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# A dual identity-electronic contact (DIEC) experiment promoting short- and long-term intergroup harmony

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ABSTRACT

Existing intergroup harmony programs have been short in length with little long-term evaluation of their true effectiveness. This experiment addresses this limitation through the development and evaluation of a new intergroup harmony program that integrates dual identity and contact tenets. At Time 1, 116 Australian Muslim and 104 Australian Christian first-year high school students attending religiously segregated schools completed pre-test measures of intergroup bias, intergroup anxiety, prejudice, and outgroup knowledge. Eight months later, in the next year of school, these students were allocated to either the nine-week dual identity-electronic or E-contact (DIEC) program that involved Muslim and Christians interacting via a synchronous internet chat tool, or the control condition where they completed the program *within* their religious groups with no recategorization. All participants completed the same pre-test measures at two weeks (Time 2) and 6-months (Time 3) post-program. At Time 2, for students in the DIEC condition, intergroup bias and intergroup anxiety decreased significantly, and outgroup knowledge increased significantly, compared to the control condition. In the case of intergroup bias, the decrease was maintained at Time 3. Moderation effects of ingroup identification and outgroup friendship, and mediation effects of intergroup anxiety were also found. These encouraging findings highlight that carefully designed E-contact programs can successfully promote intergroup harmony in both the short- and long-term.



## Introduction

After 80 years of social psychology researchers identifying and evaluating the underlying mechanisms, formation, and measurement of prejudice (Allport, 1954; Tajfel & Turner, 1979), research attention would benefit from turning to the more challenging and pressing need to develop and evaluate long-term interventions to promote harmony between minority and majority groups. Longitudinal studies have always been recognized as important vehicles for obtaining high-quality evidence about the causes of particular psychological attitudes and behaviors. Despite the fact that it can track critical periods, test models of causal relationships, and provide evidence on optimal times for interventions to promote positive development (Sanson & Smart, 2011), longitudinal prejudice reduction research has been surprisingly rare.

Several leading scholars in prejudice reduction recognize the importance of longitudinal studies as the key to future progress in the field. For example, Dovidio, Gaertner, and Saguy (2009, p. 16) have argued that "Future research would profit from studying the dynamic processes over time from the perspective of majority and minority group members… interventions emphasizing commonality and shared fate may be valuable for reframing relationships between the groups". Similarly, in their prejudice reduction review and recommendations paper, Paluck and Green (2009, p. 357) stated that "The strength of field experimentation rests not only in its ability to assess causal relationships but also its ability to assess whether an intervention's effects emerge and endure….". Finally, Pettigrew's (1998) pioneering advocacy for longitudinal prejudice reduction research is best exemplified in his reformulation of Allport's intergroup Contact theory.

A modest number of longitudinal intergroup research studies have been conducted. Sherif's (1966) Robber's Cave study was one of the first to show that only after repeated attempts to achieve the common goal, did the conflict between the groups eventually reduce. Other longitudinal studies examining contact and intergroup attitudes followed (Brown, Eller, Leeds, & Stace, 2007; Eller & Abrams, 2003, 2004; Hamilton & Bishop, 1976; Levin, van Laar, & Sidanius, 2003; Maras & Brown, 1996; Stephan & Rosenfield, 1978; Vezzali, Giovannini, & Capozza, 2010). Recently, Binder et al. (2009) conducted a large cross-national study that examined the relationship between contact and prejudice reduction involving European minority ($n = 512$) and majority ($n = 1{,}143$) groups. They found that amongst majority group members only, that contact (as measured by outgroup friendship) reduced prejudice (as measured by negative intergroup emotions and desire for social distance), and that prejudice reduced

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contact. Their study however, like other longitudinal research (see Levin et al., 2003; Vezzali et al., 2010), did not experimentally manipulate intergroup contact or the processes by which contact changes attitudes during data collection points to directly test for its causal nature, rather causal inferences relating to quality and quantity of contact were made on statistical grounds.

The current longitudinal fieldwork experiment will directly address these and other critical issues, and in so doing, advance the prejudice reduction literature in several important ways: i) develop a new long-term intervention that integrates dual identity re-categorization and contact tenets; ii) apply an experimental longitudinal design that evaluates both short-term (two-weeks post-program) and long-term (six-months post-program) effectiveness of the intervention; iii) examine the effectiveness of the intervention on *both* minority (Australian-Muslim) and majority (Australian Christian) students' intergroup anxiety, outgroup knowledge, outgroup bias and prejudice; and iv) identify the factors that moderate and mediate the effectiveness of the intervention on outgroup bias and prejudice. These innovative strategies are illuminated in the following sections.

### *Prejudice reduction: intergroup contact strategies*

Prejudice has been defined as "An antipathy… directed toward a group as a whole, or toward an individual because he [sic] is a member of that group" (Allport, 1954, p.9). Prejudice can be successfully reduced, according to Allport's (1954) seminal intergroup contact hypothesis, if four facilitating conditions are met: equal status among the groups, common goals to orient the contact, contact characterized by intergroup cooperation rather than competition, and the support of authorities to establish norms of acceptance. Pettigrew's (1998) insightful reformulation of the contact hypothesis involved a longitudinal model where participants can be provided with sufficient time to become friends. Time is therefore an additional and essential condition for optimal contact and the development of cross-group friends. Intergroup contact with friendship formation encourages positive affect and more accurate perceptions that can disconfirm negative stereotypes about the outgroup (Brown, 2010). Allport's hypothesis laid the foundation for proliferation of contact research best exemplified by Pettigrew and Tropp's (2006) meta-analysis of 515 studies, which revealed that greater contact is associated with lower levels of prejudice ($r = -.21$; Cohen's $d = -.43$). Interestingly, the negative correlation rose to $r = -.29$ when all four of Allport's facilitating conditions were satisfied. Taken together, if Allport and Pettigrew's conditions could all be successfully integrated into prejudice reduction or intergroup harmony interventions, then contact will be more effective in reducing the salience of the original ingroup–outgroup (racial/religious) category and negative intergroup schema.

Whilst intergroup contact has been held up as something of a panacea for prejudice, research has demonstrated that it is nonetheless reliant on *opportunity* for contact. Segregation by race, ethnicity and religion continue in many multicultural western countries making direct intergroup contact difficult (e.g., Turner, Hewstone, & Voci, 2007). This represents a considerable practical limitation of Allport's theory, particularly in segregated settings where interventions to reduce prejudice are most needed. Even where there are opportunities for contact, high levels of anxiety about direct contact may lead to awkward and counter-productive social encounters (Paolini, Hewstone, Cairns, & Voci, 2004; Stephan & Stephan, 1985).

Fortunately, significant developments in extended contact theory and research have demonstrated that contact can be beneficial in the absence of face-to-face interactions. For example, Wright, Aron, McLaughlin-Volpe, and Roppe (1997) showed that knowing ingroup members who have outgroup friends, that is, simply learning about the positive contact experiences of others, have lower levels of outgroup prejudice. In an application of this approach, Cameron, Rutland, and Brown (2007) had children read stories featuring in- and outgroup children in a friendship context (see also Turner, Hewstone, Voci, Paolini, & Christ, 2007 for a review). Recent research has demonstrated that extended contact has positive effects on intergroup attitude beyond the influence of direct contact. Specifically, Gómez, Tropp, and Fernández (2011) found that the extended contact effect on both attitudes and intergroup expectancies was mediated, for both majority (Spanish) and minority (immigrant) samples, by perceived ingroup norms, perceived outgroup norms, and greater inclusion of the other in the self. Moreover, Gómez et al. (2011) found that the effects of direct contact on improving intergroup attitudes were weaker for minority-group than majority-group members (see also Binder et al.'s, 2009 findings), whereas the effects of extended contact were equally strong for majority and minority groups. Similarly, Cameron, Rutland, Hossain, and Petley (2011) developed and tested an intervention with 6–11 years old children. They found that children in the intervention who read stories that portrayed friendships between ethnic majority and minority (Indian) children reported more positive attitudes toward minority children compared to the control condition, and these effects occurred independently of the participating children's direct, personal contact with the outgroup. These examples of extended contact have either involved reporting friends who have outgroup friends (Wright et al., 1997) or hearing/reading about intergroup contact (Cameron et al., 2007, 2011), *rather* than the active engagement of self, and such engagement, whilst retaining the non-face-to-face nature of the paradigm, may be necessary for the long-term effectiveness of contact strategies.

### *Electronic or E-contact: a new formulation*

In an advancement of the contact paradigm, the current study develops and evaluates a new paradigm, electronic or E-contact. E-contact can be defined as computer mediated contact involving an engagement of self in the intergroup relationship. Here ingroup and outgroup members never physically meet or see one another, but interact in a text-only fashion using synchronous internet chat tool. Thus the text-only or non-face-to-face nature of the contact ensures that it remains indirect, however the synchronous nature of the internet chat has the added advantage of the actual engagement of self in the immediate contact situation. The classroom environment is a perfect platform for E-contact. The classroom has long been shown to be an effective context for implementing cooperative learning programs and improving intergroup relations (see Aboud & Fenwick, 1999; Aronson & Patnoe, 1997; Houlette et al., 2004). In the new millennia however, many school, college and university classroom environments can utilize moderated internet technology such as virtual chat groups or face-to-face internet discussions using Skype. Such forms of internet communication are practical tools that can be used to cut across boundaries created by race, religious or gender segregation. Importantly, internet technology in the form of a synchronous chat tool provides the current study with a suitably novel and viable platform for E-contact between Muslim and Christian students attending segregated religious high-schools where direct contact is difficult. To date, the internet classroom has yet to be used as a platform to operationalize and facilitate contact and test prejudice reduction outcomes. The impact of E-contact on outgroup attitudes through the formation of inter-religious internet groups has yet to be empirically examined, despite Oskamp (2000) and others showing that active cooperative contact produces stronger and longer-lasting attitude change in stereotypes than does passive individual participation such as reading stories about intergroup contact. The current study will empirically examine E-contact via the synchronous internet classroom as an advancement of the contact paradigm.

### *Prejudice reduction: recategorization strategies*

In addition to contact, cognitive recategorization strategies have also been found to be effective in improving outgroup attitudes of

minority and majority group members (Dovidio, Gaertner, Saguy, & Halabi, 2008; Dovidio et al., 2009). Recategorization refers to a set of cognitive processes that are theorized to underpin prejudice reduction, in which ingroup and outgroup members recategorize themselves as an inclusive superordinate group in order to achieve harmonious relations. Much recategorization theory and research have focused on methods of recategorization based on the social concepts of assimilation and multiculturalism (Dovidio et al., 2009). The social policy of assimilation corresponds to the creation of a *common ingroup identity* (Gaertner & Dovidio, 2000) in which a single more inclusive group is created and subgroup identities are deemphasized. In contrast, the social policy of multiculturalism corresponds with a *dual identity* framework (Dovidio, Gaertner, Pearson, & Riek, 2005), which incorporates the simultaneous activation of the original subgroup identity and a common or superordinate identity.

Cross-national research has shown the effectiveness of the common ingroup and dual identity recategorization strategies in reducing bias for both minority and majority groups. For example, studies carried out in the United States and United Kingdom have found that for the majority (high status) group, intergroup contact reduced bias primarily through creating a stronger common ingroup identity, whereas for ethnic minorities, outgroup bias was effectively reduced via dual identity representations (Dovidio, Gaertner, Niemann, & Snider, 2001; González & Brown, 2006). In Portugal however, dual identity representation was found to be effective for reducing bias among European Portuguese majority-group children and a common ingroup identity was effective amongst African Portuguese minority group children (Guerra et al., 2010; Rebelo, Guerra, & Monteiro, 2005). Most recently, Cameron et al. (2011) have found that both common ingroup identity and dual identity strategies are equally effective for promoting positive outgroup attitudes amongst majority British school children. Taken together, this cross-national research demonstrates that both recategorization strategies have been effective in reducing outgroup bias in minority and majority groups. The following section will provide a rationale for focussing on the dual identity recategorization strategy in the current study.

### *A dual identity-E-contact (DIEC) framework: achieving a common goal is facilitated by a common identity*

Recategorization strategies should be integrated into intergroup harmony interventions to *complement* and *enhance* intergroup contact strategies. Previous studies (Cameron et al., 2011; Dovidio et al., 2001; González & Brown, 2006; Guerra et al., 2010; Houlette et al., 2004; Rebelo et al., 2005) have attempted this integration but have not provided sufficient detail on exactly how the *social* strengths of contact and the *cognitive* advantages of recategorization strategies work together. For example, an earlier study conducted by Houlette et al. (2004) evaluated the effectiveness of a four-week Green Circle school program that integrated a common ingroup identity recategorization strategy amongst a culturally diverse group of 830 first and second grade children. However there was no attempt to directly manipulate the type of contact or cooperation between minority (Black and Hispanic) and majority (White) children to achieve the superordinate goal of a common humanity. Rather, outgroup contact or choosing a cross race friend to play with, was the dependent variable in the study's design. As previously mentioned, Cameron et al. (2011) manipulated both extended contact and recategorization strategies through reading three stories over six sessions to a sample of majority (white-English) children ($M = 8$ years and 3.5 months). In some of the stories the superordinate (school) category membership of the characters was salient (common ingroup identity), whereas in other stories the protagonists' superordinate and subgroup identities were made salient (dual identity). Although equally effective, the interventions were only evaluated in relation to majority attitudes and measured one week later, i.e., in the short-term. To address these issues, the current study will experimentally manipulate *both* contact (outgroup vs ingroup contact) and dual identity recategorization (ingroup + superordinate vs ingroup identity only), and evaluate their combined effectiveness on both majority and minority attitudes in short- and long-term. In so doing, this study will highlight the extent to which 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.

Specifically, 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. Moreover, emphasizing that a dual identity improves outgroup attitudes beyond the specific intergroup contact situation because the association between the present outgroup members and the outgroups as a whole is maintained (González & Brown, 2003). Most importantly, a dual identity framework is useful in intergroup harmony interventions where *both* minority and majority subgroups are not only involved, but also value their identities as central to their functioning. Research leaders in the field such as Dovidio et al. (2009) have argued that although majorities may prefer a common ingroup identity to a dual identity recatgorization, as it maintains their superior status, 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 current study the dual identity recategorization strategy involves 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. Therefore the superordinate category used was an environmental category and the subgroup identities were their religions, this is in line with most of the recategorization literature where the categories do not have to be on the same dimension.

Specifically, the intervention program took place in one classroom session across eight weeks of a teaching semester. Here Muslim and Christian students used the newly formulated E-contact paradigm to exchange in a *cooperative way,* information about how their respective religious beliefs and practices could work together to develop a water-saving, energy saving or recycling solution to create an environmentally sustainable Australia — the *superordinate or common goal* (Allport, 1954; Fiske, 2000; Pettigrew & Tropp, 2006). For example, in the Water Saving classroom session students in the DIEC condition are asked to discuss the following amongst their four-person virtual group:

> "Water has important uses in Muslim and Christian religious practices. For example, Catholic babies are baptized in water that has been blessed by a priest. Similarly, Muslims purify themselves by performing *wudu*, which involves wiping their hands, face, hair, arms and feet with water before praying in each of their five daily prayers. As Muslim and Catholic students, what can you do at home to save water to help the Australian environment?"

Here, the recategorized dual identity involves students retaining their religious identity (Muslim or Christian) in addition to an environmentally sustainable Australian identity, the common identity. Allowing diversity with commonality is an essential element of any framework attempting to promote positive intergroup relations (Pedersen, Walker, & Wise, 2005). A common goal, a facilitating condition of the contact hypothesis, is more likely to be achieved with the recategorization of a common identity whilst maintaining

one's religious identity. This new integrated dual identity-electronic contact (DIEC) framework allows for a successful refashioning of a common national identity of *an environmentally sustainable future*. A reinvigorated sense of social inclusion via a DIEC framework can begin to refashion this common national identity and restore the mechanisms of intergroup trust and harmony.

### *A long-term program and a long-term evaluation — the DIEC intervention*

The vast majority of field tests of contact theory have employed cross-sectional designs in which the causal interpretability of the direction of effects remains more or less ambiguous (Brown et al., 2007; Pettigrew, 1998). For the rare number of longitudinal designs to examine the relationship between contact and prejudice there have also been problems. These studies have either examined short-term programs (one session) with short-term evaluations (three week) (see Guerra et al., 2010), short-term programs (three-day) with long-term evaluations (3-month follow-up) (see Hill & Augoustinos, 2001); long-term programs (four or six weeks) with short-term evaluations (immediate) (see Cameron et al., 2011; Houlette et al., 2004: Pedersen & Barlow, 2008), no program with long-term intervals between T1 and T2 testing (6-month or 10 week intervals) (see Binder et al., 2009; Vezzali et al., 2010, respectively), or no program with five data collection points between 1996 and 2000 (Levin et al., 2003). Therefore what is currently lacking in the prejudice reduction literature is a study that comprises *both* a long-term experimental program *and* a long-term evaluation. Such a study would provide the time needed for the realistic and effective development of cooperative intergroup contact and recategorization strategies, and align with Pettigrew's (1998) recommendation that longitudinal contact research would only further strengthen Allport's four facilitating conditions. Not only will the current study address this gap in the literature, it will also include a pre-and-post-test experimental design that allows for tracking of developmental changes of the same cohort of students from 13 to 15 years of age. This design feature, in addition to the inclusion of an experimental (DIEC) condition, and a control (no outgroup contact and no recategorization) condition, will clarify the degree of change in the *natural* levels of outgroup prejudice (via the class allocated to the control condition), as well as changes that have occurred due to the experimental intervention.

### *Moderating and mediating factors of the contact-prejudice relationship*

The degree of success of the DIEC intervention in reducing outgroup bias and prejudice may depend on several moderating and mediating factors. Ingroup identification – the degree to which group membership is subjectively important – has been found to be a potential moderator of the contact-prejudice relationship, in that high religious ingroup identifiers have been found to report high ingroup bias (see Cairns, Kenworthy, Campbell, & Hewstone, 2006). Importantly however, since the current DIEC intervention preserves each subgroup identity, alongside a more inclusive superordinate identity, high ingroup identifiers are thought to cope particularly well in such a contact situation (see Crisp & Beck, 2005), and in so doing, are likely to report positive outgroup feelings and attitudes.

Additionally, researchers have examined outgroup or cross-group friendship as a moderator of the contact-prejudice relationship (Levin et al., 2003; Paolini et al., 2004). Recently, Davies, Tropp, Aron, Pettigrew, and Wright (2011) conducted a meta-analysis involving 208 independent samples and reported that having outgroup friends is strongly associated with less intergroup prejudice (mean $r = -.236$), with the more reliable friendship and attitude measures yielding even stronger results. These research findings suggest that developing outgroup friendships allows for the building of an important self-engagement context where trust can be developed — trust being the cornerstone of positive outgroup feelings and attitudes.

Research has also shown that both cognitive and affective factors significantly mediate the contact-prejudice relationship. For example, intergroup anxiety – the fear that an individual may feel when anticipating or experiencing contact from another group (Stephan & Stephan, 1985) – has been identified as an affective mediator and outgroup knowledge – factual beliefs about the outgroup (Mallett, Wilson, & Gilbert, 2008; Pedersen et al., 2005) – as a cognitive mediator. Specifically, research has shown that positive contact is associated with reduced intergroup anxiety, which in turn is associated with reduced outgroup prejudice (Brown & Hewstone, 2005; Pettigrew & Tropp, 2008). In fact, Pettigrew and Tropp (2006) calculated that 21% of the effect of contact in reducing prejudice is mediated by contact which reduces intergroup anxiety. Interestingly, Binder et al. (2009) found that intergroup anxiety moderated the contact-prejudice effect for majority group members only. They explained this finding in relation to their minority sample being too heterogeneous, and that a future minority subgroup analysis may clarify the situation. Moreover, contact was not experimentally manipulated by Binder et al. (2009), thus the differing results for minorities and majorities may simply be a result of a self-report bias.

With regard to outgroup knowledge as a mediator there has been mixed success. For example, Pedersen et al. (2005) reviewed several research findings whereby challenging false beliefs about certain outgroups (i.e., asylum seekers, Indigenous Australians) significantly reduced the reporting of them, and in turn reduced prejudice towards these outgroups. Outgroup knowledge may counteract negative stereotypes, in that more similarities are learnt about the outgroup than first expected, which in turn reduces bias and prejudice towards them (Mallett et al., 2008). In contrast, Pettigrew and Tropp (2011) reviewed 17 studies and found that contact does enhance knowledge ($r = .22$) but that this enhanced knowledge has only a minor effect in reducing prejudice ($r = -.08$).

Taken together, the effectiveness of the DIEC intervention in reducing intergroup bias and prejudice would be moderated by the strength of ingroup identification and outgroup friendship, and mediated by intergroup anxiety and outgroup knowledge.

### *The current study: aims and hypotheses*

Importantly, the DIEC intervention ensures that Allport (1954) and Pettigrew's optimal conditions for contact are met: i) there are an equal number of Muslim and Christian students forming four-person internet groups; ii) a common goal to orient the E-contact occurs in the form of each group developing an environmental solution for a sustainable Australia to be presented in a poster format at the end of the school program; iii) E-contact occurs via a non-face-to-face synchronous internet text-tool where religious beliefs and environmental solutions are exchanged; iv) the support of school authorities (principals and teachers) to include the program into their curriculum; and v) a longitudinal design over eight one-hour classroom sessions where participants are provided with sufficient time to become friends. Together, the current research addresses several of the recommendations of leading scholars (Dovidio et al., 2009; Paluck & Green, 2009; Pettigrew, 1998) in prejudice reduction and intergroup harmony promotion on how the field can be advanced. Specifically, the study i) establishes much needed baseline differences in affective and cognitive factors including intergroup bias, intergroup anxiety, prejudice, and outgroup knowledge between Australian Muslim (religious minority) and Christian high school students (religious majority); ii) integrates dual identity re-categorization and E-contact (DIEC) tenets into classroom intervention; iii) applies an experimental longitudinal design that examines both short-term (two-week post-program) and long-term (six-month post-program) changes in outgroup measures; and iv) investigates how cognitive and affective factors moderate and

mediate the effects of the DIEC intervention on *both* Muslim and Christians' outgroup measures.

It is hypothesized that:

**H1.** Participants (Australian Muslim and Christian students) in the dual identity E-contact (DIEC) condition will report a significantly greater increase in positive outgroup measures (lower intergroup bias, intergroup anxiety, and prejudice, and higher outgroup knowledge and outgroup friendships) in the short-term (Time 2 or two-weeks post-program) and long-term (Time 3 or six-months post-program) compared to participants in the control condition.[1]

**H2.** Ingroup identification and outgroup friendship will moderate the effects of the intervention on participants' intergroup bias and prejudice.

**H3.** Intergroup anxiety and outgroup knowledge will mediate the intervention effects on participants' intergroup bias and prejudice.

## Method

### *Participants*

The initial sample at Time 1 (pre-intervention) of data collection comprised 220 participants from a total of four single-sex high schools, two Christian (one boy's and one girl's) and two Muslim (one boy's and one girl's), within the Sydney metropolitan area.

Of the original 220 students, 205 (93%) could be matched at Time 2 (two weeks post-program) and 201 (91%) could be matched at Time 3 (six-month post-program). Here, matched refers to the same students being present for all three data collection waves (Times 1, 2, and 3). The matching rates for the four groups were 83% (Muslim male), and 90% (Muslim female), 100% (Christian male), and 98% (Christian female). The final sample at Time 3 consisted of 201 participants matched across three testing points, with 98 students (54 Females) participating from the Muslim schools and 103 students (50 Females) from the Christian schools. For these matched participants, mean ages at pre-intervention were 12.47 years ($SD = 0.36$) for Muslim males, 12.44 years ($SD = 0.33$) for Muslim females, 12.81 years ($SD = 0.32$) for Christian males, and 12.76 years ($SD = 0.37$) for Christian females. Of the Muslim sample, 61% identified as Middle Eastern and 31% as Asian. English was the main language spoken at home by 37% of the sample. Of the Christian sample, 79% was identified as Anglo/European Australian. English was the main language spoken at home by 94% of the sample. Importantly, for all students, English was the main language spoken at school.

All participants took part on a voluntary basis, with permission given by the schools, parents and students.

### *Study design*

The present field-experimental study employed a single-cohort longitudinal approach across three time intervals: pre-intervention (Time 1), when students were six months into their first year of high school; two-week post-program (Time 2) when students were six months into their second year of high school; and six months post-program (Time 3) when students were twelve months into their second year of high school. A $2 \times 2 \times 3$ repeated measures design was adopted, with Condition [DIEC, Control], and Religion [Muslim, Christian] being the between-subjects factors, and Times [1, 2, 3] the repeated measures factor. The dependent variables or within-subjects factors were intergroup bias, intergroup anxiety, outgroup prejudice, outgroup knowledge and outgroup friendship.

### *Dependent variables/measures at Times 1, 2, and 3*

Reliabilities are given as internal consistencies (Cronbach's $\alpha$), where possible, for matched participants at Times 1, 2, and 3.

#### *Intergroup bias*

We created an Image Affect Scale (IAS) which consisted of 20 images, 10 related to the religious ingroup (Muslim or Christian) and 10 images related to the religious outgroup (Christian or Muslim), which served as a measure of intergroup bias. Participants were asked to rate as fast as possible how they feel about each image on a Likert-scale from 1 (*Extremely unpleasant*) to 8 (*Extremely pleasant*). For example, participants were asked to rate an image of a Mosque and a Church. Images were presented in a random order to participants. Cronbach's $\alpha$ reliability of the measure ranged from .83 to .88 for Muslims and .93 to .94 for Christians through Time 1 to Time 3. Intergroup bias score for each participant was calculated, after reversing negative items, through the subtraction of their total score on the ingroup part from their total score on the outgroup part of the measure.

#### *Intergroup anxiety*

Stephan and Stephan's (1985) intergroup anxiety scale has been used successfully in previous research (see Paolini et al., 2004) and was adapted for the current experiment. Participants were asked how they would feel if they were in a group made up entirely of members of their ingroup (Muslims or Christians); and how they would feel if they were the only member of their ingroup (Muslims or Christians) interacting with a group made up entirely of outgroup members (Christians or Muslims). Participants were asked to rate 8 feelings (happy, awkward, self-conscious, warm, cold, friendly, respect, and disgusted) for each of these two situations on a Likert-scale from 1 (*Not at all*) to 8 (*Extremely*). Cronbach's $\alpha$ reliability of the measure ranged from .76 to .83 for Muslims and .83 to .87 for Christians through Time 1 to Time 3. Intergroup anxiety score for each participant was calculated, after reversing negative items, through the subtraction of their total ingroup anxiety score from their total outgroup anxiety score.

#### *Prejudice*

The Cultural Issues Scale (CIS) (White, 2010) was used to measure outgroup prejudice, consisting of blatant and subtle forms of prejudice. The CIS consisted of 12 short events: six events related to blatant prejudice, for example, "A person shouted insults at a Muslim/Christian based on their Muslim/Christian appearance"; and other 6 related to subtle prejudice, for example, "Having a shop assistant check the bags of a Muslim/Christian customer whilst simply letting several Christian/Muslim customers pass by". Participants rated the seriousness of each event on a Likert-scale from 1 (*Not at all serious*) to 8 (*Extremely serious*). For example, if the 'shouted insults' item is rated as '1 = not serious' this indicates high blatant prejudice, if it is rated '8 = very serious' this indicates low blatant prejudice. Negative items were reversed scored to ensure that a high score indicated high prejudice. For the overall scale, scores ranged from 12 (Low prejudice) to 96 (High prejudice). Cronbach's $\alpha$ reliability of the overall prejudice measure ranged from .73 to .83 for Muslims and .80 to .85 for Christians through Time 1 to Time 3.

#### *Religious knowledge*

We developed a 14-item multiple-choice quiz that assessed both the ingroup and outgroup religious knowledge. The quiz consisted of seven questions referring to Islam and seven to Christianity,

[1] We did not hypothesize that the DIEC intervention would affect religious ingroup identification because the intervention makes use of religious identity salience in the process of the establishment of the dual identity. Relevant analyses, indeed, confirmed that the DIEC intervention did not have any short-term or long-term effects on the participants' religious ingroup identification. We should note that across the three testing points, Muslims reported a higher ingroup identification than Christians, $F(1, 195) = 24.75$, $p < .001$.

with four alternatives to choose from. For example, "Muslims fast during… (Lent; Ramadan; Ekadassi; Yom Kippur)" and "According to Christians, who is the Son of God? (Muhammad; Jesus; Moses; Krishna)".

*Outgroup friendship*

Turner, Hewstone, and Voci (2007) measure of quantity and quality of outgroup contact was adapted for the present study. The adapted measure consisted of two items of intergroup contact with outgroup friends outside school. In the first item, participants were asked "This year, how many of your friends outside school are [outgroup members, e.g. Muslim or Christian]?" Participants indicated their responses on a Likert-scale from 1 (*None of my friends*) to 8 (*Most of my friends*). In the second item they were asked "This year, how often have you spent time with [outgroup members, e.g. Muslim or Christian] outside school?" Participants indicated their answers on a Likert-scale from 1 (*Never*) to 8 (*Most of the time*). Cronbach's α reliability of the measure ranged from .57 to .73 for Muslims and .72 to .81 for Christians through Time 1 to Time 3.

*Ingroup identity*

We adapted Brown, Condor, Mathews, Wade, and Williams (1986) ingroup identification scale, consisted of 10 items gaging the extent to which participants identified with their religion (Islam or Christianity). Participants rated their agreement or disagreement with each item-statement (for instance "I consider my religion to be important") on a Likert-scale from 1 (*Not at all*) to 8 (*All the time*). Cronbach's α reliability of the measure ranged from .77 to .92 for Muslims and .86 to .91 for Christians through Time 1 to Time 3.

*Manipulation checks*

To determine whether DIEC participants actually experienced positive or cooperative intergroup contact with their outgroup team members across the eight internet sessions, participants were asked "Please rate today's internet interaction with your group on the following scale", where 1 = Extremely Unpleasant to 8 = Extremely Pleasant. Cronbach's α reliability of the eight ratings was .74 for the DIEC condition, and .74 for the Control condition. We expected that DIEC participants would indicate that they had a positive contact experience compared to the participants in the Control condition.

*Procedure*

*Time 1 — six-month pre-intervention phase*

Six months prior to the intervention phase, participants were instructed to complete a set of online questionnaires relating to intergroup bias, intergroup anxiety, prejudice, religious knowledge, outgroup friendship, ingroup identification, and demographics about sex, year of birth, religion, ethnicity, and language spoken at home. The intergroup bias scale was always presented first and the demographic questions last, however the order of the remaining measures was counterbalanced, with Muslim and Christian participants receiving different versions of the questionnaire set to control for ingroup–outgroup presentation effects. All of the measures were delivered online via Limesurvey and completed individually in the group setting of a school computer lab.

*Intervention phase*

Two classes (one boys and one girls, overall $n = 55$) from the Muslim schools and two classes (one boys and one girls, overall $n = 61$) from the Christian schools were assigned to the Dual Identity E-Contact (DIEC) classroom program. Equivalent classes (overall $n = 43$, $n = 42$, for Muslims and Christians, respectively) were assigned to the control classroom program. Both programs were nine classroom sessions in length, and required two pairs of same-sex students to use the internet to conduct a synchronous chat with two other same-sex students forming one team of four students. To ensure standardization of procedures and protocols two Anglo-Australian research assistants coordinated each classroom session in the Christian schools and two Muslim research assistants monitored each classroom session in the Muslim school.

*DIEC program*

At the beginning of the program, participants were each provided with a 40-page 'Harmony Program' student manual, which contained structured intergroup activities concerning Islam and Christianity, and their doctrines relating to respecting the environment. Each student manual was illustrated with color pictures of environmental themes and contained space for student note-taking from their team internet discussions.

The first two classroom sessions consisted of getting-to-know-you questions and friendship-building exercises. For example, "What do you like doing in your free time?", "What are some qualities you look for in a new friend?, "If you could invite anyone to dinner from the past or present, who would it be?", "What are two environmental problems facing Australia that are important to you?", "Name two things Muslim and Christian Australians have in common".

The next six sessions consisted of two sessions each on the topics of saving water, saving energy, and recycling. Each of these six sessions started with a class discussion section, where the lesson plan and information in the student manual was read out by various participants and the class leaders asked participants questions about the information. This was followed by 30–45 min of synchronous internet contact between the cross-religious group members. Groups were composed of two pairs, with each pair sitting at computers and discussing set questions from their student manual with the other pair in their group. This structured and monitored weekly discussion took place within a specially designed internet chat room.

The ninth session of the program consisted of a student poster presentation to the class by each pair of students. The poster represented the superordinate goal of the program in that it was the culmination of the eight E-contact sessions. The poster was decorated with pictures and addressed three questions related what student teams had learnt during the program: 1) Describe the environmental issue your group chose and why it is an important Australian environmental issue; 2) As Australia is a common home to both Christian and Muslim Australians, what possible solutions can you think of that will effectively address this environmental issue to protect our common home?; 3) How can Muslim and Christian religious perspectives be integrated to improve this aspect of the Australian environment?

*Control program*

The control program proceeded with the same structure as the DIEC program. However, each participant's 40-page 'Harmony Program' student manual only contained information on their ingroup religion, either Muslim or Christian, and the religious doctrines relating to respecting the environment. These manuals used the same images and environmental topics, however, all reference to the outgroup religion were removed. As with the DIEC condition, participants still participated in a synchronous internet chat session in two pairs, however, everyone in the group was from the same religion. The ninth session of the Control program also involved a student poster presentation however the three questions were from a religious ingroup perspective only.

*Time 2 vs Time 3 post-intervention phases*

Two weeks after the final contact session of the program (Time 2) and six months later (Time 3), participants completed the same set of questionnaires as at Time 1.

## Results

The results are presented in four sections. First, we report the pre-intervention (Time 1) differences between Muslim and Christian students on the measures administered in the study. Here, we compared the whole Muslim sample ($n=116$) with the whole Christian sample ($n=104$). The second section reports attrition analyses and manipulation checks concerning the cooperative or positive nature of E-contact in the DIEC condition. The third section reports the analysis of the effectiveness of the DIEC program over the control program in the short- and long-term (*Hypothesis 1*). The final section reports the moderation and mediation analyses (*Hypothesis 2 & Hypothesis 3*). For these analyses only matched participants with available data in Time 1 through to Time 3 ($n=98$ for Muslims and $n=103$ for Christians) were included.

### *Pre-intervention differences between Muslims and Christians*

To test differences between Muslims and Christians, MANOVA analyses were performed, with respondents' religion (Muslim or Christian) posited as the independent factor. This analysis revealed that scores for the dependent variables were significantly different between the two groups, $F(7, 212)=57.71$, $\Lambda=.35$, $p=.001$. Post-hoc univariate tests revealed that Muslims reported significantly higher intergroup bias, $F(1, 218)=169.44$, $p=.001$, intergroup anxiety, $F(1, 218)=10.11$, $p=.002$, blatant prejudice, $F(1, 218)=6.84$, $p=.01$, subtle prejudice, $F(1, 218)=9.90$, $p=.002$, total prejudice (blatant + subtle), $F(1, 218)=9.57$, $p=.002$, outgroup knowledge, $F(1, 218)=93.22$, $p=.001$, and ingroup identification, $F(1, 218)=27.34$, $p=.001$ than Christians. The two groups did not differ with regard to outgroup friendships reported. Refer to Table 1 for means and standard deviations for further details.

### *Attrition analyses and manipulation checks of the positive E-contact interaction*

#### *Attrition analyses*

As the main attrition occurred within the Muslim group ($n=15$) through Times 1 to 3, an attrition analysis was conducted to examine whether these Muslim students were different from the Muslim students who completed the program ($n=98$) on the variables measured at Time 1. An analysis of variance confirmed that the two groups were not significantly different across any of the measures: intergroup bias, $F(1, 111)=0.09$, $p=.76$, intergroup anxiety, $F(1, 111)=1.18$, $p=.28$, blatant prejudice, $F(1, 111)=0.41$, $p=.52$, subtle prejudice, $F(1, 111)=2.74$, $p=.10$, total prejudice, $F(1, 111)=1.47$, $p=.23$, outgroup knowledge, $F(1, 111)=0.84$, $p=.36$, outgroup friendships, $F(1, 111)=0.32$, $p=.57$, and ingroup identification, $F(1, 111)=0.06$, $p=.80$.

**Table 1**
Means and standard deviations of study variables at Time 1.

| | Muslim | | Christian | | |
|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | *Potential range* |
| Intergroup bias | 44.67 | 18.05 | 14.27 | 15.76 | 0–70 |
| Intergroup anxiety | 18.24 | 14.54 | 12.42 | 13.23 | 0–56 |
| Outgroup knowledge | 6.37 | 0.72 | 4.95 | 1.43 | 0–7 |
| Outgroup blatant prejudice | 15.93 | 9.17 | 12.58 | 8.34 | 6–48 |
| Outgroup subtle prejudice | 19.58 | 7.59 | 15.91 | 7.83 | 6–48 |
| Outgroup total prejudice | 35.51 | 15.24 | 28.49 | 15.26 | 12–96 |
| Outgroup friends | 6.37 | 1.98 | 5.61 | 2.24 | 2–16 |
| Ingroup identification | 75.25 | 7.44 | 69.28 | 10.14 | 10–80 |

*Note*. Intergroup bias/anxiety scores were calculated by subtracting outgroup bias/anxiety from ingroup bias/anxiety. Therefore the higher the score the greater the outgroup bias/anxiety relative to ingroup bias/anxiety.

#### *Manipulation checks*

Analyses confirmed, as expected, that not only did DIEC participants report a highly positive E-contact experience across the eight internet chat sessions ($M=6.06$, $SD=1.27$), their experience with outgroup members was more pleasant than Control participants' experience with ingroup members ($M=5.16$, $SD=1.36$), $t(199)=4.78$, $p=0.001$. Importantly, within the DIEC condition, there was no difference between Muslims and Christian's ratings on their internet contact experience.

### *Short- and long-term effects of the intervention on outgroup feelings and attitudes: testing H1*

To test H1 we performed 2×2×3 (Condition [DIEC, Control]× Religion [Muslim, Christian]×Time [1, 2, 3]) repeated measures ANOVAs with Condition and Religious group as the between-subjects factors and Time on all variables as the within-subjects factors. This was followed by contrast analyses comparing Time 2 vs. Time 1 and Time 3 vs. Time 1 to investigate whether the effects of the intervention were longitudinally maintained at Time 2 and Time 3 for each of the variables. It is important to note that the repeated measure design takes into account any pre-intervention differences between Christians and Muslims. Means and standard deviations for each measure for each group from Time 1 through to 3 are reported in Table 2.

#### *Main effects of time*

A reduction in *intergroup bias* across Time was found, $F(1.74, 342.08)=64.62$, $p=.001$, with this effect being maintained at T1 ($M=28.57$, $SD=24.21$) vs. T2 ($M=18.52$, $SD=18.79$), $F(1, 196)=104.04$, $p=.001$, and T1 vs. T3 ($M=19.77$, $SD=19.81$), $F(1, 196)=64.08$, $p=.001$. This was also true in the case of *intergroup anxiety*, $F(1.96, 380.38)=13.88$, $p=.001$, with the effect being maintained at T1 ($M=14.49$, $SD=14.43$) vs. T2 ($M=10.93$, $SD=12.57$), $F(1, 194)=16.99$, $p=.001$, and T1 vs. T3 ($M=10.99$, $SD=13.08$), $F(1, 194)=21.82$, $p=.001$. *Outgroup knowledge* was also found to increase with Time, $F(1.84, 360.17)=11.31$, $p=.001$. This main effect of Time was maintained at T1 ($M=5.65$, $SD=1.36$) vs. T2 ($M=6.08$, $SD=1.07$), $F(1, 196)=18.71$, $p=.001$, and T1 vs. T3 ($M=5.99$, $SD=1.04$), $F(1, 196)=10.74$, $p=.001$. No other short- or long-term main effects of Time were observed.

#### *Interaction effects of Time×Condition*

The analyses revealed that for *intergroup bias*, the Time×Condition interaction was significant, $F(1.75, 342.09)=3.75$, $p=.03$. Participants in the DIEC condition reported a greater reduction in intergroup bias between T1 ($M=26.25$, $SD=22.45$) vs. T2 ($M=14.46$, $SD=16.48$), $F(1, 196)=5.37$, $p=.02$, and T1 vs. T3 ($M=15.70$, $SD=18.38$), $F(1, 196)=4.33$, $p=.039$ than the Control condition ($M_1=31.74$, $SD_1=26.21$, $M_2=24.04$, $SD_2=20.37$, $M_3=25.28$, $SD_3=20.46$). Thus H1 is supported. Pair-wise comparisons revealed that the Muslim DIEC condition especially, reported a greater decrease in intergroup bias than the Muslim Control and the Christian DIEC and Control conditions between T1 vs. T2, $t(96)=2.65$, $p=.009$, $t(114)=7.10$, $p=.001$, $t(95)=7.05$, $p=.001$, and T1 vs. T3, $t(96)=2.01$, $p=.045$, $t(114)=5.35$, $p=.001$, $t(95)=5.77$, $p=.001$, respectively.[2] Refer to Fig. 1.

[2] Three-way interaction analyses between Condition×Religious group×Time were initially conducted with no significant findings for any of the measures. We must note however that three-way interactions are difficult to interpret and can conceal actual differences. Therefore pairwise comparisons were conducted instead to longitudinally examine Condition x Religious group differences.

**Table 2**
Means and standard deviations of study variables by religion, condition and time.

| | Muslim | | | | | | Christian | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DIEC | | | Control | | | DIEC | | | Control | | |
| | T1 | T2 | T3 | T1 | T2 | T3 | T1 | T2 | T3 | T1 | T2 | T3 |
| | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* |
| Intergroup bias | 41.51 (18.51) | 20.47 (18.44) | 23.04 (18.56) | 50.14 (15.71) | 36.40 (15.68) | 37.88 (15.68) | 12.49 (15.89) | 9.05 (12.32) | 8.98 (15.54) | 12.90 (20.91) | 11.40 (16.57) | 12.33 (16.36) |
| Intergroup anxiety | 16.05 (14.87) | 7.80 (11.16) | 11.26 (12.94) | 19.56 (13.50) | 17.63 (13.46) | 14.98 (15.45) | 10.39 (12.81) | 8.25 (8.84) | 8.35 (12.07) | 13.21 (15.52) | 12.07 (15.34) | 10.36 (11.37) |
| Blatant prejudice | 14.51 (8.85) | 13.33 (8.58) | 14.74 (9.70) | 17.51 (9.63) | 15.53 (8.17) | 18.05 (10.57) | 12.93 (8.50) | 12.28 (7.14) | 13.00 (7.88) | 12.29 (8.61) | 11.76 (7.82) | 12.07 (8.71) |
| Subtle prejudice | 18.02 (7.73) | 17.47 (7.63) | 16.65 (7.50) | 20.44 (7.23) | 21.40 (7.59) | 19.43 (8.95) | 16.16 (7.84) | 15.11 (7.41) | 16.63 (7.90) | 15.81 (8.28) | 14.88 (8.87) | 14.95 (8.38) |
| Total prejudice | 32.53 (15.49) | 30.80 (15.18) | 31.39 (16.28) | 37.95 (14.77) | 36.93 (14.95) | 37.48 (18.75) | 29.10 (15.25) | 27.39 (14.06) | 29.63 (14.92) | 28.10 (16.27) | 26.64 (16.21) | 27.02 (15.94) |
| Outgroup knowledge | 6.51 (0.57) | 6.75 (0.48) | 6.58 (0.71) | 6.30 (0.80) | 6.30 (0.77) | 6.28 (0.83) | 4.70 (1.42) | 5.79 (1.07) | 5.55 (1.08) | 5.24 (1.46) | 5.40 (1.33) | 5.55 (1.11) |
| Outgroup friends | 6.58 (1.96) | 7.40 (2.43) | 7.29 (2.21) | 5.95 (1.84) | 6.28 (2.21) | 6.53 (2.35) | 5.54 (2.34) | 5.64 (2.30) | 5.48 (2.14) | 6.26 (3.10) | 5.52 (1.85) | 5.48 (1.98) |
| Ingroup identification | 75.18 (7.56) | 75.98 (6.86) | 76.07 (7.81) | 75.42 (6.78) | 74.56 (8.67) | 73.00 (12.00) | 68.26 (10.27) | 67.97 (11.33) | 68.37 (11.96) | 69.48 (11.67) | 68.90 (11.30) | 68.90 (13.36) |

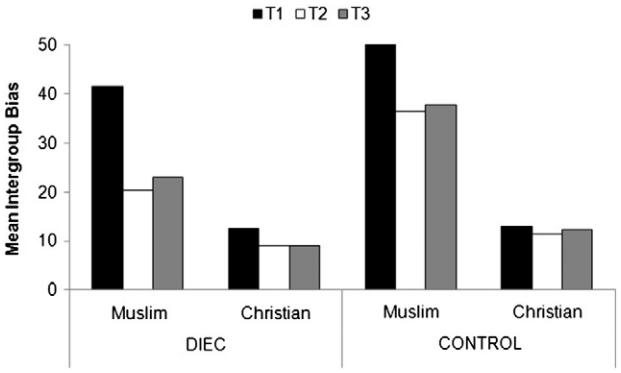


**Fig. 1.** Differences between religious groups and conditions in intergroup bias.

As for *Intergroup anxiety*, the Time × Condition interaction was also significant, $F(1.96,\ 380.38) = 3.60$, $p = .028$. Participants in the DIEC condition reported a greater decrease in intergroup anxiety only between T1 ($M = 13.07$, $SD = 14.05$) vs. T2 ($M = 8.03$, $SD = 9.96$), $F(1,\ 194) = 5.17$, $p = .02$, than the Control condition ($M_1 = 16.42$, $SD_1 = 14.79$, $M_2 = 14.88$, $SD_2 = 14.60$). Thus H1 is supported for the short-term only. The Muslim DIEC condition especially, reported a greater decrease in intergroup anxiety than the Muslim Control and the Christian DIEC and Control conditions between T1 vs. T2, $t(96) = 2.75$, $p = .007$, $t(114) = 2.89$, $p = .004$, $t(95) = 3.05$, $p = .003$, respectively. Refer to Fig. 2.

The DIEC intervention also had a significant effect on Muslims and Christians' *outgroup religious knowledge*. The Condition × Time interaction was significant, $F(1.83,\ 360.17) = 5.87$, $p = .004$, with participants in the DIEC condition showing a greater increase in outgroup knowledge only between T1 ($M = 5.56$, $SD = 1.42$) vs. T2 ($M = 6.24$, $SD = .96$) than the Control condition ($M_1 = 5.77$, $SD_1 = 1.28$, $M_2 = 5.85$, $SD_2 = 1.16$), $F(1,\ 196) = 10.88$, $p = .001$. Thus H1 is supported for the short-term only. The Christian DIEC condition especially, showed a greater increase in outgroup knowledge between T1 vs. T2 than the Christian Control condition and the Muslim DIEC and Control conditions, $t(101) = 4.04$, $p = .001$, $t(114) = 3.61$, $p = .001$, $t(102) = 4.42$, $p = .001$, respectively. Refer to Fig. 3.

The DIEC intervention did not have any short- or long-term effects on the participants' reporting of explicit blatant prejudice, subtle prejudice, total prejudice, and outgroup friendship.

### *Moderation and mediation of the longitudinal intervention effects: testing H2 and H3*

H2 proposed that ingroup identification and outgroup friendship would moderate the effects of the DIEC intervention on intergroup bias and prejudice. Because the previous analyses revealed that the

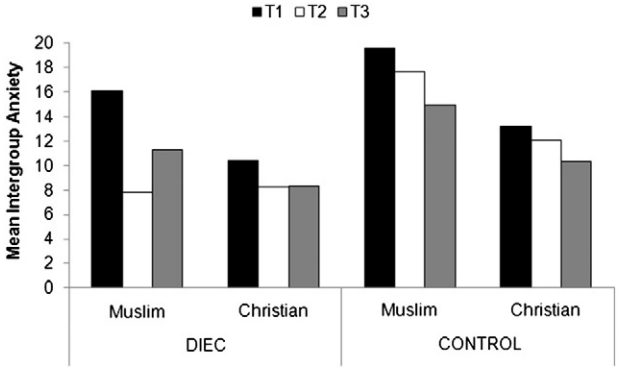


**Fig. 2.** Differences between religious groups and conditions in intergroup anxiety.

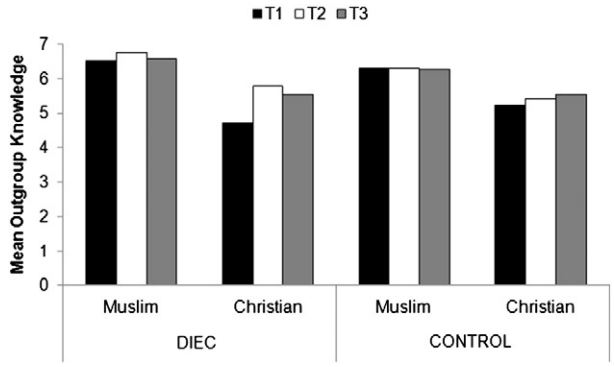


**Fig. 3.** Differences between religious groups and conditions in outgroup religious knowledge.

intervention was only effective in reducing intergroup bias in the short- and long-terms, moderation analyses were conducted only on this outcome variable. Condition was coded as either 0 (Control) or 1 (DIEC). This variable, together with the interaction term condition and moderator at T1, was entered in regression models to predict intergroup bias at T2 and T3, while controlling for the same variable at T1.

Analyses have confirmed H2 in relation to intergroup bias. Evidence for moderation of ingroup identification was found for the effect of the intervention on *intergroup bias* reduction at T2 and T3 (interaction, $\beta = -.71$, $p = .02$; $\beta = -.69$, $p = .03$, respectively). When looking at these relationships within each religion, the effects held true in the case of Muslim participants only (interaction, $\beta = -1.01$, $p = .01$ at T2; $\beta = -.87$, $p = .04$ at T3). The negative $\beta$ coefficients indicate that participants with high ingroup identification had decreased *intergroup bias* due to the intervention in the short- and long-terms.

Moderation effects of outgroup friendship were revealed only at T2 (interaction, $\beta = -.60$, $p = .006$). A subset analysis by religion revealed that this finding was only true for Muslims (interaction, $\beta = -.94$, $p = .02$). The negative $\beta$ coefficient indicates that participants with high scores on the outgroup friendship measure had decreased *intergroup bias* in the short-term due to the intervention.

H3 proposed that anxiety and outgroup knowledge would mediate the effects of the DIEC intervention on intergroup bias and prejudice. Given the absence of any effect of the intervention on prejudice, intergroup bias is the focus here. Specifically, we employed pathway analysis and wanted to test whether Condition at T1 predicts less intergroup anxiety (or more outgroup knowledge) at T2 that in turn predicts intergroup bias at T3. Following similar reasoning made in research on the effectiveness of intervention programs (see Binder et al., 2009), in the mediation models used we controlled for intergroup bias and intergroup anxiety (or outgroup knowledge) at T1. Mediation was established if paths from condition (DIEC vs Control) to intergroup anxiety (or outgroup knowledge) and from anxiety (or outgroup knowledge) to intergroup bias were significant (Sobel, 1982).

Results confirmed H3 in relation to intergroup bias only. Specifically, intergroup anxiety fulfilled the conditions for mediating the contact condition-intergroup bias relationship. The paths from condition to intergroup anxiety and from intergroup anxiety to intergroup bias were, $\beta = -.20$, $p = .001$, $\beta = .27$, $p = .001$, respectively, and the Sobel test was significant, $z = -3.07$, $p = .001$. When the analyses were conducted separately for the Muslim and Christian subgroups, mediation was established only for Muslim students. The paths from condition to intergroup anxiety and from intergroup anxiety to intergroup bias were, $\beta = -.31$, $p = .001$, $\beta = .27$, $p = .002$, respectively, and the Sobel test was significant, $z = -2.43$, $p = .007$. Refer to Fig. 4. There was no evidence that outgroup knowledge mediated the longitudinal intervention effect. The path from condition to outgroup knowledge was significant, $\beta = .22$, $p = .001$, but the path from outgroup knowledge to intergroup bias was not significant, $\beta = -.05$, $p = .26$. Similar patterns of results were obtained for the Muslim and Christian subgroups separately.

## Discussion

This unique DIEC intergroup harmony program, which integrated the social and cognitive strengths of *E-contact* and a *dual identity* re-categorization, respectively, is the first of its kind to successfully promote both short- and long-term positive outgroup feelings amongst its participants. Importantly, the content and long-term structure of the DIEC program carefully integrated all of Allport's optimal situational factors as well as Pettigrew's (1998) insightful reformulation to include sufficient time for cross-group friendships to develop. The DIEC classroom program also formulated the new E-contact paradigm through the use of a synchronous internet chat tool that encouraged active intergroup participation and the engagement of self in achieving the virtual groups' superordinate goal. Together, the promising findings from the DIEC program support and advance existing research (Binder et al., 2009; Cameron et al., 2011; Pettigrew & Tropp, 2006) of the effects of intergroup contact on promoting positive outgroup feelings and attitudes.

### *Pre-intervention differences between the Muslim minority and Christian majority*

At pre-intervention (Time 1) the Muslim sample reported significantly more intergroup bias, intergroup anxiety, and outgroup prejudice than the Christian sample. Such findings are consistent with previous prejudice research that showed that minority groups reported higher levels of prejudice than majority groups (McGrane & White, 2007), as possible evidence of minority group's coping

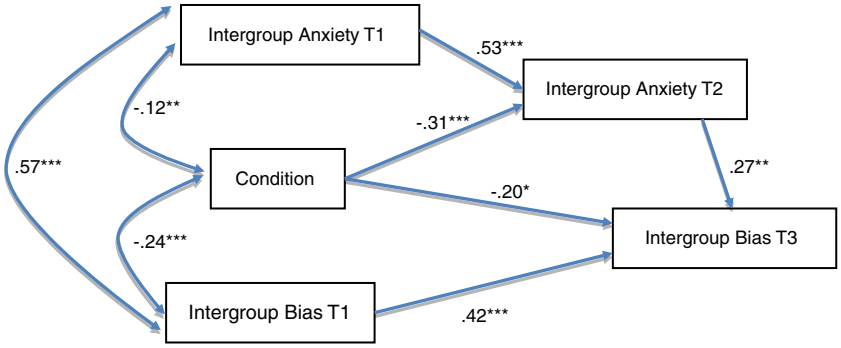


**Fig. 4.** Longitudinal mediation effects of intergroup anxiety on Muslim students' intergroup bias. T1 = Time 1; T2 = Time 2; T3 = Time 3. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

strategies to deal with their own stigmatization by the majority (Ashburn-Nardo, Knowles, & Monteith, 2003). Despite this possible explanation for the base-line differences, Muslims also reported higher religious ingroup identification than Christians, and greater knowledge of Christianity than Christian's reported knowledge of Islam. These base-line findings imply that at the group level, high outgroup knowledge and high religious identification do not result in more positive outgroup attitudes, especially in the case of minority group members.

*Short- and long-term effects on outgroup feelings and attitudes*

The main effect of Time, as shown by a reduction in intergroup bias and anxiety, and an increase in outgroup knowledge at six months post-program for the whole sample, is a significant finding as it implies that when control and intervention programs are simultaneously administered in the one school, there is an overall benefit for the sum of student participants at six months post-program. This may result from students in the DIEC and control conditions discussing their various programs with one another, and thus the benefits of a positive internet discussion with an outgroup generalize — a type of extended intergroup contact effect.

Having said this however, the Time x Condition interaction analyses revealed that the long-term reduction in intergroup bias was only present for DIEC participants. As far as other measures are concerned, DIEC participants reported a significantly greater decrease in intergroup bias, intergroup anxiety and a greater increase in outgroup knowledge than control participants in the short-term. These findings are supported by a plethora of existing research examining the short-term consequences of contact and/or recategorization strategies for improving outgroup attitudes (Cameron et al., 2011; Dovidio et al., 2008; Houlette et al., 2004; Wright et al., 1997). Importantly, unlike previous research, the current findings were obtained by experimentally manipulating E-contact and dual identity, rather than just relying on self-reports without any intervention. Therefore, this study's findings are less prone to self-presentation effects. Moreover, the finding of a long-term or six month post-program reduction in intergroup bias (see Fig. 1) is unique to the current study. The intergroup bias measure used here (Image Affective Scale: IAS) asked respondents to rate their pleasant or unpleasant feelings towards several ingroup and outgroup images, and therefore can be considered a measure of affective intergroup bias. This long-term affective improvement in intergroup bias is supported by several meta-analyses that have shown that contact is consistently more impactful on affective outgroup change than cognitive change (Pettigrew & Tropp, 2011).

Related to the above issue of being less impactful on cognitive changes, the DIEC intervention appeared to have no short-term or long-term effects on reducing outgroup prejudice. Outgroup prejudice was measured by the Cultural Issues Scale (CIS) — a scale that requires participants to cognitively evaluate the seriousness of prejudice-laden scenarios. Here both Muslim and Christians reported very low levels of outgroup prejudice at Time 1, leaving little room for improvement. Such low levels may have also been a result of social desirable responding, a common problem of explicit cognitive measures of prejudice. However, the manipulation-check data revealed that both DIEC Muslim and Christian participants found the eight E-contact sessions to be a pleasant experience on average, providing indirect support for the low levels of outgroup prejudice reported. Future DIEC research is advised to investigate more diverse groups that are likely to report a wider range of explicit blatant and subtle prejudice.

Interestingly, long-term and short-term intervention effects by religious groups were also found. The Muslim DIEC condition reported a greater decrease in intergroup bias than the Muslim Control and both Christian conditions between Time 1 vs. Time 2, and Time 1 vs. Time 3. The Muslim DIEC condition also reported a greater decrease in intergroup anxiety than the Muslim Control and both Christian conditions between Time 1 vs. Time 2. The current finding accords with previous research (Dovidio et al., 2001; Dovidio et al., 2009; González & Brown, 2006) showing that dual identity recategorization was more effective in reducing ethnic minorities' outgroup bias (than majority bias), because minorities are encouraged to preserve their identity and distinctiveness in the contact situation.

There were also positive outcomes for the majority Christian group. Specifically, the Christian DIEC condition reported a greater increase in religious outgroup knowledge than the Christian Control and both the Muslim conditions between Time 1 vs. Time 2. This increase however, is likely due to the religious content of the nine-session DIEC program where Christian students were introduced to Islamic contents probably for the first time. In addition, the Christian DIEC group reported the lowest level of outgroup knowledge at Time 1 and thus had the most room for improvement. These findings suggest that more short- and long-term benefits occurred to the minority than the majority group via contact, however, it must be noted that the minority group had the most room for improvement. They also suggest that the benefits can be differentiated by the group status. For minority members, their inter-group anxiety is likely to reduce in the short-term and their intergroup bias is likely to reduce in the short- and long-terms. For majority members, it seems their outgroup knowledge is likely to increase in the short-term. To further understand the differences in results across the minority and majority groups future research could compare a common ingroup identity intervention with the current dual identity intervention to further inform this field of research.

*Moderation and mediation of the longitudinal effects on intergroup bias*

Our findings confirmed that ingroup identification and outgroup friendship moderated the effects of the DIEC intervention on reducing intergroup bias. In the case of ingroup identification, moderation effects of the intervention were evident in the short-and long-terms, and in the case of outgroup friendship, moderation effects were only evident in the short-term. It seems that high ingroup identifiers and those with high scores on the outgroup friendship measure were most affected by the DIEC intervention which in turn resulted in a greater decrease in intergroup bias. When a subset analysis by religion was carried out similar moderation effects of ingroup identification and outgroup friendship were found for Muslim participants only.

These findings highlight the positive role ingroup religious identification can play in moderating the contact-prejudice relationship, particularly amongst minority members. As such, the findings confirm previous speculation (Crisp & Beck, 2005) that when participant's subgroup identities are preserved alongside a more inclusive superordinate identity, as in the current DIEC intervention, high ingroup identifiers tend to benefit more from such interventions in the short- and long-term. Our findings also accord with previous research supporting the positive effect outgroup friendship has on prejudice reduction (Davies et al., 2011). The longitudinal moderation effects examined here within the DIEC intervention imply however, that such effects are likely to occur in the short-term only, particularly for minority members.

Previous research has extensively shown that intergroup anxiety mediates the relationship between contact and prejudice (Brown & Hewstone, 2005; Pettigrew & Tropp, 2008). Much of this evidence was based on cross-sectional data. Our findings confirm such meditational effects using longitudinal data as the case with very few studies in the field (Binder et al., 2009). This evidence makes it apparent that the intergroup anxiety mediator plays a central role as an underlying mechanism through which the DIEC intervention reduces intergroup bias. It is noteworthy, however, that differences between Christian

and Muslim students regarding the mediation process were found. Subset analyses by religion revealed that mediation was only evident in the case of Muslims. It seems that DIEC Muslim students might lose their anxiety during their interaction with Christian students which in turn reduces their intergroup bias.

Our findings did not confirm any longitudinal mediation effects of outgroup knowledge. As such, they deviate from previous studies showing that challenging false beliefs about certain outgroups may reduce the reporting of them, and in turn may reduce prejudice towards these outgroups (Pedersen et al., 2005). It must be noted however, that the outgroup knowledge measure employed in the present study did not challenge outgroup views or stereotypes. For a more precise examination of the potential mediation effect of outgroup knowledge, future DIEC research is recommended to take advantage of a kind of stereotype-challenging measure of the outgroup.

### *Research implications*

Longitudinal field experimental research, such as the current DIEC program, has highlighted the importance of integrating a semester-long classroom intergroup harmony intervention into the high-school curriculum in order to promote positive intergroup relations. Clearly, students in the DIEC program, who were encouraged to actively and cooperatively interact with students from a religious outgroup reported less intergroup bias or more positive feelings towards this outgroup than students who received the control in-faith program. Moreover these positive outgroup feelings reported at Time 2, two-weeks post-program, were sustained at Time 3, six-months post-program, particularly for the Muslim DIEC participants. These encouraging findings were achieved using standard internet technology and without any students having to physically meet the outgroup students, which could be disruptive for school administration to organize and anxiety provoking for some students. Effectively utilizing synchronous internet technology to create E-contact between physically segregated religious school groups who would not normally have the opportunity to directly interact was significant achievement. These positive consequences for improved intergroup relations for DIEC students may have critically important flow-on effects to their friends and family. From a national and international perspective, there clearly needs to be continued support for, and implementation of, dual identity-E-contact (DIEC) research.

There are also important social policy implications of the current research findings. First, implementing an evidence-based approach, such as the current DIEC intervention, equips high-school students with the understanding, skills and strategies to challenge negative media portrayals of minority groups, increase awareness of environmental sustainability, and maximize their potential as our future civic citizens and policy-makers. Second, because this DIEC intervention and findings will be made available to researchers, educational authorities and Government agencies developing school curricula, it will assist them in making more informed decisions on effective classroom strategies to promote intergroup cooperation. From the moderation results it is advisable that such interventions as the DIEC program targets high ingroup identifiers and students with well-established outgroup friendships. Finally, in the spirit of earlier prejudice reduction classroom interventions (Aboud & Fenwick, 1999; Aronson & Patnoe, 1997; Houlette et al., 2004) the current study introduced and evaluated the new DIEC program that can be routinely incorporated into classroom practice by either teachers and/or researchers, with the ultimate goals of reinvigorating a sense of social inclusion, refashioning the national identity, and identifying the mechanisms to promote intergroup trust and harmony, both nationally and internationally.

### *Conclusion*

The current research study extends intergroup harmony research in important ways. First, it shows that dual identity recategorization combined with E-contact is effective in promoting intergroup harmony (Dovidio et al., 2005). Second, the study highlighted the benefits of a formulation of the new E-contact paradigm, clearly showing that when two religiously segregated groups (Muslims and Christian high-school students) are given an opportunity to engage themselves in a non-face-to-face synchronous internet discussion with one another, an increase in positive intergroup feelings and attitudes result. Third, the study highlighted important moderators and mediators that facilitated the longitudinal effectiveness of the DIEC intervention.

Long-term reductions in intergroup bias have the potential to stabilize social relations, improve the psychological well-being of both minority and majority groups, and increase national productivity. One validated way of achieving this goal is a carefully designed, theory-driven, internet classroom that offers a synchronous and effective context for researchers interested in encouraging groups attending ethnically and/or religiously segregated schools, colleges or universities, to interact in a cooperative and harmonious way.

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