ORIGINAL ARTICLE

asap
Analyses of Social Issues and Public Policy   SPSSI   **WILEY**

What can be achieved with online intergroup contact interventions? Assessing long-term attitude, knowledge, and behaviour change

Sandy Schumann | Ysanne Moore

Department of Security and Crime Science, University College London, London, UK

Correspondence
Sandy Schumann, Department of Security and Crime Science, University College London, Tavistock Square 35, London WC1H 9EZ, UK.
Email: s.schumann@ucl.ac.uk

ABSTRACT

Previous studies demonstrated that when individuals interact with outgroup members on social media, in online games, or through (a)synchronous chats, prejudice is reduced. Evaluations of real-world interventions, however, did not consistently confirm the positive impact of online intergroup contact. We advance the literature and investigate whether participation in a global online intergroup contact program predicts lower prejudice as well as increased outgroup knowledge, confidence, and tendencies to take collective action on behalf of outgroup members. We also assess if the quantity of online intergroup contact moderates developments of the outcome measures over time. Applying a pre-post design, participants ($N = 547$) completed surveys before and after the intervention. One follow-up survey was, depending on the program cohort, administered with a delay of six, 12, and 18 months. Throughout the intervention, prejudice decreased, and collective action tendencies, outgroup knowledge, as well as confidence in one's ability to communicate in intercultural environments increased. These trends were maintained for up to 18 months after program

completion. Changes in attitude, knowledge, confidence, or collective action tendencies did not differ systematically between a four-weeks and an eight-weeks module. We conclude that online intergroup contact is a powerful tool to promote harmonious intergroup relations at scale.

INTRODUCTION

The contact hypothesis (Allport, 1954) has inspired numerous real-world interventions that aim to prevent or overcome intergroup conflict (Lemmer & Wagner, 2015). As an alternative to activities that rely on direct face-to-face encounters, intergroup contact schemes are increasingly delivered in online settings, using, for instance, synchronous and asynchronous chats or video conferencing, blogs, and mobile apps (e.g., Helm & van der Velden, 2019; Stevens Initiative, 2021). Although studies that were conducted in controlled research environments endorse the effectiveness of online intergroup contact (e.g., Abu-Rayya, 2017; Imperato et al., 2021; Walther et al., 2015; White & Abu-Rayya, 2012), programs that were implemented in the field did not consistently attain promising effects on outcomes such as outgroup attitudes, perceived outgroup similarity, and willingness to engage with outgroup members (e.g., Boehm et al., 2010; Cameron et al., 2017; Tavakoli et al., 2010). Therefore, it is, to date, difficult to accurately determine the impact of online intergroup contact interventions.

The present study sought to advance the literature in three important ways. We assessed whether participation in a global online intergroup contact program, led by the non-governmental organisation Soliya, is associated with a decrease in prejudice as well as an increase in self-reported knowledge about key aspects of intergroup relations, higher confidence in engaging in intergroup interactions, and a higher likelihood to take action that advances the position of outgroup members (i.e., collective action on behalf of an outgroup). Further to investigating the immediate outcomes of the intervention (pre-post comparison), we tested changes in attitudes, knowledge, confidence, and collective action tendencies after the program ended (post follow-up comparison). Finally, we contrasted outcomes of a four-weeks module against those of an eight-weeks activity to identify whether contact quantity moderates trends of the outcome measures over time (Imperato et al., 2021).

Online intergroup contact: empirical evidence in research settings

Gordon Allport (1954) stipulated that positive interactions between members of different social, religious, or ethnic groups improve outgroup attitudes; a substantial body of empirical evidence corroborates the *contact hypothesis* (Dovidio et al., 2017; O'Donnell et al., 2021; Pettigrew & Tropp, 2006). The benefits of intergroup encounters are not limited to direct face-to-face contact (Pettigrew & Tropp, 2006). Imagined and extended contact (i.e., indirect contact), that is, observing ingroup members engage with the outgroup, were also shown to reduce prejudice and foster positive outgroup perceptions (for meta-analyses see Miles & Crisp, 2014; Zhou et al., 2019). Mediated intergroup contact, during which individuals view a positive depiction of outgroup members or positive interactions between in- and outgroup members in the media, shapes outgroup attitudes

in a similar manner as direct contact (Kim et al., 2020; Park, 2012; Paluck & Green, 2009). Finally, intergroup contact that is established through synchronous or asynchronous computer-mediated communication (CMC) tools has been found to promote harmonious intergroup relations (Imperato et al., 2021; White et al., 2020). The latter, online intergroup contact, is the focus of this article.

More precisely, previous research highlights that interacting with outgroup members through CMC, playing online video games together, or viewing outgroup members' social media profiles is moderately related to enhanced outgroup attitudes ($d = .36$; Imperato et al., 2021) and lower biases (e.g., Adachi et al., 2015; Andrews et al., 2018; Stiff & Kedra, 2020; White et al., 2014), including subtle prejudice (Lissitsa & Kushnirovich, 2019)[1]. Engaging in direct online intergroup contact also increases outgroup knowledge (White & Abu-Rayya, 2012), reduces intergroup anxiety (Abu-Rayya, 2017; White et al., 2019) and dehumanisation (Bruneau et al., 2020), predicts stronger trust and perceived similarity (Römpke et al., 2019) as well as lower stigmatisation (Boccanfuso et al., 2021) (see White et al., 2020, for a narrative review). Positive behaviour towards outgroup members (Adachi et al., 2016) and increased/decreased approach/avoidance tendencies, such as contact intentions, were further related with more frequent online intergroup contact (Bagci et al., 2021; Benatov et al., 2021; Maunder et al., 2019). In addition, Lissitsa and Kushnirovich (2018) demonstrated that positive direct online intergroup contact predicts secondary transfer effects such that attitudes towards outgroups that are not involved in the contact are improved as well (Lolliot et al., 2015; Pettigrew, 2009).

Certain conditions strengthen the success of online intergroup contact; other factors appear to be less relevant. Notably, online encounters that are centred around working towards a common goal or that have authority support do not result in a stronger reduction of prejudice (i.e., as compared to scenarios that fulfilled these criteria; Imperato et al., 2021). Contrary to previous assumptions (Wilson et al., 2006; Walther & Bunz, 2005; Walther et al., 2015), contact duration (e.g., the number of contact sessions in an experiment) does not moderate the relationship between online intergroup interactions and outgroup feelings. If participants cooperate, prejudice, is, however, attenuated more strongly (Imperato et al., 2021).

Online intergroup contact interventions

Taken together, there is largely unanimous support for the benefits of online intergroup contact. Having said this, the literature discussed thus far relied on the assessment of intergroup contact experiences that were designed for research purposes, often taking place in laboratories, and including confederates or simulated outgroup interaction partners (e.g., Alvídrez et al., 2015; Cao & Lin, 2017; White et al., 2019). Extending the evidence base to evaluations of real-world interventions, the results are mixed (Lemmer & Wagner, 2015).

Promising findings were reported for initiatives that included direct face-to-face *as well as* online contact. For instance, Hoter, Shonfeld, and Ganayim (2009) reported an evaluation of a program in which Jewish secular, Orthodox Jewish, and Arab-Islamic teachers interacted weekly via chat rooms, blogs, wikis, or audio tools and, in later stages, video calls to collaborate on projects and discuss how digital tools can be implemented in their teaching. In-person meetings were organised after the first semester and at the end of the program. Although strict causal influences

---

[1] However, see, Mustafa & Poh, 2019 and White & Abu-Rayya, 2012, for nil findings.

cannot be concluded, prejudice towards religious outgroups improved during the year-long intervention (Walther et al., 2015). The *Dissolving Boundaries Through Technology in Education* project was initiated to promote contact between students in Northern Ireland and the Republic of Ireland. Around 500 schools, 2500 teachers, and 40 000 students—six to 18 years old—participated. Students worked on a collaborative project using chats, video conferences, or by creating blogs or websites. The online platform also allowed for off-topic interactions. At any point of the year, an offline meeting could be arranged too. Teachers reported that students' cultural understanding improved (Abbott et al., 2004; Austin et al., 2003). Lastly, Yablon and Katz (2001) documented outcomes of a program that facilitated encounters between Jewish and Bedouin (Arab) high school students in Israel. Participants met initially in person. Only then did they join internet chat rooms and exchanged emails on a weekly basis to discuss aspects that both groups have in common. Students also attended weekly teacher-led workshops about, for instance, inter-ethnic stereotypes and inequality. Following 12 months of interactions, the participants met again offline. For the Bedouin participants, who held rather positive attitudes prior to the intervention, outgroup feelings and outgroup-directed emotions did not change. Jewish participants, however, developed more positive attitudes towards the Bedouin interaction partner and reported understanding the Bedouin minority better (Yablon & Katz, 2001).

Considering evaluations of initiatives that relied purely on online interactions reveals less consistent results. An online pen-pal program between Canadian and Iranian students, using only text-based synchronous and asynchronous communication, showed a significant increase in outgroup knowledge and improved attitudes but no change in willingness to have a close relationship with the outgroup and perceived similarity (Tavakoli et al., 2010). Boehm, Kurthen, and Aniola-Jedrzejek (2010) noted that a six-week online collaborative project between universities in the United States and Poland did not predict changes in students' endorsement of ethnocentrisms. Finally, an evaluation of *One Global Kids* (Cameron et al., 2017), a program that allowed children to read stories about peers in other countries and enabled simulated outgroup interactions through a mobile app or website, highlighted that self-reported cultural openness and perceived similarity to outgroup children increased but neither contact nor helping intentions were enhanced.

The present research

The present research aimed to contribute to the limited and heterogenous literature that explores the outcomes and impact of online intergroup contact interventions. Collaborating with the non-governmental organisation Soliya, which delivers a large, global, and exclusively online intergroup contact program (i.e., the Connect Program modules), we, first, sought to replicate previous findings and tested whether participation in the Connect modules predicts more positive outgroup attitudes and more outgroup knowledge (Imperato et al., 2021; White & Abu-Rayya, 2012). Additionally, we captured behaviour tendencies as an outcome measure, focusing on collective action taken to defend the position of outgroup members (Bernardo et al., 2021; Mallett et al., 2008). Collective action was originally defined as behaviour, performed either alone or with others, that intends to advance the position of the ingroup (Wright et al., 1990). However, this conceptualisation has been extended to include activities that reflect solidarity with outgroups (Mallett et al., 2008; Saab et al., 2015). It has been found that direct intergroup contact is associated with stronger collective action tendencies (Reimer et al., 2017).

We investigated if the relationship can also be established in the context of online intergroup contact.

To date, the long-term implications of online intergroup contact have only been demonstrated in two studies: Abu-Rayya (2017) and White and colleagues (2012; 2014) showed that outgroup feelings were more positive than before an online encounter for up to 12 months after the contact sessions ended. Neither of the studies examined, however, changes between the post- and follow-up measures. It is, therefore, difficult to estimate whether outgroup attitudes remained stable or improved further after the intervention was completed (Abrams et al., 2008; Wölfer et al., 2016). In addition, both analyses relied on a pre-test that was taken several weeks or months before the online intergroup contact program started. Consequentially, crucial experiences that affected outgroup attitudes may not have been taken into account. Responding to these limitations, we collected self-report data immediately before, after, as well as several months after the Connect Program modules ended (i.e., pre-post design with one follow-up measure). Specifically, one follow-up survey was administered to three different cohorts at the same time, which resulted in follow-up measures being captured for the three sub-samples with a lag of either six, 12, or 18 months.

Finally, we determined how factors pertaining to the program design shape the outcomes of online intergroup encounters. Longer interventions have been thought to be required for achieving an improvement of outgroup attitudes (Walther et al., 2015). A recent meta-analysis, admittedly based on a small number of studies conducted in a research context, challenged this assumption and did not identify online intergroup contact duration as a significant moderator (Imperato et al., 2021). Confirming this latter result would provide crucial information for efficient resource allocation; practitioners could run more sessions and widen the scale of online contact projects.

In summary, we investigated the following hypothesis and research questions:

Hypothesis 1: Participation in the Connect Program modules is associated with reduced prejudice, increased knowledge about intergroup relations and increased confidence in intergroup interactions, as well as enhanced collective action tendencies.

Research Question 1: To what extent, and how, do outgroup attitudes, outgroup knowledge, confidence, and collective action tendencies develop after the Connect Program modules have ended?

Research Question 2: Does the length of the Connect Program modules moderate changes in outgroup attitudes, outgroup knowledge, confidence, and collective action tendencies over time?

Method

The analyses reported below were not pre-registered. Study materials are reported in the text and, for questions that were not included in the present study, in the supplementary materials (S2). Data is available by contacting Soliya[2].

---

[2] Data is available by contacting Soliya through their contact form (https://soliya.net/contact-us) or by email: info@soliya.net. Please indicate 'Research' in the subject line.

The Connect Program

Soliya's Connect Program is offered in four different modules. The primary module is *Connect Global*. Here, eight to ten students from the United States, Europe, the Middle East and Northern Africa, and Asia meet weekly for two hours, over the course of eight weeks, to engage in dialogue. Students explore topics of interest to their group, including pressing global and social challenges (e.g., the role of religion in students' lives; gender relations and the role of women in society; immigration and integration; the global economy and inequality; stereotypes and cultural misunderstanding; global, local, and interpersonal conflict); they also train skills such as listening, intercultural communication, and critical awareness. The sessions are led by one or two experienced facilitators based a detailed curriculum. Audio-, video-, and text-based tools are used to enable synchronous interactions. Between sessions, participants can join asynchronous text-based interactions with everyone registered with Soliya. Participants' nationality is made salient in the first session when students introduce themselves. Specifically, following the mutual intergroup differentiation model (Hewstone & Brown, 1986), differences in participants' background remain evident to reduce distinctiveness threat. Doing so, status differences are not fully erased but participants' unique expertise on different dimensions is explicitly valued (Dovidio et al., 1998). Relatedly, the organisation's technology supports low-bandwidth connections to afford equal levels of participation for all students.

The *Connect Express* module entails a similar core curriculum as Connect Global but lasts only four weeks. *Connect Global Foreign Affairs* also follows the principles of Connect Global, focuses, however, on the relationship between Western and Muslim-majority societies; it tends to attract students who study relevant courses, e.g., foreign affairs, political science, Middle Eastern Studies. Finally, *Connect Collaborate* offers students the opportunity to work for five weeks on a joint project. After choosing a topic that is relevant to people around the globe (e.g., the environment, poverty, gender equality), students develop an awareness-raising campaign. The teams compete over prizes for the best campaign.

All Connect Program modules are typically offered as a marked component of a university course. Self-selection into the respective courses or classes is likely, although some are core classes. However, not all students are enrolled in higher education (HE) institutions. Non-HE students join through partner organisations that select participants based on an application. The universities or non-HE partners provide clear institutional support for the program.

Design and sample

We applied a pre-post design that included one follow-up measure. The period between the pre- and post-measure corresponded to eight or four weeks (i.e., for Connect Express). The follow-up survey was distributed in October 2019 to three program cohorts: the spring 2019, autumn 2018, and spring 2018 cohort. The lag of the follow-up survey, therefore, corresponded to six, 12, and 18 months respectively for the three sub-samples.

The longitudinal analytical sample was comprised of $N = 547$ ($n = 228$ spring 2019; $n = 167$ autumn 2018; $n = 152$ spring 2018) students who all completed the pre-, post-, and follow-up survey. Participants were on average $M_{age} = 22.65$ ($SD_{age} = 3.28$; range: 17 - 52) years old; 68% were women, 32% were men, two students preferred not to state their gender. Most participants described themselves as coming from the Arab region (60%), followed by Europeans (23%), and participants from

the United States (7%). Forty-eight nationalities were represented, with most participants reporting Tunisian (25%), Italian (15%), and Moroccan (9.6%) nationality. An overview of all nationalities is presented in the supplementary material (S1).

Measures

The measures of study had been used by Soliya over several years in their internal monitoring and evaluation. We had only limited ability to adjust the questions, as consistency had to be maintained and the overall length of the surveys had to be kept at a minimum.

To assess *prejudice*, students reported how "cold" or "warm" they felt towards individuals belonging to different ethnic groups and individuals with different religious backgrounds (two items; 1 = *Very Cold* to 10 = *Very Warm*; adaption of the feeling thermometer; Converse et al., 1980). To ease the interpretation of the results, we reverse-coded answers such that higher values indicated higher prejudice; consequently, a decrease of the value of the responses would be considered as an improvement of prejudice. We then calculated a mean score across both items (ρ^{3}PRE = .91, ρPOST = .95, ρFOLLOW-UP = .89). It is important to note that prejudice was recorded in this manner across all three data collection points only for the spring 2019 cohort. The other two cohorts completed a different prejudice measure in the pre- and/or post-survey (see supplementary material S3 for a pilot study and clarification). Therefore, analyses pertaining to 'prejudice' only refer to the sub-sample of the spring 2019 cohort.

Collective action taken on behalf of outgroups was captured with two items ('I have challenged media misrepresentation of other groups', 'I have spoken out or acted to promote awareness about an issue related to the relationship between Western and predominately Muslim societies'; 1 = *Strongly disagree* to 5 = *Strongly agree*). A mean score was created, and higher scores indicated higher agreement with the fact that those behaviours had been taken (ρPRE = .68, ρPOST = .65, ρFOLLOW-UP = .68). Finally, we investigated self-reported '*confidence* about communicating/working in culturally diverse environments' and '*knowledge* about Western-Muslim relationships' (1 = *Very low* to 5 = *Very high*) with one item each. In the follow-up survey, an *attention check* was included as well ('This is an attention check. Please respond with '5 = Very high' to indicate that you are paying attention'); all participants passed the attention check.

Procedure

The study design and measures were first tested in a pilot study (supplementary material S3) that yielded promising results but suggested that the original prejudice measures should be adapted. The new items, used in the present analysis, were implemented in the pre- and post-survey of the spring 2019 cohort and in the follow-up survey of all cohorts.

In the present research, all students completed the pre-survey as part of their registration for the Soliya program. At the end of the last module session, facilitators shared the post-survey to be filled in immediately. Those who missed the last session received the post-survey by email; reminders were distributed as well. Importantly, only students who had attended at least half of

---

[3] Spearman-Brown coefficients were calculated to indicate reliability for a two-item measure.

the module sessions were invited to the post-survey. Participants of the four Soliya Connect Program modules between spring 2018 and spring 2019 who had completed the pre- and post-survey ($n = 1009$ spring 2019; $n = 1215$ autumn 2018; $n = 1087$ spring 2018) were invited by email to fill in a follow-up survey (17% response rate). No incentives were provided for the completion of the pre- and post-survey. However, students who participated in the follow-up survey were entered in a raffle.

RESULTS

Drop-out analysis

The drop-out analysis revealed a cohort-difference in response rates of the follow-up survey ($\chi^2(2)$ = .38.87, $p < .001$); 42% of those who returned the follow-up survey belonged to the cohort that had completed the modules only six months earlier. Those who completed the follow-up survey (as compared to those who did not respond) also reported warmer feelings towards outgroup members ($F(1, 2211) = 9.24$, $p = .002$, $d = .18$) and higher confidence in their communication skills ($F(1, 2211) = 5.23$, $p = .022$, $d = .20$) before the start of the program. No differences were identified with respect to collective action tendencies ($F(1, 2211) = 0.11$, $p = .736$, $d = .09$) and self-reported knowledge about intergroup relations ($F(1, 2211) = 0.64$, $p = .423$, $d = .13$).

Descriptive statistics

Mean scores and standard deviations of all analysed variables across all three measuring points for the longitudinal analytical sample are reported in Table 1; bi-variate correlations are shown in Table 2.

Changes in prejudice, outgroup knowledge, confidence, and collective action tendencies over time

To examine Hypothesis 1, that is, whether participation in the Connect Program modules was associated with reduced prejudice, increased knowledge and confidence, as well as higher collective action tendencies, we conducted repeated measures analyses of variance (ANOVAs). Sample sizes for these analyses differed because prejudice was only recorded consistently at all three data collection points for a sub-sample of $N = 228$ participants (all other comparisons were based on the full longitudinal analytical sample, $N = 547$). Separate analyses were completed for the spring 2018, autumn 2018, and spring 2019 cohorts as the follow-up survey was fielded with a lag of six, 12, and 18 months respectively. To adjust for the multiple comparisons, all p-values reported in the repeated-measures analyses are corrected using Holm's procedure. As the follow-up survey attained only a 17% response rate, we also assessed pre-post comparisons for a sample that was comprised of participants who had not returned the follow-up survey. Results (see supplementary material S4) confirm the findings presented below. Lastly, sensitivity analyses highlighted that, expecting 95% power and $\alpha = .05$ all ANOVAs were able to detect small to moderate effects (see supplementary material S5).

TABLE 1 Mean values and standard deviations of the assessed variables

Variable	Pre-measure M (SD)	Post-measure M (SD)	Follow-up M (SD)
Prejudice (scale 1 – 10, higher scores indicate greater prejudice)			
Spring 2018 cohort	–	–	2.68 (1.72), $n = 152$
Autumn 2018 cohort	–	–	2.79 (1.85), $n = 167$
Spring 2019 cohort	3.32 (2.04), $n = 228$	2.21 (1.76), $n = 215$	3.03 (1.83), $n = 228$
Collective action (scale 1 - 5)			
Spring 2018 cohort	3.47 (.81), $n = 142$	3.84 (.77), $n = 151$	4.00 (.81), $n = 152$
Autumn 2018 cohort	3.20 (.77), $n = 167$	3.83 (.83), $n = 155$	3.85 (.75), $n = 167$
Spring 2019 cohort	3.25 (.81), $n = 228$	3.83 (.74), $n = 215$	3.74 (.83), $n = 228$
Confidence (scale 1 - 5)			
Spring 2018 cohort	3.89 (.76), $n = 142$	4.17 (.73), $n = 151$	4.37 (.67), $n = 152$
Autumn 2018 cohort	3.75 (.79), $n = 167$	4.04 (.71) $n = 155$	4.17 (.73), $n = 167$
Spring 2019 cohort	3.77 (.81), $n = 228$	4.16 (.67), $n = 215$	4.21 (.70), $n = 228$
Knowledge (scale 1 - 5)			
Spring 2018 cohort	3.21 (.74), $n = 142$	4.13 (.84), $n = 151$	3.80 (.86), $n = 152$
Autumn 2018 cohort	3.01 (.70), $n = 167$	4.08 (.87) $n = 155$	3.51 (.76), $n = 167$
Spring 2019 cohort	3.02 (.80), $n = 228$	4.23 (.69), $n = 215$	3.62 (.80), $n = 228$

SCHUMANN AND MOORE

TABLE 2 Bi-variate correlations (whole sample)

Variable	1	2	3	4	5	6	7	8	9	10	11	12
Pre-measure												
1 Prejudice	1											
2 Collective action	−.20**	1										
3 Confidence	−.26**	.27**	1									
4 Knowledge	−.12**	.38**	.37**	1								
Post-measures												
5 Prejudice	.52**	−.12**	−.15**	−.08*	1							
6 Collective action	−.18**	.32**	.18**	.20**	−.22**	1						
7 Confidence	−.21**	.17**	.39**	.20**	−.30**	.38**	1					
8 Knowledge	−.08***	.13**	.08**	.11**	−.24**	.32**	.22**	1				
Follow-up												
9 Prejudice	.39**	−.13*	−.12*	−.09*	.46**	−.20**	−.17**	−.08	1			
10 Collective action	−.09	.27**	.11*	.20**	−.06	.42**	.22**	.17**	−.28**	1		
11 Confidence	−.19**	.23**	.34**	.25**	−.19*	.25**	.42**	.07	−.29**	.26**	1	
12 Knowledge	−.02	.27**	.21**	.40**	−.14*	.30**	.26**	.16**	−.17**	.36**	.39**	1

Note. ** $p < .001$, * $p < .05$.

Spring 2018 cohort ($N = 152$)

In line with an overall effect of time ($F(2, 280) = 30.08$, $p < .001$, $\eta^2_G = .082$), *collective action* tendencies increased between the pre- and post-survey ($t = -4.90$, $p < .001$) as well as between the post and follow-up survey ($t = -2.76$, $p < .001$). *Confidence* in communication in culturally diverse environments also improved over time ($F(2, 280) = 24.02$, $p < .001$, $\eta^2_G = .066$), that is, during participation in the Connect Program modules ($t = -3.88$, $p < .001$) as well as after the end of the program ($t = -3.04$, $p = .003$). For self-reported *knowledge* about Western-Muslim relationships (effect of time: $F(2, 280) = 63.76$, $p < .001$, $\eta^2_G = .183$), similar trends were reported during the program (pre-post comparison: $t = -11.22$, $p < .001$). However, the follow-up scores were on average lower than those recorded in the post-survey ($t = 4.51$, $p < .001$). Having said this, even after 18 months, self-reported knowledge was higher than before the module started ($t = -6.72$, $p < .001$).

Autumn 2018 cohort ($N = 167$)

In this cohort, we also identified a significant effect of time for *collective action* tendencies ($F(2, 308) = 57.48$, $p < .001$, $\eta^2_G = .137$), confirming an increase in collective action during the program activities ($t = -8.94$, $p < .001$). After the intervention, however, collective action tendencies did not change ($t = -0.649$, $p = .517$). Average follow-up scores were, nevertheless, higher than those identified in the pre-survey ($t = -9.59$, $p < .001$). *Confidence* in inter-cultural communication skills increased both while participating in the Connect program ($t = -4.48$, $p < .001$) and after completion ($t = -2.10$, $p < .001$; effect of time: $F(2, 308) = 22.59$, $p < .001$, $\eta^2_G = .059$). Regarding *knowledge* about Western-Muslim relationships, an improvement was documented between the pre- and post-survey ($t = -13.11$, $p < .001$). In the follow-up survey, average self-reported knowledge was, however, lower than immediately after the program ($t = 6.83$, $p < .001$); this score was still higher than knowledge reported in the pre-survey ($t = -6.28$, $p < .001$; effect of time: $F(2, 308) = 85.95$, $p < .001$, $\eta^2_G = .242$).

Spring 2019 cohort ($N = 228$)

Prejudice was assessed consistently at all three measuring points in this cohort. Prejudice decreased during the Connect program ($t = 4.58$, $p < .001$) but rose again after ($t = -2.00$, $p = .046$). Average follow-up scores remained lower than pre-scores ($t = 2.57$, $p = .021$; effect of time: $F(2, 428) = 10.52$, $p < .001$, $\eta^2_G = .016$). *Collective action* tendencies increased between the pre- and post-survey ($t = -9.52$, $p < .001$) but did not change significantly after the program was completed ($t = 0.89$, $p = .373$). Similar to the trend in the autumn 2018 cohort, follow-up scores of collective action were higher than the pre-score ($t = -8.83$, $p < .001$; effect of time: $F(2, 428) = 55.26$, $p < .001$, $\eta^2_G = .102$). *Confidence* in communicating in intercultural settings increased while students participated ($t = -7.52$, $p < .001$) but did not change further after they had finished the Connect modules ($t = -1.30$, $p = .195$). The average follow-up score was nonetheless higher than those recorded in the pre-survey ($t = -8.82$, $p < .001$; effect of time: $F(2, 428) = 45.36$, $p < .001$, $\eta^2_G = .076$). Lastly, *knowledge* about Western-Muslim relations increased between the pre- and post-measure ($t = -18.95$, $p < .001$); it decreased, however, after the Connect modules ended ($t = 9.47$, $p < .001$). Average knowledge identified in the follow-up survey was still higher than students'

self-assessment in the pre-survey ($t = -9.47$, $p < .001$; effect of time: $F(2, 428) = 179.52$, $p < .001$, $\eta^2_G = .290$).

Summary

Results showed that participation in the Soliya Connect modules predicts a reduction in prejudice, an increase in confidence in communicating in intercultural settings, enhanced self-reported knowledge about Western-Muslim relationships, and a higher likelihood to take collective action on behalf of outgroup members. Notably, changes in attitudes, knowledge, confidence, and collective action tendencies persisted also after the program ended. That is, findings were in line with *Hypothesis 1*. Responding to *Research Question 1*, as the aforementioned trends were replicated in all three program cohorts, we concluded that the associations between participation in the Connect Program and changes in the outcome measures hold for up to 18 months after students had completed the intervention.

Comparison of the Connect Global and Connect Express modules

We examined whether the length of the Connect Program modules moderates changes in attitude, knowledge, confidence, and collective action tendencies over time (*Research Question 2*). Two modules—Connect Global (lasting eight weeks) and Connect Express (lasting four weeks)—that followed the same structure and approach but differed in module duration were compared. Sample sizes were not equal across the modules. Most students ($n = 274$) had completed Connect Global, $n = 160$ students attended Connect Express. Module type was added as a between-subject factor in the repeated measures ANOVAs, which were again conducted separately for each program cohort. As reported in Table 3, no systematic significant differences between the two programs were identified.

DISCUSSION

Taken together, the present research demonstrated that participating in a global online intergroup contact intervention was associated with reduced prejudice, increased collective action tendencies on behalf of outgroups, higher levels of self-reported knowledge about intergroup relations, and stronger confidence in communicating in intercultural environments. We identified a stronger effect of prejudice reduction than was proposed by Imperato et al. (2021). Additionally, the findings strengthen evidence from a small number of studies that suggest that intergroup contact can facilitate, rather than undermine, collective action on behalf of disadvantaged outgroups (Reimer et al., 2017; Selvanathan et al., 2018). In our analysis, the distinction between advantaged and disadvantaged groups was admittedly somewhat ambiguous— participants might have been majority or minority group members in their respective societies but were then in a different position while taking part in the program. We can, nevertheless, speculate that by fostering collective action tendencies, online intergroup contact can elicit ripple effects that extend beyond those who participated in an intervention (i.e., participants serve as multipliers for social change).

To date, the long-term contributions of online intergroup contact have not been well-established. In line with two previous studies (Abu-Rayya, 2017; White & Abu-Rayya, 2012; White

TABLE 3 Means and standard deviations of program outcomes for the Connect Global and Connect Express modules

Variable	Connect Global M (SD)	Connect Express M (SD)
Prejudice		
Spring 2018		
Pre		
Post		
Follow-up	2.66 (1.64)	2.58 (1.73)
Autumn 2018		
Pre		
Post		
Follow-up	2.97 (1.88)	2.64 (1.77)
Spring 2019		
Pre	3.24 (2.06)	3.55 (2.11)
Post	2.59 (1.76)	3.10 (1.86)
Follow-up*	2.89 (1.75)	3.17 (1.84)
Collective Action		
Spring 2018		
Pre	3.38 (.77)	3.33 (.84)
Post	3.93 (.72)	3.67 (.80)
Follow-up	4.01 (.70)	4.04 (.70)
Autumn 2018		
Pre	3.16 (.81)	3.17 (.77)
Post	3.80 (.75)	3.63 (.80)
Follow-up	3.89 (.80)	3.77 (.67)
Spring 2019		
Pre	3.30 (.83)	3.18 (.79)
Post	3.87 (.70)	3.63 (.74)
Follow-up	3.92 (.75)	3.53 (.92)
Confidence		
Spring 2018		
Pre	3.91 (.73)	3.63 (.79)
Post	4.16 (.72)	4.18 (.73)
Follow-up	4.32 (.70)	4.34 (.63)
Autumn 2018		
Pre	3.68 (.81)	3.66 (.88)
Post	4.07 (.77)	3.84 (.78)
Follow-up	4.19 (.69)	4.13 (.79)
Spring 2019		
Pre	3.68 (.84)	3.63 (.81)
Post	4.19 (.74)	3.92 (.78)
Follow-up	4.27 (.71)	4.14 (.68)

TABLE 3 (Continued)

Variable	Connect Global *M* (*SD*)	Connect Express *M* (*SD*)
Knowledge		
Spring 2018		
Pre	3.19 (.68)	3.00 (.72)
Post	4.26 (.83)	3.92 (.75)
Follow-up	3.77 (.84)	3.66 (.84)
Autumn 2018		
Pre	2.97 (.82)	2.96 (.84)
Post	4.05 (.85)	3.86 (.94)
Follow-up	3.56 (.74)	3.38 (.78)
Spring 2019		
Pre	3.03 (.88)	2.93 (.79)
Post	4.21 (.73)	3.98 (.76)
Follow-up**	3.75 (.81)	3.38 (.76)

Note: * The follow-up score for collective action tendencies was lower for the Connect Global than the Connect Express program ($t = 3.18$, $p = .011$). ** The follow-up measure for self-reported knowledge about Western-Muslim relations was higher for Connect Global ($t = 2.84$, $p = .019$).

et al., 2014), we demonstrated that changes in prejudice, knowledge, confidence, and collective action tendencies that were attained during the Connect Program persisted over a period of up to 18 months after the modules were completed. Albeit promising for practitioners, this finding also raises the question of *why* attitude, knowledge, and behaviour change was maintained over time. Little is known about the factors that drive lasting intergroup contact effects. It is possible that contact experiences foster substantial lifestyle changes that mean that individuals continue to engage with outgroup members, for instance, with those whom they met in an intervention. Alternatively, after participating in an intergroup encounter, individuals might be less affected by negative intergroup contact experiences—online intergroup contact serves as an inoculation (Abrams et al., 2008; Wölfer et al., 2016). The present study does not allow us to explore these processes. We, therefore, recommend that future research determines when and how effects of intergroup contact can be sustained effectively over time.

Finally, and in line with a recent meta-analysis (Imperato et al., 2021), we found no systematic differences when comparing outcomes of a four-weeks and an eight-weeks Connect Program module. This result suggests that it is not a disadvantage to run shorter interventions; implying that the same resources could be used to engage more people in contact initiatives. The finding also draws attention to the fact that affective processes that mediate the relationship between intergroup contact and prejudice—higher empathy and lower anxiety (Pettigrew & Tropp, 2008)—can possibly be evoked relatively quickly. Further empirical support is needed to ascertain that this assumption holds.

Those conclusions must be considered in light of a number of limitations, which are to some extent expected when working with data from a real-world intervention. First, it must be noted that the modules of Soliya's Connect Program combine elements of intergroup contact interventions and diversity training. Notably, in addition to engaging directly with outgroup members, participants also discuss complex topics such as political events or social conflicts that may highlight differences in opinions (Paluck & Green, 2009). Previous research indicated that the latter could have detrimental implications for minority group members who are exposed to the negative

opinions of the majority group (Tropp, 2003). We are unable to distinguish how distinct module sessions where sensitive topics were raised affected prejudice, knowledge, confidence, and collective action tendencies. Going forward, it would, therefore, be valuable to compare the outcomes of activities that focus on controversial topics with those that centre on themes which highlight shared perspectives.

Moreover, we could only partially influence the choice of measures included in the pre-, post-, and follow-up survey, as these had to align with Soliya's existing monitoring and evaluation practices. To ease the interpretation of the results, we recommend that collective action tendencies are in the future assessed with response options that capture the frequency of the respective activities, and not agreement with the statement that certain action was taken. Doing so, an otherwise dichotomous measure (i.e., Yes, I agree I have performed this behaviour vs. No, I do not agree that I have performed this behaviour) is not forced onto an ordinal/continuous scale. Consequentially, due to the wording of the answer options, we cannot conclude whether the frequency of collective action tendencies increased over the course of participation in the Connect program modules; we can only speculate that the behaviour was more likely to occur.

Likewise, although it had been applied in similar ways in previous research (Aydogan & Gonsalkorale, 2015; Rodríguez-Pérez et al., 2011), the self-report measure of 'perceived knowledge' about Muslim-Western relations could be improved. In the way that the question was phrased in the present study, changes in knowledge over time may not reflect 'learning about the outgroup and intergroup relation' but rather participants' growing confidence in their existing knowledge. That is, being involved in the Connect program modules may lead participants to believe that they already know everything about Western-Muslim relationships. Others have examined outgroup knowledge with multiple-choice quizzes (White & Abu-Rayya, 2012). Alternatively, transcripts of the interactions could be analysed to identify changes in expressed knowledge. Lastly, it must be taken into account that a need to provide socially desirable answers might have led to systematically inflated responses and ceiling effects across all measures. This is especially a concern for the pre- and post-survey that were completed within the program setting.

One must also be cautious to not conclude causal effects. Applying a pre-post test design implies several threats to the study's internal validity. First, as participation in the intervention was not based on principles of random assignment but students' self-selection, participants might differ from other students in their college and the general population with respect to their openness and outgroup attitudes. Students who joined the program were possibly already very interested in outgroup members and held lower prejudice. Drop-out analysis further showed that the analytical sample scored lower on prejudice and higher on confidence before the intervention started, compared to other participants who did not complete the follow-up survey. Consequentially, the overall change in prejudice, knowledge, confidence, and collective action tendencies that could be detected was reduced. In turn, due to self-selection, participants' contact experience may have been more positive than had individuals who were not particularly keen to join intergroup encounters been involved; that is, contact effects could be exaggerated in the present analysis. Moreover, the lack of a control group impairs our ability to identify possible effects of maturation or history. To address these concerns, a randomised controlled trial would be ideal. Alternatively, and following Walther et al. (2015), if random assignment of participants to different conditions is not possible due to practical or ethical reasons, pre- and post-measures from comparable participants (e.g., students at the same college) could be collected to allow for static-group comparison.

Speaking to the comparison between the eight-weeks and four-weeks program, we also cannot draw conclusions about 'short' interventions in general. The Connect Express program included

four one-hour sessions, meaning that it is unclear whether, for instance, an intervention with only one session could attain similar result patterns. Having said this, a large proportion of previous experimental research on computer-mediated intergroup contact included only one session, often with a confederate, and attained promising effects (e.g., Alvídrez et al., 2015; Boccanfuso et al., 2021; Cao & Lin, 2017). Imperato et al.'s (2021) meta-analysis also suggested that the duration of computer-mediated intergroup contact sessions did not moderate their relationship with outgroup feelings.

Despite these challenges, we believe that the present study makes an important contribution to the literature that examines intergroup contact, in general, and online intergroup interactions, in particular. We found that long-term improvements in prejudice, outgroup knowledge, confidence, and collective action tendencies are attained even with online programs that are less resource-intensive. This insight can inform the activities of stakeholders that aim to prevent or counter intergroup conflict at scale. At the same time, the results highlight several open questions that should be assessed in future research to further strengthen the understanding of optimal conditions to foster lasting harmonious intergroup relations.

ACKNOWLEDGEMENTS

CONFLICT OF INTEREST
Dr Sandy Schumann has been advising Soliya on matters of program impact evaluation since 2016.

DATA AVAILABILITY STATEMENT
Data is available by contacting Soliya through their contact form (https://soliya.net/contact-us) or by email: info@soliya.net. Please indicate "Research" in the subject line.

REFERENCES
Abbott, L., Austin, R., Mulkeen, A., & Metcalfe, N. (2004). The global classroom: Advancing cultural awareness in special schools through collaborative work using ICT. *European Journal of Special Needs Education*, 19, 225-240. https://doi.org/10.1080/08856250410001678504

Abrams, D., Crisp, R. J., Marques, S., Fagg, E., Bedford, L., & Provias, D. (2008). Threat inoculation: experienced and imagined intergenerational contact prevents stereotype threat effects on older people's math performance. *Psychology and Aging*, 23, 934–939. https://doi.org/10.1037/a0014293

Abu-Rayya, H. M. (2017). Majority members' endorsement of the acculturation integrationist orientation improves their outgroup attitudes toward ethnic minority members: An electronic-contact experiment. *Computers in Human Behavior*, 75, 660-666. https://doi.org/10.1016/j.chb.2017.06.010

Adachi, P. J., Hodson, G., Willoughby, T., Blank, C., & Ha, A. (2016). From outgroups to allied forces: Effect of intergroup cooperation in violent and nonviolent video games on boosting favorable outgroup attitudes. *Journal of Experimental Psychology: General*, 145, 259–265. https://doi.org/10.1037/xge0000145

Adachi, P. J., Hodson, G., Willoughby, T., & Zanette, S. (2015). Brothers and sisters in arms: Intergroup cooperation in a violent shooter game can reduce intergroup bias. *Psychology of Violence*, 5, 455-462.

Allport, G. (1954). *The Nature of Prejudice*. Addison-Wesley.

Alvídrez, S., Piñeiro-Naval, V., Marcos-Ramos, M., & Rojas-Solís, J. L. (2015). Intergroup contact in computer-mediated communication: The interplay of a stereotype-disconfirming behavior and a lasting group identity on reducing prejudiced perceptions. *Computers in Human Behavior*, 52, 533-540. https://doi.org/10.1016/j.chb.2014.09.006

Andrews, N. P., Yogeeswaran, K., Walker, M. J., & Hewstone, M. (2018). Effect of valenced vicarious online contact on out-group prejudice and perceived out-group variability: A study of online poker. *Journal of Applied Social Psychology*, 48, 571-581. https://doi.org/10.1111/jasp.12548

Austin, R., Abbott, L., Mulkeen, A., & Metcalfe, N. (2003). Dissolving boundaries: cross-national co-operation through technology in education. *The Curriculum Journal*, 14, 55-84. https://doi.org/10.1080/0958517032000055938

Aydogan, A. F., & Gonsalkorale, K. (2015). Breaking down a barrier: Increasing perceived out-group knowledge reduces negative expectancies about intergroup interaction. *European Journal of Social Psychology*, 45(4), 401-408. https://doi.org/10.1002/ejsp.2107

Bagci, S. C., Guvensoy, I., Turner, R. N., White, F. A., & Piyale, Z. E. (2021). Investigating the role of E-contact and self-disclosure on improving Turkish-Kurdish interethnic relations. *Journal of Applied Social Psychology*. https://doi.org/10.1111/jasp.12760

Benatov, J., Berger, R., & Tadmor, C. T. (2021). Gaming for peace: Virtual contact through cooperative video gaming increases children's intergroup tolerance in the context of the Israeli–Palestinian conflict. *Journal of Experimental Social Psychology*, 92, https://doi.org/10.1016/j.jesp.2020.104065

Bente, G., Rüggenberg, S., Krämer, N. C., & Eschenburg, F. (2008). Avatar-mediated networking: Increasing social presence and interpersonal trust in net-based collaborations. *Human Communication Research*, 34, 287-318. https://doi.org/10.1111/j.1468-2958.2008.00322.x

Boccanfuso, E., White, F. A., & Maunder, R. D. (2021). Reducing transgender stigma via an E-contact intervention. *Sex Roles*, 84, 326-336. https://doi.org/10.1007/s11199-020-01171-9

Boehm, D., Kurthen, H., & Aniola-Jedrzejek, L. (2010). Do international online collaborative learning projects impact ethnocentrism?. *E-learning and Digital Media*. 7, 133-146. https://doi.org/10.2304/elea.2010.7.2.133

Bruneau, E., Hameiri, B., Moore-Berg, S. L., & Kteily, N. (2020). Intergroup contact reduces dehumanization and meta-dehumanization: Cross-sectional, longitudinal, and quasi-experimental evidence from 16 samples in five countries. *Personality and Social Psychology Bulletin*. https://doi.org/10.1177/0146167220949004

Cameron, Lindsey, Glick, Anne, Swift Hannah, J. (2017) Using technology to promote multicultural competence in Primary Schools: An evaluation of the One Globe Kids method. In: Royal Geographical Society with IBG International Conference, Sep 2017, London.

Cao, B., & Lin, W. Y. (2017). Revisiting the contact hypothesis: Effects of different modes of computer-mediated communication on intergroup relationships. *International Journal of Intercultural Relations*, 58, 23-30. https://doi.org/10.1016/j.ijintrel.2017.03.003

Converse, P. E., Dotson, J. D., Hoag, W. J., & McGee, W. H. (1980). American social attitudes data sourcebook *1947-1978*. Cambridge, Mass: Harvard University Press

Di Bernardo, G. A., Vezzali, L., Stathi, S., McKeown, S., Cocco, V. M., Saguy, T., & Dixon, J. (2021). Fostering social change among advantaged and disadvantaged group members: Integrating intergroup contact and social identity perspectives on collective action. *Group Processes & Intergroup Relations*, 24, 26-47. https://doi.org/10.1177/1368430219889134

Dovidio, J. F., Gaertner, S. L., & Validzic, A. (1998). Intergroup bias: status, differentiation, and a common in-group identity. *Journal of personality and social psychology*, 75(1), 109–120. https://doi.org/10.1037/0022-3514.75.1.109

Dovidio, J. F., Love, A., Schellhaas, F. M., & Hewstone, M. (2017). Reducing intergroup bias through intergroup contact: Twenty years of progress and future directions. *Group Processes & Intergroup Relations*, 20, 606-620. https://doi.org/10.1177/1368430217712052

Helm, F. & van der Velden, B. (2019). Erasmus + Virtual Exchange 2018 Impact Report. Available at: https://europa.eu/youth/sites/default/files/eyp/eve/attachments/2018_erasmus_virtual_exhange_impact_report.pdf

Hewstone, M. E., & Brown, R. E. (1986). *Contact and conflict in intergroup encounters*. Oxford, UK: Basil Blackwell.

Hoter, E., Shonfeld, M., & Ganayim, A. (2009). Information and communication technology (ICT) in the service of multiculturalism. International Review of Research in Open and Distributed Learning, 10. *Available at*: https://www.erudit.org/en/journals/irrodl/2009-v10-n2-irrodl05158/1067917ar/

Imperato, C., Schneider, B. H., Caricati, L., Amichai-Hamburger, Y., & Mancini, T. (2021). Allport meets internet: A meta-analytical investigation of online intergroup contact and prejudice reduction. *International Journal of Intercultural Relations*, 81, 131-141.

Kim, N., Kim, H. K., Wojcieszak, M., Igartua, J. J., & Lim, C. M. (2020). The presence of the protagonist: explaining narrative perspective effects through social presence. *Media Psychology*, 23, 891-914. https://doi.org/10.1080/15213269.2019.1665548

Lemmer, G., & Wagner, U. (2015). Can we really reduce ethnic prejudice outside the lab? A meta analysis of direct and indirect contact interventions. *European Journal of Social Psychology*, 45, 152-168. https://doi.org/10.1002/ejsp.2079

Lissitsa, S., & Kushnirovich, N. (2018). Secondary transfer effect of positive and negative online contact between groups involved in high-intensity conflict. *International Journal of Intercultural Relations*, 67, 71-80. https://doi.org/10.1016/j.ijintrel.2018.10.001

Lissitsa, S., & Kushnirovich, N. (2019). Harnessing digital media in the fight against prejudice: Social contact and exposure to digital media solutions. *Journalism & Mass Communication Quarterly*, 96, 1052-1075. https://doi.org/10.1177/1077699019837938

Lolliot, S., Fell, B., Schmid, K., Wölfer, R., Swart, H., Voci, A., … & Hewstone, M. (2015). Measures of intergroup contact. *Measures of Personality and Social Psychological Constructs*, 652-683. https://doi.org/10.1016/B978-0-12-386915-9.00023-1

Mallett, R. K., Huntsinger, J. R., Sinclair, S., & Swim, J. K. (2008). Seeing through their eyes: When majority group members take collective action on behalf of an outgroup. *Group Processes & Intergroup Relations*, 11, 451-470. https://doi.org/10.1177/1368430208095400

Maunder, R. D., White, F. A., & Verrelli, S. (2019). Modern avenues for intergroup contact: Using E-contact and intergroup emotions to reduce stereotyping and social distancing against people with schizophrenia. *Group Processes & Intergroup Relations*, 22, 947-963. https://doi.org/10.1177/1368430218794873

Miles, E., & Crisp, R. J. (2014). A meta-analytic test of the imagined contact hypothesis. *Group Processes & Intergroup Relations*, 17, 3-26. https://doi.org/10.1177/1368430213510573

Mustafa, H., & Poh, S. K. C. (2019). Increasing intercultural contact in cyberspace: How does it affect the level of prejudice among Malaysians? *Pertanika Journal of Social Sciences & Humanities*, 27, 601-620.

O'Donnell, A., Friehs, M.-T., Bracegirdle, C., Watt, S., Zúñiga Rivas, C. & Barlow, F.K. (2021). Technological and analytical advancements in intergroup contact research. *Journal of Social Issues*. Available at: https://spssi.onlinelibrary.wiley.com/doi/epdf/10.1111/josi.12424

Paluck, E. L., & Green, D. P. (2009). Prejudice reduction: What works? A review and assessment of research and practice. *Annual Review of Psychology*, 60, 339-367.

Park, S. Y. (2012). Mediated intergroup contact: concept explication, synthesis, and application. *Mass Communication and Society*, 15, 136-159. https://doi.org/10.1080/15205436.2011.558804

Pettigrew, T. F. (2009). Secondary transfer effect of contact: Do intergroup contact effects spread to noncontacted outgroups? *Social Psychology*, 40, 55-65. https://doi.org/10.1027/1864-9335.40.2.55

Pettigrew, T. F., & Tropp, L. R. (2006). A meta-analytic test of intergroup contact theory. *Journal of Personality and Social Psychology*, 90, 751-783. https://doi.org/10.1037/0022-3514.90.5.751

Pettigrew, T. F., & Tropp, L. R. (2008). How does intergroup contact reduce prejudice? Meta-analytic tests of three mediators. *European journal of social psychology*, 38(6), 922-934. https://doi.org/10.1002/ejsp.504

Reimer, N. K., Becker, J. C., Benz, A., Christ, O., Dhont, K., Klocke, U., … & Hewstone, M. (2017). Intergroup contact and social change: Implications of negative and positive contact for collective action in advantaged and disadvantaged groups. *Personality and Social Psychology Bulletin*, 43, 121-136. https://doi.org/10.1177/0146167216676478

Rodríguez-Pérez, A., Delgado-Rodríguez, N., Betancor-Rodríguez, V., Leyens, J. P., & Vaes, J. (2011). Infra-humanization of outgroups throughout the world. The role of similarity, intergroup friendship, knowledge of the outgroup, and status. *anales de psicología*, 27(3), 679-687.

Römpke, A. K., Fritsche, I., & Reese, G. (2019). Get together, feel together, act together: International personal contact increases identification with humanity and global collective action. *Journal of Theoretical Social Psychology*, 3, 35-48. https://doi.org/10.1002/jts5.34

Saab, R., Tausch, N., Spears, R., & Cheung, W.Y. (2015). Acting in solidarity: Testing an extended dual pathway model of collective action by bystander group members. *British Journal of Social Psychology*, 54(3), 539-560. https://doi.org/10.1111/bjso.12095

Selvanathan, H.P., Techakesari, P., Tropp, L. R., & Barlow, F. K. (2018). Whites for racial justice: How contact with Black Americans predicts support for collective action among White Americans. *Group Processes & Intergroup Relations*, 21(6), 893-912. https://doi.org/10.1177/13684302176909

Stevens Initiative (2021). Projects. Available at: https://www.stevensinitiative.org/projects/

Stiff, C., & Kedra, P. (2020). Playing well with others: The role of opponent and intergroup anxiety in the reduction of prejudice through collaborative video game play. *Psychology of Popular Media*, 9, 105-115. DOI:10.1037/ppm0000210

Tavakoli, M., Hatami, J., & Thorngate, W. (2010). Changing Stereotypes in Iran and Canada. *Journal of Intercultural Communication*. Available at: https://immi.se/intercultural/nr23/tavakoli.pdf

Tropp, L. R. (2003). The psychological impact of prejudice: Implications for intergroup contact. *Group processes & intergroup relations*, 6(2), 131-149. https://doi.org/10.1177/1368430203006002001

Walther, J. B., & Bunz, U. (2005). The rules of virtual groups: Trust, liking, and performance in computer-mediated communication. *Journal of Communication*, 55, 828-846. https://doi.org/10.1111/j.1460-2466.2005.tb03025.x

Walther, J. B., Hoter, E., Ganayem, A., & Shonfeld, M. (2015). Computer-mediated communication and the reduction of prejudice: A controlled longitudinal field experiment among Jews and Arabs in Israel. *Computers in Human Behavior*, 52, 550-558. https://doi.org/10.1016/j.chb.2014.08.004

White, F. A., & Abu-Rayya, H. M. (2012). A dual identity-electronic contact (DIEC) experiment promoting short- and long-term intergroup harmony. *Journal of Experimental Social Psychology*, 48, 597-608. https://doi.org/10.1016/j.jesp.2012.01.007

White, F. A., Abu-Rayya, H. M., & Weitzel, C. (2014). Achieving twelve-months of intergroup bias reduction: The dual identity-electronic contact (DIEC) experiment. *International Journal of Intercultural Relations*, 38, 158-163. https://doi.org/10.1016/j.ijintrel.2013.08.002

White, F. A., Maunder, R., & Verrelli, S. (2020). Text-based E-contact: Harnessing cooperative Internet interactions to bridge the social and psychological divide. *European Review of Social Psychology*, 31, 76-119. https://doi.org/10.1080/10463283.2020.1753459

White, F. A., Turner, R. N., Verrelli, S., Harvey, L. J., & Hanna, J. R. (2019). Improving intergroup relations between Catholics and Protestants in Northern Ireland via E-contact. *European Journal of Social Psychology*, 49, 429-438. https://doi.org/10.1002/ejsp.2515

Wilson, J. M., Straus, S. G., & McEvily, B. (2006). All in due time: The development of trust in computer-mediated and face-to-face teams. *Organizational Behavior and Human Decision Processes*, 99, 16-33. https://doi.org/10.1016/j.obhdp.2005.08.001

Wölfer, R., Schmid, K., Hewstone, M., & van Zalk, M. (2016). Developmental dynamics of intergroup contact and intergroup attitudes: Long-term effects in adolescence and early adulthood. *Child Development*, 87(5), 1466-1478. https://doi.org/10.1111/cdev.12598

Wright, S.C., Taylor, D.M., & Moghaddam, F.M. (1990). Responding to membership in a disadvantaged group: From acceptance to collective protest. *Journal of personality and social psychology*, 58(6), 994-1003. https://doi.org/10.1037/0022-3514.58.6.994

Yablon, Y. B., & Katz, Y. J. (2001). Internet-based group relations: A high school peace education project in Israel. *Educational Media International*, 38(2-3), 175-182. https://doi.org/10.1080/09523980110043591

Zhou, S., Page-Gould, E., Aron, A., Moyer, A., & Hewstone, M. (2019). The extended contact hypothesis: A meta-analysis on 20 years of research. *Personality and Social Psychology Review*, 23(2), 132-160. https://doi.org/10.1177/1088868318762647

AUTHOR BIOGRAPHIES

Sandy Schumann (PhD) is a Lecturer at University College London, Department of Security and Crime Science. Her research examines risk factors of radicalisation, extreme political attitudes, as well as hate crime prevention in online and offline settings.

Ysanne Moore (MSc) is a junior cyber threat intelligence consultant at the NCC Group. She graduated from the Jill Dando Institute of Security and Crime Science at University College London in 2020. Her research interests include extremist ideologies and behaviours, including far-right hate speech, as well as prevention strategies to counter intolerant and discriminatory beliefs.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Schumann, S., & Moore, Y. (2022) What can be achieved with online intergroup contact interventions? Assessing long-term attitude, knowledge, and behaviour change. *Analyses of Social Issues and Public Policy*, 1–20. https://doi.org/10.1111/asap.12333