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Brief report

Achieving twelve-months of intergroup bias reduction: The dual identity-electronic contact (DIEC) experiment

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ABSTRACT

This longitudinal experiment addresses a critical gap in the intergroup relations literature by showing that the theory-driven nine-week dual identity E-contact (DIEC) intervention is successful in maintaining a reduction in intergroup bias twelve months post-intervention. Here, 92 Muslim and 96 Christian students completed measures of affective intergroup bias, intergroup anxiety, and outgroup knowledge twelve months after completing either the DIEC or control program. In line with predictions, these main effect analyses revealed that the affective intergroup bias reduction observed among DIEC participants, compared to control participants at two weeks post-intervention was maintained at twelve months post-intervention. Additional analyses investigating religious group differences revealed however that this bias reduction was confined to Muslim DIEC students only. Finally, outgroup friendship was found to continue to moderate, and intergroup anxiety continue to mediate, the effects of the DIEC program on intergroup bias reduction for Muslim students – even with a twelve month absence of cooperative intergroup contact or dual identity curricula. This final and significant piece of empirical information is definitive in addressing the dearth of long-term intergroup bias reduction literature.

1. Introduction

Creating long lasting improvements in intergroup relations is a fundamental aim of prejudice reduction theory and research. Therefore, theoretical and experimental contributions to this field are best judged by their efficacy in the long-term. Despite this, there is a scarcity of experimental research investigating long-term prejudice reduction or intergroup harmony. Further, the term 'long-term' is used inconsistently in the social psychology literature, with some research referring to 'long-term' as four or eight weeks post-intervention (Devine, Forscher, Austin, & Cox, 2012), four months (Clement et al., 2012) or six months (White & Abu-Rayya, 2012). Whatever the definition, the long-term assessment of the effects of racial bias reduction strategies beyond six months has been lacking in social psychology research, particularly in naturalistic settings, where retaining participation over time is especially difficult.

Interventions that have the best chance of retaining efficacy in the long-term are likely to require 'considerable goal-directed effort over time' (Devine et al., 2012, p. 1268). Thus, it is important not only to have a long-term evaluation of prejudice reduction interventions, but also to design theoretically driven interventions that involve participants from different groups cooperatively engaging with one another to achieve the program's common goal. An example of such an intervention is White and Abu-Rayya's (2012) dual identity-electronic contact (or E-contact) (DIEC) program.

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1.1. The theoretical framework underpinning the dual identity-E-contact (DIEC) program

The DIEC program integrates a dual identity recategorization framework (Dovidio, Gaertner, Niemann, & Snider, 2001; González & Brown, 2006) with contact theory (Allport, 1954; Pettigrew, 1998) to promote intergroup harmony for *both* majority and minority groups in short- and long-term. The theoretical premise of the DIEC program is that a dual identity recategorization provides Allport's (1954) contact conditions with the cognitive mechanism needed to successfully achieve the superordinate or common goal – the main driver behind prejudice reduction. This can be achieved by the fact that a dual identity recategorization reduces intergroup biases by extending the benefits of ingroup favoritism to former outgroup members who are now included members of the created common ingroup. As argued by Dovidio, Gaertner, and Saguy (2009), dual identity approaches are advantageous to improving both groups' outgroup attitudes: – (i) it is advantageous for the majority group as dual identity salience emphasizes group-based inequity, making the majority's responses to moral violations against minority groups more likely, and (ii) it is advantageous to minority groups because it allows them to maintain their identity and distinctiveness in a context of connection and cooperation with the majority group. In the DIEC program specifically, dual identity recategorization is promoted by encouraging Australian Muslim and Christian high-school students to think of ways in which their religious identities can actively contribute to an 'environmentally sustainable future for Australia', their shared community or common identity.

The DIEC program was conducted in a naturalistic high-school classroom setting, and involved carefully designed curricula that integrated inter-faith information with electronic (E)-contact to guide the Muslim and Christian high-school students to create a dual identity and achieve the program's common goal of developing an environmentally sustainable future for Australia. In each of the eight weekly sessions of the DIEC program, Muslim and Christian high school students formed a four-person group, where one pair of ingroup members made E-contact with a pair of outgroup members synchronously via eight internet chat sessions each lasting 50-min. Importantly, the DIEC program incorporated Allport's (1954) and Pettigrew's (1988) optimal conditions for successful contact, including equal numbers of Christian and Muslim students, a common goal, the opportunity for friendliness and familiarity between participants, support for the program by the school authorities, and a longitudinal design to allow time for friendship formation to occur.

1.2. DIEC program findings at two weeks and six months post-intervention

As previously reported by White and Abu-Rayya (2012), there were several significant findings of the DIEC program. Specifically, compared to pre-intervention testing (Time 1), there were short-term (two weeks post-intervention; Time 2) reductions in both affective intergroup bias and intergroup anxiety as well as an increase in outgroup knowledge for DIEC participants compared to participants in the Control program, and the significant reduction in affective intergroup bias was maintained six month post-intervention (Time 3).

Importantly, the success of the DIEC program was also moderated and mediated by factors that have been identified as theoretically significant in the intergroup relations literature. These include ingroup identification and outgroup friendship that moderated reductions in affective intergroup bias at two weeks and six months post-intervention. These findings suggest that the DIEC program was most effective in reducing intergroup bias for high ingroup identifiers and those with high levels of outgroup friendship (refer to White & Abu-Rayya, 2012).

Further, intergroup anxiety mediated affective intergroup bias reduction at two weeks and six months post-intervention, supporting previous short-term research (Brown & Hewstone, 2005; Pettigrew & Tropp, 2008).

In order to advance the literature and provide a complete picture of long-term improvements in intergroup relations, it is empirically and theoretically necessary to evaluate the extent to which these moderators and mediators remain effective twelve months after the completion of DIEC program. To this end, the current study will be the first to investigate the twelve-months efficacy of the DIEC program, and in doing so, an extended evaluation of the robustness of the theoretical and experimental framework underpinning the program will also be conducted. Thus based on previous findings, we predict that:

H1. DIEC participants will show significantly less intergroup bias and intergroup anxiety and more outgroup knowledge compared to Control participants at twelve-months post-intervention.

H2. Ingroup identification and outgroup friendship will moderate DIEC participants' intergroup bias reduction at twelve-months post-intervention.

H3. Intergroup anxiety will mediate DIEC participants' intergroup bias reduction at the twelve-months post-intervention.

2. Method

2.1. Participants

The sample comprised 188 participants (85% of the 220 original participants; 116 Muslims and 104 Christians) who had completed the DIEC and Control programs and all four waves of measures. Participants were 92 Muslim students (51 females) and 96 Christian students (46 females) at two Muslim (one boys, one girls) and two Christian (one boys, one girls) high schools in Sydney. For these matched participants, mean ages at the twelve-months post-intervention testing were 14.53 years ($SD = 0.35$) for Muslim males, 14.55 years ($SD = 0.35$) for Muslim females, 14.88 years ($SD = 0.32$) for Christian

males, and 14.82 years (*SD* = 0.38) for Christian females. All participants took part on a voluntary basis, with permission given by the schools, parents and students.

2.2. Measures

Quantitative measures of affective intergroup bias, intergroup anxiety, and outgroup religious knowledge administered during the baseline pre-intervention phase (Time 1), two weeks post-intervention (Time 2), six months post-intervention (Time 3) were also used in the current study at twelve months post-intervention (Time 4).

2.2.1. Affective intergroup bias

The Image Affect Scale (IAS) measured intergroup bias and was developed by the authors to evaluate intergroup relations between Muslim and Christian participants. The measure consisted of 20 pieces of stimuli consisting of images (i.e., a Mosque or a Church; the Qu'ran or Bible, etc.) and names (i.e., Abdulla or Patrick; Aisha or Catherine, etc.), 10 were associated with the religious ingroup (Muslim or Christian) and 10 were associated with the religious outgroup (Christian or Muslim). The stimuli were presented in a random order to participants. Participants used an eight-point Likert scale to rate the pleasantness of the stimuli (where 1 = extremely unpleasant and 8 = extremely pleasant). Intergroup bias scores were calculated as the difference between the total ingroup and total outgroup image scores, where higher scores meant higher intergroup bias. Cronbach's α for the measure at Time 4 was $\alpha = 0.94$.

2.2.2. Intergroup anxiety

Stephan and Stephan's (1985) intergroup anxiety scale was adapted here and required participants to rate their expected feelings in a situation of being in a group totally composed of ingroup members (Muslims or Christians), and then in a situation of being the only ingroup member amongst a group totally composed of outgroup members (Christians or Muslims). Participants were asked to rate the extent to which they felt happy, awkward, self-conscious, warm, cold, friendly, respect, and disgusted in each of these two situations on an eight-point Likert-scale (where 1 = extremely unpleasant and 8 = extremely pleasant). Total scores were calculated as the difference between the total ingroup and total outgroup anxiety scores, where higher scores meant higher intergroup anxiety. Cronbach's α for the measure at Time 4 was $\alpha = 0.86$.

2.2.3. Ingroup identity

Brown, Condor, Mathews, Wade, and Williams' (1986) ingroup identification scale was modified to produce ten items that gauged the extent to which participants identified with their religion (Islam or Christianity). An eight-point Likert scale (where 1 = not at all and 8 = all the time) was used where higher scores indicated higher ingroup identification. Cronbach's α for the measure at Time 4 was $\alpha = 0.91$.

2.2.4. Religious knowledge

A 14-item test was developed by the authors to specifically assess *actual* ingroup and outgroup religious knowledge, rather than perceived knowledge. The test consisted of seven factual, multiple-choice questions on Islam and seven on Christianity.

2.2.5. Outgroup friendship

An adapted version of Turner, Hewstone, and Voci's (2007) measure was used. Here two items asked how many outgroup friends do participants have and how much time do participants spend with outgroup members. An eight-point Likert scale (where 1 = none and 8 = most) was used where higher scores indicated higher outgroup friendship. Cronbach's α for the measure at Time 4 was $\alpha = 0.73$.

2.3. Procedure

When Muslim and Christian participants were in their first year of high-school (Time 1) they completed the pre-intervention measures. Eight months later, when this same cohort of students were in their second year of high school, they participated in either the nine week dual identity E-contact (DIEC) program or a nine week Control program. The allocation to either program was random based on the class to which they belonged. The DIEC program involved eight structured E-contact sessions, in which students received and discussed interfaith information in a specially-produced booklet and then four-person teams composed of a Christian dyad and a Muslim dyad synchronously discussed, via internet chat, ways that their religions (subgroup identity) could work together to develop energy saving, water saving and recycling solutions to improve the sustainability of the Australian environment (the superordinate or shared identity). For example, in the Energy Saving internet classroom DIEC students were asked the discuss the following in their four-person virtual groups:

> Friday is a particularly holy day for Muslims to pray at their Mosque. For Catholics, Sunday is their holy day when they attend Church. When Muslims and Catholics go to their Mosque or Church they often meet other family members and friends. If all these people drive their own cars to the Mosque or Church a lot of energy is being used and a lot of pollution is being produced. Discuss two ways that Muslims and Catholics could make their way to the Mosque or

Table 1
Means and standard deviations of intergroup bias at Time 1 and Time 4.

	Total		Muslim		Christian	
	DIEC *M* (SD)	Control *M* (SD)	DIEC *M* (SD)	Control *M* (SD)	DIEC *M* (SD)	Control *M* (SD)
Time 1	26.05 (22.38)	31.68 (26.42)	41.42 (18.41)	50.18 (16.03)	11.77 (15.14)	13.17 (21.33)
Time 4	15.74 (19.53)	24.59 (22.99)	21.13 (20.70)	35.70 (20.40)	10.73 (17.08)	13.48 (20.04)

Church in an energy-efficient way that would help reduce the amount of carbon omissions in order to protect their shared Australian environment.

The nine-week Control program did not involve dual identity recategorization or intergroup E-contact instead participants only received religious ingroup curricula and ingroup E-contact.

The final ninth session all students in the DIEC and Control programs presented a poster on the environmental solution they had developed in their four-person group over the previous eight weeks.

Two weeks following the final contact session of both programs, all Muslim and Christian students completed the same measures (Time 2) as in the pre-intervention, and they did so again six months later (Time 3), and finally twelve months later (Time 4), when they were in their third year of high school.

3. Results

3.1. Attrition analyses

To examine whether there was any effect of attrition on the study findings, attrition analyses were carried out specifically on the Muslim sample between Time 1 and Time 4, as the main attrition occurred within this group ($n = 24$). A series of ANOVAs employing Bonferroni adjustments revealed that these Muslim students were not different from the Muslim students who completed the program ($n = 92$) on the variables of interest measured at Time 1, including intergroup bias, $F(1, 115) = 0.27$, $p = 0.62$, intergroup anxiety, $F(1, 115) = 0.77$, $p = 0.38$, outgroup knowledge, $F(1, 115) = 0.98$, $p = 0.32$, outgroup friendships, $F(1, 115) = 0.03$, $p = 0.86$, and ingroup identification, $F(1, 115) = 0.48$, $p = 0.49$.

3.2. Hypothesis 1: intergroup bias, anxiety reduction and increase in outgroup knowledge

To test whether the DIEC program's effects remained at twelve-months post-intervention, we performed a series of $2 \times 2 \times 2$ (Condition [DIEC, Control] $\times$ Religion [Muslim, Christian] $\times$ Time [1,4]) repeated measures ANOVAs with Condition and Religious group as the between-subjects factors and Time on intergroup bias, intergroup anxiety, or outgroup knowledge as the within-subjects factor. Analyses revealed that the intervention had a sustained effect on intergroup bias reduction at Time 4 for DIEC participants compared to control participants, $F(1, 184) = 47.35$, $p < 0.001$, partial $\eta^2 = 0.21$. Despite the religion $\times$ condition interaction effect being non-significant, $F(1, 184) = 1.92$, $p = 0.17$, post hoc analyses revealed that Muslim participants in the DIEC condition sustained a greater decrease in intergroup bias at Time 4 when compared to the Muslim control group, $F(1, 89) = 5.82$, $p = 0.02$. A similar effect for the Christian participants was not found. Means and standard deviations of intergroup bias at Time 1 and Time 4 are reported in Table 1.

The DIEC program's effects on intergroup anxiety and outgroup knowledge that were present at two weeks post-intervention were not sustained at twelve-months post-intervention, and hence Hypothesis 1 is partially supported.

3.3. Hypothesis 2: moderators of intergroup bias reduction

Regression analyses were carried out to test whether ingroup identification and outgroup friendship moderated the effects of the DIEC intervention on intergroup bias reduction at twelve-months post-intervention. To achieve this, Condition was coded as either 0 (Control) or 1 (DIEC), this variable and the interaction term condition and moderator at Time 1 were entered into regression models to predict intergroup bias at Time 4 while controlling for the same variable at Time 1.

Evidence for a sustained moderation effect was found for outgroup friendship only (interaction, $\beta = -0.25$, $p = 0.029$). Further, a subset analysis by religion revealed that this finding only held for Muslim participants (interaction, $\beta = -0.51$, $p = 0.026$). The negative β coefficient indicates that participants with high scores on the outgroup friendship measure displayed decreased *intergroup bias* at twelve-months post-DIEC intervention. Thus Hypothesis 2 is partially supported.

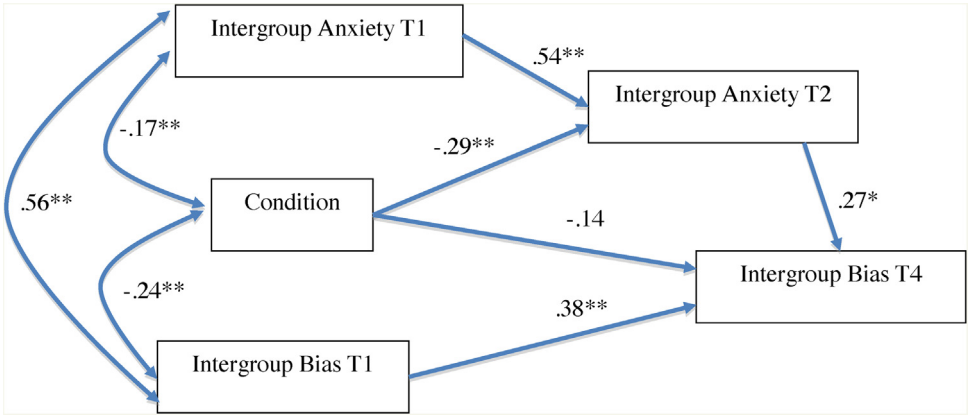

Fig. 1. Longitudinal mediation effects of intergroup anxiety on DIEC Muslims' intergroup bias reduction. T1 = Time 1; T2 = Time 2; T4 = Time 4. $^{*}p < 0.02$, $^{**}p < 0.01$.

3.4. Hypothesis 3: intergroup anxiety as a mediator of intergroup bias reduction

Pathway analyses were carried out to test whether intergroup anxiety mediated the effect of the DIEC intervention on intergroup bias reduction at twelve-months post-intervention. Mediation is found if Condition at Time 1 (pre-intervention) predicts a reduction in intergroup anxiety at Time 2 (two-weeks post-intervention), which in turn predicts a reduction in intergroup bias at Time 4 (twelve-months post-intervention). In our mediation models we controlled for intergroup bias and intergroup anxiety at Time 1 (for reasoning, see Binder et al., 2009; White & Abu-Rayya, 2012). Using Sobel's (1982) criteria, mediation was established if paths were significant from condition (DIEC vs Control) to intergroup anxiety and from anxiety to intergroup bias.[1]

Intergroup anxiety fulfilled the mediation conditions, supporting Hypothesis 3. The paths from condition to intergroup anxiety and from intergroup anxiety to intergroup bias were $\beta = -0.20$, $p = 0.001$, $\beta = 0.30$, $p = 0.001$, respectively, and the Sobel test was significant, $z = -2.89$, $p = 0.003$.

When the analyses were conducted separately for the Muslim and Christian subgroups, mediation was established only for Muslim students. As shown in Fig. 1, the paths from condition to intergroup anxiety and from intergroup anxiety to intergroup bias were, $\beta = -0.29$, $p = 0.001$, $\beta = 0.27$, $p = 0.004$, respectively, and the Sobel test was significant, $z = -3.06$, $p = 0.002$.

4. Discussion

The current main effect findings provide support for the twelve-month efficacy of the DIEC program in reducing intergroup bias. Additional religious subgroup analysis revealed that this sustained reduction was confined to Muslim DIEC students only. This finding supports and extends White and Abu-Rayya's (2012) six-month post-intervention results, further confirming the effectiveness of a dual identity recategorization strategy in reducing minority members' outgroup bias (Dovidio et al., 2001, 2009; González & Brown, 2006). Here the dual identity recategorization strategy encouraged and supported the DIEC Muslim minority to preserve their identity and distinctiveness as well as integrate the shared identity in the multiple sessions of E-contact. Importantly, this DIEC strategy continued to impact on their reduced levels of bias toward Christians at Time 4, twelve months after the completion of the program. Interestingly, the DIEC Christian majority also showed a reduction in intergroup bias at twelve-months post-intervention (Time 4), however the reduction was not significantly different to the already low levels of bias reported at Time1.

This significant finding in bias reduction for DIEC Muslims logically permeated the moderation and mediation findings as well. Outgroup friendship continued to moderate the relationship between DIEC program participation and intergroup bias reduction for Muslim students at twelve months. This finding further supports Pettigrew's (1998) notion of the importance of friendship development for improving intergroup relations. The nine-week DIEC program's encouragement of intergroup friendships within the mixed internet dyads continued to benefit Muslim students (by way of maintenance in bias reduction), despite the twelve months of post-intervention religious segregation between the two high-schools.

With regard to the moderation analyses, ingroup identification was not found to moderate the effect of intergroup bias reduction at twelve-months post-intervention, despite ingroup identification being a significant moderator at two-weeks post-intervention. This suggests that the maintenance of intergroup bias reduction as a result of the DIEC program, particularly for the Muslim minority, may gradually become independent of initial religious ingroup identification. That is,

[1] Further, the increase in outgroup knowledge that was found at two-weeks post-DIEC intervention did not predict a reduction in intergroup bias at twelve-months post-intervention.

by twelve months post-intervention the intergroup bias reduction benefits remain for minority individuals because now they seem to have developed a stronger sense of a 'shared' or 'dual' identity as a result of actively participating in the DIEC program.

The mediation analyses also produced a robust finding. In particular, intergroup anxiety continued to mediate the reduction in intergroup bias at twelve months post-intervention for Muslim DIEC students. In other words, intergroup anxiety continues to be a central mechanism through which the DIEC program reduces intergroup bias (White & Abu-Rayya, 2012). Importantly, this twelve-month finding extends the bias reduction literature significantly by showing that the immediate reduction in anxiety at two weeks post-DIEC intervention is sufficiently impactful to continue to contribute to intergroup bias reduction twelve months later, especially for the Muslim minority who appear to have benefitted more from the DIEC program as discussed previously.

Related to these successful twelve-month post-intervention findings, are several recommendations made by Aboud et al. (2012) in a recent systematic review of prejudice reduction interventions. They argue that in order to improve the overall effectiveness of prejudice reduction programs, researchers need to: include theory-driven interventions; assign participants to different levels of contact; tailor messages to the cognitive and emotional maturity of the participants; and scale programs through a school community. Interestingly, all of these recommendations were carefully integrated into the DIEC program. The DIEC program carefully integrated social identity and social contact theories, focussing on the processes and circumstances that best suited a positive change in intergroup attitudes. The DIEC program also valued and promoted the discussion of difference alongside the need for a cooperative and inclusive superordinate identity between participants from different status groups, Christian and Muslim school students, and thus aligns with a recent commentary offered by Abrams, Vasiljevic, and Wardrop (2012), who argued strongly that successful intergroup harmony could be achieved via 'a shared intergroup reality involving consensual understanding of differences between groups' (p. 426) in order to increase intergroup harmony in the real world of unequal status.

This experimental fieldwork study has confirmed the long-term effectiveness of the theory-driven DIEC harmony program in maintaining a reduction in affective intergroup bias at twelve months post-intervention for Muslim students. This robust intergroup bias reduction effect is maintained for twelve months post-completion of the DIEC program which integrated eight sessions of dual identity recategorization curricula and intergroup E-contact. Together, with previous research findings (White & Abu-Rayya, 2012), the current study provides strong and on-going evidence that school-based and theory-driven programs, such as the DIEC, can have a long-term impact in improving intergroup relations in real world settings.

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