

Virtual contact improves intergroup relations between non-Muslim American and Muslim students from the Middle East, North Africa and Southeast Asia in a field quasi-experiment

Corresponding Author: Ms Shira Hebel-Sela

This file contains all editorial decision letters in order by version, followed by all author rebuttals in order by version.

Version 0:

Decision Letter: First round

Decision Letter:

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Dear Ms Hebel,

Thank you for your patience during the peer-review process. Your manuscript titled "Building bridges: A large-scale field quasi-experiment demonstrating the improvement of intergroup relations through virtual contact" has now been seen by 2 reviewers, and I include their comments at the end of this message. They find your work of interest but raised some important points. We are interested in the possibility of publishing your study in Communications Psychology, but would like to consider your responses to these concerns and assess a revised manuscript before we make a final decision on publication.

We therefore invite you to revise and resubmit your manuscript, along with a point-by-point response to the reviewers. Please highlight all changes in the manuscript text file.

Editorially, we consider it crucial that the revised manuscript demonstrates that the potential confounding factors related to attrition rate do not skew the current results. In addition, it is strongly encouraged that the ethics procedure, demographic information, and the potential demographic differences in the results are clearly presented and addressed. Lastly, as per both reviewers' request, a justification of the choice of American and Muslim samples should be clearly stated in relation to the current global context.

We are committed to providing a fair and constructive peer-review process. Please don't hesitate to contact us if you wish to discuss the revision in more detail.

I am attaching an Editorial Requests Table that details critical reporting requirements for the revised manuscript. Please attend to each item and ensure your manuscript is fully compliant. We are requesting that your manuscript aligns with these requirements as this facilitates the evaluation of your manuscript, reducing delays in re-review and potential future acceptance. If your revised manuscript is not aligned with these requests on major issues, such as those concerning statistics, it may be returned to you for further revisions without re-review. Additional information can be found in our style and formatting guide <https://www.nature.com/documents/commspsychol-style-formatting-guide-accept.pdf> Communications Psychology formatting guide.

Please use the following link to submit your

- revised manuscript,
- point-by-point response to the referees' comments,
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We hope to receive your revised paper within 8 weeks; please let us know if you aren't able to submit it within this time so that we can discuss how best to proceed. If we don't hear from you, and the revision process takes significantly longer, we may close your file. In this event, we will still be happy to reconsider your paper at a later date, provided it still presents a significant contribution to the literature at that stage.

We would appreciate it if you could keep us informed about an estimated timescale for resubmission, to facilitate our planning.

We look forward to seeing the revised manuscript and thank you for the opportunity to review your work.

Best regards,

Troby Lui

Troby Lui, PhD
Associate Editor
Communications Psychology

REVIEWER EXPERTISE:

Reviewer #1: intergroup conflict/polarisation, intergroup contact

Reviewer #2: intergroup conflict/polarisation, dehumanisation

REVIEWER REPORTS:

Reviewer #1 (Remarks to the Author):

I found the study "Building bridges: A large-scale field quasi-experiment demonstrating the improvement of intergroup relations through virtual contact" commendable for its contribution to understanding how digital interactions can positively impact relations between diverse cultural groups. The authors have crafted a clear, well-organized manuscript that meaningfully advances research on intergroup contact. Below, I offer several points for consideration, focusing on areas where the study could be further strengthened and clarified.

Introduction.

The introduction would benefit from a more explicit rationale for selecting these two specific groups in the context considered. Clarifying why American and Muslim students from MENA and Southeast Asia were chosen would underscore the relevance of the study within the current global context.

Prior research on virtual contact has investigated the use of the IOS in online settings. Given the novelty of this context, the authors might be interested to know that a recent study (Solving online conflicts by sensing the other. The role of social presence and closeness in improving the effectiveness of online intergroup contact) explored the application of this variable specifically in online intergroup contact.

Religious Identity (p.9): Authors noted that over 90% of the 341 students identified as Muslim. Additional clarity on the remaining 10%—who they were and how they might have experienced intergroup contact differently—would enhance the reader's understanding of the group dynamics and potentially nuanced participant experiences.

Methods and results.

Information such as participants' mean age, gender, and university major is missing. Including this data would offer a more comprehensive socio-demographic profile of the sample. Specifically, were participants' fields of study collected? This information could be relevant, as students in fields such as psychology or social sciences may have a heightened awareness of intergroup dynamics, potentially affecting outcomes.

Furthermore, the manuscript lacks information on the ethical procedures followed, including whether informed consent was obtained and if the study had been approved by an ethics board.

As far as the contact program, if all surveys and communications were conducted in English, was there a control for language fluency among non-native speakers? Such control could be significant in ensuring consistency across groups. Again on the program, since participants opted into the program, there is a possibility of selection bias towards individuals already motivated to improve intergroup relations. Coupled with the attrition rate and predictors of attrition, this potentially limits the conclusions that can be drawn. It may be helpful to highlight this limitation more prominently in the discussion, as well as the fact that the sample was limited to university students.

Just two curiosities: given the multi-session structure of the program, was data collected during the contact sessions themselves? Doing so could provide insights into the changes that occur throughout the contact process, rather than solely pre- and post-intervention. Furthermore, was there a reason for not using the classic graphical version of the IOS? The final point of this scale represents outgroup membership, which could be challenging for participants to select, regardless of the prejudice levels. Providing group-specific averages for IOS could also be informative.

Supplemental.

Please, note that the main manuscript states that the IOS measure was conducted solely towards the outgroup, yet the supplementary materials suggest that it was administered toward three groups (including a non-participating Chinese group). Please, clarify this discrepancy. Additionally, including a table of descriptive statistics by group in the supplementary materials would allow readers a clearer overview of group differences.

Reviewer #2 (Remarks to the Author):

I had the pleasure to review, "Building bridges: A large-scale field quasi-experiment demonstrating the improvement of intergroup relations through virtual contact". In this manuscript the authors highlight how virtual contact can be a valuable tool for improving intergroup relations through 2 studies that test effects with American and Muslim participants. Results indicate virtual contact is effective for improving perceptions of self-outgroup overlap, attitudes towards the outgroup, and less (meta)dehumanization.

While I believe this is a timely and meaningful work that will greatly contribute to the literature, some points still need to be addressed before it is ready for publication.

Feedback:

1) Sample justification. I think the sample choice is great and includes (as the authors note), underrepresented populations. However, I would love to see more discussion in the introduction for why this context is especially important (e.g., perhaps by discussing how anti-American/anti-Muslim sentiment is pervasive in each study population and the negative consequences associated with that negative sentiment). Examining this conflict specifically needs more context and justification.

2) Theory. The authors touch a bit on intergroup contact theory but I wish they would do much more in engaging with the theoretical literature. As of now, the manuscript reads very very applied and does not deeply interconnect the current research with the theoretical insights from past research/psychological literature more broadly. I would encourage the research to better connect their work to theory.

3) Considering Sample Differences. I noticed that for the main analyses, the authors grouped together all Muslim students (e.g., MENA, southeast Asian) into one group. I wondered; did you conduct any additional analyses controlling for the potential regional effects? For example, I could imagine potential differences in MENA and southeast Asian participants in terms of their attitudes in general towards Americans? E.g., perhaps based on cultural or historical reasons southeast Asians could (in general) have a more favorable view towards Americans? I think this would be an important supplemental analysis to include.

4) In Study 2, I immediately noticed the big difference in sample size between the experiment and control conditions. Later on, in the discussion the authors mentioned that those in the control condition did not receive the intervention or compensation and that could be a reason for why less of them agreed to participate. Does this mean those who took part in the intervention did receive compensation? I also would like much more detail about the procedure of Study 2, right now it is quite brief. For example, (I assume) students that took part were in a class that was either assigned to the control condition or the intervention condition (explaining the lack of random assigned)? What exactly did students do in the intervention condition? What percent of students were Muslim in the American and MENA/Southeast Asian samples? In some ways I am bit a surprised there is a high attrition rate given that this study was run in classrooms (were students taking the surveys in class?). Please explain in much more detail the methodology of this study.

5) From my read of things, it seems that the DVs focused on attitudes (in general) towards the outgroup. I find this fascinating because it would suggest that contact with one (or a few) people from the outgroup could benefit attitudes towards the entire group more broadly. I think this is a really promising finding that perhaps you should consider emphasizing at some point (e.g., perhaps in the discussion).

6) The authors may want to consider what this research more broadly means for change to technology. Often people blame technology and (social) media for increasing divisiveness and conflict but this research points to how it can help us. I think it could have implications for how people from around the world interact with each other online and it may be an interesting point to bring up in the discussion (this point is just a suggestion and is not required).

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Version 1:

Decision Letter: Second round

Decision Letter:

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Dear Ms Hebel,

Your manuscript titled "Building bridges: A large-scale field quasi-experiment demonstrating the improvement of intergroup relations through virtual contact" has now been seen by our reviewers, whose comments appear below. In light of their advice I am delighted to say that we are happy, in principle, to publish a suitably revised version in Communications Psychology.

We therefore invite you to revise your paper one last time to address the remaining concerns of our reviewers and a list of editorial requests. At the same time we ask that you edit your manuscript to comply with our format requirements and to maximise the accessibility and therefore the impact of your work.

EDITORIAL REQUESTS:

In particular, we emphasize that the reporting and interpretation of non-significant results in NHST analyses does not yet comply with our policy (<https://www.nature.com/commpsychol/submit/submission-guidelines#statistical-guidelines>). Please

ensure that full statistics are reported for non-significant findings just as for significant findings; that null findings obtained in NHST are not presented as positive evidence for the absence of a difference or effect (and not interpreted in the Discussion); and that your interpretation of Bayes Factors is aligned with journal standards. Please avoid making claims based on anecdotal evidence following the convention detailed in Schönbrodt, F.D., Wagenmakers, E. Bayes factor design analysis: Planning for compelling evidence. *Psychon Bull Rev* 25, 128–142 (2018) <https://rdcu.be/b6uOC>

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We hope to hear from you within two weeks; please let us know if you need more time.

Best regards,

Troby Lui

Troby Lui, PhD
Associate Editor
Communications Psychology

REVIEWERS' COMMENTS:

Reviewer #1 (Remarks to the Author):

I would like to express my appreciation for the authors' efforts in addressing the comments provided by both reviewers. I believe the manuscript, in its current form, is interesting, clear, and well-written, and I therefore recommend its publication. I would also like to take this opportunity to wish the authors good luck and express my interest in reading their future work.

Reviewer #2 (Remarks to the Author):

I am thrilled to see this piece again. I find this work highly valuable and am very happy with how the authors have addressed my queries (especially with the additional analyses by region and the theoretical additions). I am satisfied with the manuscript in its current form and look forward to seeing it published!

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Author response: First round

Responses to the Reviewers' Comments:

Reviewer 1

R.1.1 Comment

I found the study "Building bridges: A large-scale field quasi-experiment demonstrating the improvement of intergroup relations through virtual contact" commendable for its contribution to understanding how digital interactions can positively impact relations between diverse cultural groups. The authors have crafted a clear, well-organized manuscript that meaningfully advances research on intergroup contact. Below, I offer several points for consideration, focusing on areas where the study could be further strengthened and clarified.

R.1.1 Response

We would like to thank the reviewer for their thoughtful and encouraging feedback on our manuscript. We are particularly gratified that they found our work to be well-organized and recognize its contribution to advancing intergroup contact research. Below, we have provided detailed responses to each of the reviewer's points to demonstrate how we have addressed their valuable suggestions for strengthening and clarifying the manuscript. We believe these revisions have substantially improved the clarity and rigor of our work while maintaining its core contributions to understanding how digital interactions can foster positive intergroup relations.

R.1.2 Comment

The introduction would benefit from a more explicit rationale for selecting these two specific groups in the context considered. Clarifying why American and Muslim students from MENA and Southeast Asia were chosen would underscore the relevance of the study within the current global context.

R.1.2 Response

We thank the reviewer for their insightful comment. We agree that the manuscript would benefit from a more explicit rationale for the selection of these specific groups. Accordingly, we have added a paragraph to the introduction that provides a clear context for why we chose to focus on American and Muslim students from MENA and Southeast Asia on p. 8:

"The selection of American and Muslim students from MENA and Southeast Asia as focal groups reflects significant ongoing sociopolitical tensions between these communities. Following the September 11, 2001 attacks, Muslims in America have faced increased scrutiny, discrimination, prejudice and dehumanization^{1,2}. These tensions were further inflamed by political rhetoric, particularly during the 2016 presidential campaign, when Donald Trump

called for "a total and complete shutdown of Muslims entering the United States" and claimed

"Islam hates us" ³. Such high-profile anti-Muslim rhetoric has been associated with increased hate incidents, with the Council on American-Islamic Relations reporting a sustained rise in anti-Muslim discrimination cases ⁴. Conversely, negative attitudes toward Americans remain widespread among populations in MENA and Southeast Asian countries, with surveys indicating consistently low favorability ratings and deep-rooted skepticism toward American society and its values ⁵. These persistent patterns of mutual distrust and negative intergroup attitudes underscore the critical need for interventions aimed at improving relations between these communities.

University students represent an ideal population for such interventions as they are at a formative stage in their development, where they begin to shape their value systems, worldviews, and perspectives on complex social, economic, and cultural issues ⁶. Recent research shows that structured opportunities for close interaction between majority and minority students in university courses can boost academic achievement and foster a sense of belonging among minority students⁷. Additionally, university students play a key role in shaping societal norms, making them an ideal group for studying intergroup contact and the broader impact of such interventions on society⁸. Lastly, universities provide a unique institutional framework that supports intercultural exchanges, offering academic structures and environments that foster sustained engagement and meaningful dialogue. This institutional support is crucial for the effectiveness of contact interventions—research has shown that when universities facilitate frequent opportunities for positive interaction, whether in shared living spaces or other settings, students demonstrate reduced levels of intergroup prejudice⁹."

R.1.3 Comment

Prior research on virtual contact has investigated the use of the IOS in online settings. Given the novelty of this context, the authors might be interested to know that a recent study (Solving online conflicts by sensing the other. The role of social presence and closeness in improving the effectiveness of online intergroup contact) explored the application of this variable specifically in online intergroup contact.

R.1.3 Response

We thank the reviewer for bringing this relevant recent research to our attention. We have incorporated a reference to this work in our introduction on p. 6, where we discuss whether virtual contact can foster psychological connectedness despite geographical distances:

".....Of particular interest is whether, like in face-to-face contact²¹, virtual contact can foster feelings of psychological connectedness despite the geographical distances that may exist between members of different groups, which is especially relevant in the context of the current research. Recent research has begun to explore this question, demonstrating that feelings of closeness and social presence in online intergroup contact can positively influence attitudes toward outgroup

members²². *This emerging work suggests the potential of virtual spaces to foster meaningful psychological connections between groups despite physical separation.*”

R.1.4 Comment

Religious Identity (p.9): Authors noted that over 90% of the 341 students identified as Muslim. Additional clarity on the remaining 10%—who they were and how they might have experienced intergroup contact differently—would enhance the reader's understanding of the group dynamics and potentially nuanced participant experiences.

R.1.4 Response

We appreciate the reviewer's thoughtful comment regarding the religious composition of our sample. Unfortunately, our partner NGO, Soliya, did not collect detailed demographic data about the religious affiliations of the non-Muslim students, which prevents us from conducting such analysis. Additionally, given that non-Muslim participants comprised only a small portion of our final sample (approximately 16 students, or 10%), such a limited number would not allow for meaningful analysis of group differences. We also discuss the demographics limitations on page 11 in a footnote.

R.1.5 Comment

Information such as participants’ mean age, gender, and university major is missing. Including this data would offer a more comprehensive socio-demographic profile of the sample. Specifically, were participants’ fields of study collected? This information could be relevant, as students in fields such as psychology or social sciences may have a heightened awareness of intergroup dynamics, potentially affecting outcomes.

R.1.5 Response

We thank the reviewer for this constructive comment. We have now added descriptive information about participants' gender and age in Study 2 (unfortunately, we do not have this information for Study 1). Regarding the potential influence of participants' fields of study on intergroup dynamics, we agree that this would be an interesting avenue to explore, as students from different academic backgrounds might indeed approach intergroup contact with varying levels of awareness and understanding. Unfortunately, information regarding participants' majors was not collected in the current study.

R.1.6 Comment

Furthermore, the manuscript lacks information on the ethical procedures followed, including whether informed consent was obtained and if the study had been approved by an ethics board.

R.1.6 Response

We thank the reviewer for bringing this important point to our attention. We have now added the requested information about the ethical procedures followed in both studies. Specifically, we have included information about the informed consent process and ethical approval on p. 11 for Study 1: “The local institutional review board approved all study procedures, and participants provided informed consent prior to participation. The identity of the institutional review board has been disclosed to the editors” And p. 18 for Study 2: “The local institutional review board approved all study procedures, and participants provided informed consent prior to participation. The identity of the institutional review board has been disclosed to the editors.”

R.1.7 Comment

As far as the contact program, if all surveys and communications were conducted in English, was there a control for language fluency among non-native speakers? Such control could be significant in ensuring consistency across groups. Again on the program, since participants opted into the program, there is a possibility of selection bias towards individuals already motivated to improve intergroup relations. Coupled with the attrition rate and predictors of attrition, this potentially limits the conclusions that can be drawn. It may be helpful to highlight this limitation more prominently in the discussion, as well as the fact that the sample was limited to university students.

R.1.7 Response

We appreciate the reviewer's important feedback about language fluency and the program's opt-in process. While English proficiency was a program requirement, we acknowledge that we did not collect data on participants' specific proficiency levels, which represents a limitation in our analysis. Regarding self-selection bias, we took steps to address this by carefully constructing our control group from classes taught by professors who had previously enrolled their students in the Soliya program but were not currently participating. We have expanded our discussion section to address these methodological considerations along with other limitations regarding sample characteristics and generalizability. See p. 27:

‘Still, our research has some limitations. Participants in this study were university students, which as we mentioned above is a population that provides a theoretically meaningful context for examining intergroup contact due to their active social engagement and influence in shaping societal norms³⁵. However, this focus also limits the generalizability of our findings to broader populations, where factors like differing educational backgrounds and life experiences may play a significant role ^{11,12}. Future research should aim to replicate these findings across more diverse populations.

To address potential self-selection bias, we carefully constructed our control group by sampling from classes taught by professors who had previously enrolled their students in the Soliya program but were not currently participating. However, our control group was significantly smaller than the experimental group, likely because control participants completed surveys

without compensation or intervention, making recruitment and retention more challenging. Though our sampling approach helped create more comparable groups, we acknowledge that fundamental differences may still exist between conditions, and we cannot definitively establish causal effects of the virtual contact intervention. Despite these limitations, we observed significant positive changes in attitudes over time within both American and Muslim participants, suggesting that meaningful improvements occurred even among those who may have started with more favorable intergroup orientations.

Finally, the English-language medium of communication may have created power differentials and impacted interaction quality, as varying levels of language proficiency could affect participation and engagement during intergroup contact ¹³. Future interventions should explore ways to mitigate linguistic barriers, perhaps by offering multilingual options or providing language support. More broadly, future research should aim to replicate these findings across more diverse populations, including those from different socioeconomic backgrounds and educational levels, while developing strategies to reduce selection bias in participant recruitment and program design.”

R.1.8 Comment

Just two curiosities: given the multi-session structure of the program, was data collected during the contact sessions themselves? Doing so could provide insights into the changes that occur throughout the contact process, rather than solely pre- and post-intervention.

R.1.8 Response

We thank the reviewer for raising the important point regarding measurement timing. We have clarified in the descriptions of both Study 1 (p. 11) and Study 2 (p. 18) that participants that took part in the virtual contact intervention completed baseline measures approximately one week prior to their first session. Post-intervention measures were either collected during the final 10-15 minutes of their last session or within several days of program completion. Control participants completed their measures within corresponding timeframes at program start and completion, though without intervention participation. Unfortunately, we were not able to collect data during the contact sessions themselves. We however agree this would be an interesting direction for future research, as it could provide valuable insights into the immediate psychological processes during virtual contact.

R.1.9 Comment

Furthermore, was there a reason for not using the classic graphical version of the IOS? The final point of this scale represents outgroup membership, which could be challenging for participants to select, regardless of the prejudice levels. Providing group-specific averages for IOS could also be informative.

R.1.9 Response

We appreciate the reviewer's question about scale selection. We opted for Schubert and Otten's (2002) Overlap of Self, Ingroup, and Outgroup (OSIO) scale as it was specifically adapted and validated for measuring intergroup relations, rather than the classic IOS which was originally designed for interpersonal relationships. While we acknowledge the reviewer's thoughtful concern about participants potentially being hesitant to indicate complete distance from outgroups on the scale, our data shows that participants did use the full range, including indicating minimal overlap when they felt psychologically distant. Following the reviewer's helpful suggestion, we have now included group-specific averages for all self-group overlap measurements in the Supplementary Materials and further explained our decision to use this specific scale in our method section (p. 13):

“Self-outgroup overlap. We used the self-outgroup overlap measure, adapted by Schubert and colleagues, to assess participants' feelings of psychological closeness between themselves and each participating outgroup. This measure is a modified version of the classic Inclusion of Other in Self (IOS) scale, specifically adapted for intergroup relations. Participants rated their perceived overlap with the target groups (Americans, Muslims) and a non-participating comparison outgroup (Chinese) to assess their psychological connection with each group (see ¹⁴). The graphic measure shows a small circle, labeled ‘you’, and a larger circle, labeled ‘group’, in progressively closer arrangement with each other; the first image shows the circles completely separated with some distance from each other, and the seventh and final image shows the ‘you’ circle centered within the ‘group’ circle. Participants made ratings in relation to each target group using the images as a 7-point scale (see SOM). “

R.1.10 Comment

Please, note that the main manuscript states that the IOS measure was conducted solely towards the outgroup, yet the supplementary materials suggest that it was administered toward three groups (including a non-participating Chinese group). Please, clarify this discrepancy.

R.1.10 Response

We thank the reviewer for bringing this discrepancy up. In the revised manuscript, we have made sure to clarify this discrepancy (p. 13). Please also refer to our response to the reviewer's previous comment.

R.1.11 Comment

Additionally, including a table of descriptive statistics by group in the supplementary materials would allow readers a clearer overview of group differences.

R.1.11 Response

We appreciate this constructive suggestion. We agree that providing descriptive statistics by group would enhance readers' understanding of the data. We have now added comprehensive

tables in the Supplementary Materials that present means and standard deviations, for gender age and all of our measures of interest (see Table S1).

Reviewer 2

R.2.1 Comment

I had the pleasure to review, “Building bridges: A large-scale field quasi-experiment demonstrating the improvement of intergroup relations through virtual contact”. In this manuscript the authors highlight how virtual contact can be a valuable tool for improving intergroup relations through 2 studies that test effects with American and Muslim participants. Results indicate virtual contact is effective for improving perceptions of self-outgroup overlap, attitudes towards the outgroup, and less (meta)dehumanization.

R.2.1 Response

We would like to thank the reviewer for their kind words and were delighted to read that they enjoyed reading our manuscript and reviewing it.

R.2.2 Comment

Sample justification: I think the sample choice is great and includes (as the authors note), underrepresented populations. However, I would love to see more discussion in the introduction for why this context is especially important (e.g., perhaps by discussing how anti-American/anti-Muslim sentiment is pervasive in each study population and the negative consequences associated with that negative sentiment). Examining this conflict specifically needs more context and justification.

R.2.2 Response

We appreciate the reviewer's thoughtful suggestion regarding the need for stronger contextual justification. We agree, and due to this comment and Reviewer 1's similar feedback, we have added a substantive paragraph to the introduction on p. 7 discussing the critical context of American-Muslim relations:

“The selection of American and Muslim students from MENA and Southeast Asia as focal groups reflects significant ongoing sociopolitical tensions between these communities. Following the September 11, 2001 attacks, Muslims in America have faced increased scrutiny, discrimination, prejudice and dehumanization ^{1,2}. These tensions were further inflamed by political rhetoric, particularly during the 2016 presidential campaign, when Donald Trump called for “a total and complete shutdown of Muslims entering the United States” and claimed “Islam hates us” ³. Such high-profile anti-Muslim rhetoric has been associated with increased hate incidents, with the Council on American-Islamic Relations reporting a sustained rise in anti-Muslim discrimination cases ⁴. Conversely, negative attitudes toward Americans remain widespread among populations in MENA and Southeast Asian countries, with surveys indicating

consistently low favorability ratings and deep-rooted skepticism toward American society and its values⁵. These persistent patterns of mutual distrust and negative intergroup attitudes underscore the critical need for interventions aimed at improving relations between these communities.”

R.2.3 Comment

Theory. The authors touch a bit on intergroup contact theory but I wish they would do much more in engaging with the theoretical literature. As of now, the manuscript reads very very applied and does not deeply interconnect the current research with the theoretical insights from past research/psychological literature more broadly. I would encourage the research to better connect their work to theory.

R.2.3 Response

We thank the reviewer for this valuable observation regarding the theoretical grounding of our manuscript. We agree that strengthening the theoretical framework would enhance the paper's contribution to the broader psychological literature. In response, we have made several substantive additions to better situate our work within contact theory and related theoretical perspectives.

First, we have added new material that contextualizes our theoretical contribution. We begin by explaining how contact theory has traditionally operated through cognitive and affective pathways (see p. 4-6): "recent theoretical work emphasizes that contact operates by shaping both cognitive and affective pathways: it can increase knowledge about outgroups, reduce intergroup anxiety, enhance perspective-taking, and build empathy." We then discuss the conditions under which contact is most effective - namely when it allows for personal connection while maintaining awareness of group identities. This sets up our examination of whether virtual contact can achieve similar effects, extending contact theory into digital spaces.

Additionally, while contact theory has traditionally focused on these cognitive and affective processes, our work examines how contact transforms fundamental psychological representations of intergroup boundaries through self-outgroup overlap and dehumanization. As we now explain in the discussion (see p. 26): "participating in virtual contact is also associated with greater self-outgroup overlap and lower (meta)-dehumanization; these findings advance contact theory by demonstrating how virtual interactions can reshape fundamental psychological representations of intergroup boundaries."

Second, we have added an important theoretical discussion about why university students represent an ideal population for examining contact interventions. We explain how students are at a formative stage in developing their worldviews, and how universities provide unique institutional frameworks that support meaningful intercultural dialogue. For instance, we cite

recent research showing how structured opportunities for contact between majority and minority students through university coursework reduced prejudice (see p. 8):

“Recent research shows that structured opportunities for close interaction between majority and minority students in university courses can boost academic achievement and foster a sense of belonging among minority students⁷. Additionally, university students play a key role in shaping societal norms, making them an ideal group for studying intergroup contact and the broader impact of such interventions on society⁸. Lastly, universities provide a unique institutional framework that supports intercultural exchanges, offering academic structures and environments that foster sustained engagement and meaningful dialogue. This institutional support is crucial for the effectiveness of contact interventions—research has shown that when universities facilitate frequent opportunities for positive interaction, whether in shared living spaces or other settings, students demonstrate reduced levels of intergroup prejudice⁹”.

Third, we addressed two additional key areas: how limited contact with individual outgroup members can transform attitudes toward the entire outgroup, and how technology can be leveraged to foster positive intergroup relations. We discuss how positive interactions with just a few outgroup members can lead to improved attitudes toward the outgroup as a whole, demonstrating contact theory's potential for broader social change (see p.25-p.26):

“A particularly compelling aspect of our findings is that interactions with a relatively small number of outgroup representatives through virtual contact led to improved attitudes toward the outgroup as a whole. This generalization effect - where positive experiences with individual outgroup members reshape perceptions of the entire group - demonstrates one of contact theory's core premises in action. The fact that these broader attitudinal changes occurred through virtual interactions with just a subset of outgroup members underscores the potency of such contact experiences in transforming intergroup relationships¹⁵. Moreover, recent research suggests that such positive contact experiences may have even wider-reaching benefits, potentially fostering more tolerant attitudes toward other outgroups not directly involved in the contact¹⁶. These positive effects highlight the profound potential of even limited intergroup contact to promote broader trends toward social harmony.”

Additionally, we highlight the opportunity to use contemporary communication technology as a bridge between communities, helping to reduce prejudices and promote connection (see p.27):

“While much attention has been focused on technology's role in amplifying societal divisions and conflicts¹⁷, our findings highlight technology's potential as a powerful tool for fostering meaningful cross-cultural connections and understanding. Our research demonstrates that when properly structured, virtual platforms can actually serve as bridges between communities, helping to break down prejudices and build genuine understanding. These positive effects of virtual contact

could be even more profound with the recent emergence of large language models (LLMs), which can serve as simultaneous translators during online interactions.

By removing language barriers that have historically limited meaningful contact between different groups, LLMs can help address a fundamental challenge in cross-cultural communication - enabling each participant to express themselves in their native language while others can understand them in theirs. This creates more equitable dialogue where no one is disadvantaged by having to communicate in a non-native language. This suggests that as we continue to intentionally design virtual spaces for meaningful dialogue, integrating technologies like LLMs could further enhance their potential for fostering genuine cross-cultural understanding."

We believe these additions help create a stronger theoretical foundation while highlighting our unique contributions to understanding how virtual contact can reshape intergroup relations.

R.2.4 Comment

Considering Sample Differences. I noticed that for the main analyses, the authors grouped together all Muslim students (e.g., MENA, southeast Asian) into one group. I wondered; did you conduct any additional analyses controlling for the potential regional effects? For example, I could imagine potential differences in MENA and southeast Asian participants in terms of their attitudes in general towards Americans? E.g., perhaps based on cultural or historical reasons southeast Asians could (in general) have a more favorable view towards Americans? I think this would be an important supplemental analysis to include.

R.2.4 Response

We thank the reviewer for this comment. This is an interesting direction that raises important questions about potential regional differences. Following the reviewer's suggestion, we ran addition analyses that indicated that participants' region of origin did not influence the effectiveness of the program - the intervention worked similarly well regardless of whether Muslim participants were from MENA or Southeast Asian regions. In the analyses we incorporated region as a factor with three levels (US, MENA, and Asia) in our repeated measures ANOVAs. Importantly, for Study 1, while we found an interaction between time and group, indicated some modest differences in how self-outgroup overlap changed over time across regions (Self-outgroup overlap increased most strongly among U.S. participants), there were no significant differences between MENA and Asian participants in either their initial attitudes or their patterns of change. Similarly, for outgroup attitudes, we found no significant differences between regions in either initial attitudes or patterns of change over time. For Study 2, these analyses revealed that while the previously reported main effects and condition $\times$ time interactions remained significant, the three-way interaction was not significant across any of our outcome measures in both studies (all $ps > .134$ and partial $\eta^2 > .01$). This finding demonstrates the program's broad applicability across different cultural contexts, despite the potential

variations in historical or cultural attitudes toward Americans. We appreciate the reviewer's suggestion to examine regional differences, as it has helped strengthen our confidence in the program's consistent effectiveness across different cultural contexts. We have added these analyses to the supplementary materials and included a footnote on p. 15 and p. 24 in the main manuscript noting these additional analyses.

R.2.5 Comment

In Study 2, I immediately noticed the big difference in sample size between the experiment and control conditions. Later on, in the discussion the authors mentioned that those in the control condition did not receive the intervention or compensation and that could be a reason for why less of them agreed to participate. Does this mean those who took part in the intervention did receive compensation? I also would like much more detail about the procedure of Study 2, right now it is quite brief. For example, (I assume) students that took part were in a class that was either assigned to the control condition or the intervention condition (explaining the lack of random assigned)? What exactly did students do in the intervention condition? What percent of students were Muslim in the American and MENA/Southeast Asian samples? In some ways I am bit a surprised there is a high attrition rate given that this study was run in classrooms (were students taking the surveys in class?). Please explain in much more detail the methodology of this study.

R.2.5 Response

We thank the reviewer for these important methodological questions. We have made several changes to clarify Study 2's procedures. First, we've clarified on p. 18 that no participants received monetary compensation, and that the intervention group received course credit. In addition, we've expanded the methods section on p. 18 to clarify assignment procedure and refer readers to the introduction where they can find the complete description of what participants did during the program sessions:

“While class sections determined condition assignment, intervention participants were mixed across classes into small discussion groups for the program implementation. These groups met virtually for two-hour weekly synchronous sessions over several weeks, led by trained facilitators following a structured curriculum (see full details in the introduction).”

We also further clarified the survey administration on p. 18:

“Program participants completed surveys approximately one week before their first virtual contact session (baseline) and during the final minutes of their last session or within several days of completion (post-intervention). Control participants completed surveys at corresponding timeframes but on their own time rather than during scheduled sessions, which likely contributed to lower response rates.”

Regarding the religious composition of our samples, we must note an important limitation in our data collection. Upon further examination of our data following the reviewer's comments, we discovered that our religious demographic information in Study 1 was based solely on estimates from the 2011 cohort, as Soliya discontinued collecting this data thereafter. This prevents us from providing precise percentages of Muslim students (as our sample is built from two cohorts) in either the American or MENA/Southeast Asian samples for subsequent years.

Given this limitation, we decided to remove the specific religious demographic information from the paper and instead wrote the following (p.11):

"We recognize that 'American' is a complex social category that could also incorporate Muslims, but for simplicity purposes, we use the term 'American'. Additionally, for the purpose of methodological clarity we categorically designate participants from the predominantly Muslim MENA and Southeast Asian countries as 'Muslims'."

We also added a footnote acknowledging our data limitations (p.11):

"Religious demographic data was only collected in the 2011 cohort, after which Soliya discontinued collecting this information. In that cohort, demographic data collected during recruitment indicated that all American students identified with non-Muslim faiths or no religious affiliation, while approximately 92% of students from MENA and Southeast Asian countries identified as Muslim. While we cannot definitively extend these proportions to subsequent years, this historical data, combined with broader demographic patterns in these regions, provides support for our methodological decision to use these categorical designations. We acknowledge this as a limitation in our demographic data collection."

Additionally, while assignment to participate in the program was indeed at the classroom level, we want to clarify that the intervention itself was implemented outside of the classroom. We have added detailed explanations of this distinction to The Connect Program section (p. 9):

"While students entered the program through their university, they were assigned to discussion groups based solely on individual availability, so groups included students drawn from different classes and institutions. All sessions took place outside of regular class time, with students participating virtually from their preferred locations such as dorm rooms, campus libraries, computer labs, or other quiet spaces that fit their academic schedules."

These clarifications highlight that while initial program participation was determined at the institutional level, the actual intervention delivery and group dynamics were not influenced by classroom-level effects, as participants were mixed across classes and institutions based on their individual schedules.

In sum, we appreciate the reviewer's methodological queries, which have prompted us to provide additional details regarding compensation, class-level assignment procedures, survey administration, religious composition data limitations, and program implementation structure. This comprehensive methodological information complements the elaboration of the intervention included in the introduction (p. 8). We believe these clarifications offer a more complete picture of our research methodology.

R.2.6 Comment

From my read of things, it seems that the DVs focused on attitudes (in general) towards the outgroup. I find this fascinating because it would suggest that contact with one (or a few) people from the outgroup could benefit attitudes towards the entire group more broadly. I think this is a really promising finding that perhaps you should consider emphasizing at some point (e.g., perhaps in the discussion).

R.2.6 Response

We thank you the reviewer for this insightful observation. We agree that this is an important aspect of our findings that deserves greater emphasis. We have expanded our discussion of this important finding in two places:

In the introduction (p. 4), we've added:

“A fundamental premise of the theory is that positive interactions with individual outgroup members can generalize to improve attitudes toward the entire outgroup - meaning that even limited contact with a few representatives can transform perceptions of the group as a whole^{18,19}.”

In the general discussion (p. 25-26), we've added:

“A particularly compelling aspect of our findings is that interactions with a relatively small number of outgroup representatives through virtual contact led to improved attitudes toward the outgroup as a whole. This generalization effect - where positive experiences with individual outgroup members reshape perceptions of the entire group - demonstrates one of contact theory's core premises in action. The fact that these broader attitudinal changes occurred through virtual interactions with just a subset of outgroup members underscores the potency of such contact experiences in transforming intergroup relationships¹⁵. Moreover, recent research on secondary transfer effects suggests that such positive contact experiences may have even wider-reaching benefits, potentially fostering more tolerant attitudes toward other outgroups not directly involved in the contact¹⁶. These positive effects highlight the profound potential of even limited intergroup contact to promote broader social harmony.”

R.2.7 Comment

The authors may want to consider what this research more broadly means for change to technology. Often people blame technology and (social) media for increasing divisiveness and conflict but this research points to how it can help us. I think it could have implications for how people from around the world interact with each other online and it may be an interesting point to bring up in the discussion (this point is just a suggestion and is not required).

R.2.7 Response

We thank the reviewer for this thoughtful suggestion. We agree that our findings have important implications for how technology can be leveraged to promote positive intergroup relations rather than exacerbate divisions. We have added the following paragraph to our general discussion section on p. 27:

“While much attention has been focused on technology's role in amplifying societal divisions and conflicts^{17,20}, our findings highlight technology's potential as a powerful tool for fostering meaningful cross-cultural connections and understanding. Our research demonstrates that when properly structured, virtual platforms can actually serve as bridges between communities, helping to break down prejudices and build genuine understanding. These positive effects of virtual contact could be even more profound with the recent emergence of large language models (LLMs), which can serve as simultaneous translators during online interactions. By removing language barriers that have historically limited meaningful contact between different groups, LLMs can help address a fundamental challenge in cross-cultural communication - enabling each participant to express themselves in their native language while others can understand them in theirs. This creates more equitable dialogue where no one is disadvantaged by having to communicate in a non-native language. This suggests that as we continue to intentionally design virtual spaces for meaningful dialogue, integrating technologies like LLMs could further enhance their potential for fostering genuine cross-cultural understanding.”

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