean for improving STEM disparities? You start to bring this up at the end of the conclusion when you say “…understanding these experiences is a vital component to ensuring cultural competence and encouraging diversity in more ways than one on the path towards STEM equity.” This could be more specific and expanded.

* *Thank you for this comment. We have added an Implications for Intervention section on page 16 that we hope better clarifies the societal implications of this study.*

**Reviewer I:** Thank you for the opportunity to review the manuscript “Maybe These Fields Just Don’t Interest Them: Gender and Ethnic Differences in Attributions about STEM Inequities“. Overall, this paper is very well written. The introduction and theoretical background are well structured. The important theoretical constructs are well explained, and the purpose of the study and the research questions are clearly presented. The mixed-methods approach is a strength of the manuscript. In the analyses, the authors focused more strongly on the qualitative analyses of the data. I would recommend strengthening the quantitative part of the manuscript in a revision. Results are well discussed. In my opinion, the manuscript would further benefit if authors would describe potential practical implications more explicitly in the discussion. I have some suggestions that should be addressed before publishing the manuscript:

* *We are grateful for the constructive feedback. It has helped us refine and polish our manuscript.*

The authors described the sample of the study and provided information about the frequencies of male and female participants, as well as of ethnic groups in the text. A table that provides the frequencies would help giving a better overview about the sample. In such table the authors should also give the information about the proportion of male and female students in each of the ethnic groups.

* *We appreciate the suggestion. We have included Table 1 on page 24 detailing demographic frequencies by gender, ethnicity, major, age, and year in school. We have also included information about the proportion of male and female students in each ethnic group.*

“It would be interesting to know the majors, participants were enrolled in. Were participants studying STEM majors or other majors? And in which year were they at university?”

* *We have included information on participant majors in the Participants section on page 9, as well as in Table 1 on page 24. Year in school is also included in Table 1.*

The results were presented clearly. The original citations give very good insights in the database. The information about the number of responses in each category is provided in the table and the text. It would be important to know the number of the respondents as well (i.e., a high number of responses could be a result of many participants giving one answer in the specific category, or a result of only a few participants giving many answers in this category).

* *If we understand correctly, this comment is asking for clarification on whether high response rates for themes and categories were driven by many participants responding individually, or by only a few participants whose responses covered many points and coded into many categories. We have added on page 9 that <1% of participant responses were coded into three or more categories. Given that about 75% of participant responses were only coded into one category, we hope it is fairly clear that high response rates indicate many participant responses that code into a single category, rather than a few participants coding into many categories. In addition, we emphasize on page 9 that multiple mentions of a category in one response were not coded multiple times—for example, eight mentions of “lack of interest” in one response were simply coded as one mention, not eight.*

The second research question focuses more on the quantitative analyses of the manuscript and on the question of whether responses of participants differed by gender and ethnicity. To strengthen the quantitative part, I recommend including a further table with the frequencies or descriptive statistics of the responses in each category. E.g., how many women and men of each ethnicity group gave answers in category x, category y, and category z? So far, only the results of the Chi² tests are provided in the text. The information about how many female/male participants of each ethnicity gave responses in each category would be important additional information. In the discussion the authors mention that sample size was not sufficiently large to examine differences in the reasoning by gender and ethnicity simultaneously. Hence, the information about the sample size in each category is even more important for the reader.

* *This is a great point. We have inserted a table on page 26 detailing the frequency responses in each category by gender and ethnicity.*

The discussion is well written and addresses two concerns I had while reading the manuscript: the option to examine variation in the reasoning by gender and ethnicity simultaneously, and possible variation in the reasoning in different STEM majors. Authors should further refer to the argument made in the introduction about why it is important to investigate the reasoning of undergraduate students, whereas previous research focused more on doctoral students or adolescents. Hereby, authors should also stress potential practical implications of their results.

* *We agree about stressing the importance of the developmental context. We reiterate our developmental arguments from the introduction in the Conclusion on page 18.*