Longitudinal Effects of Contact on Intergroup Relations: The Role of Majority and Minority Group Membership and Intergroup Emotions

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ABSTRACT

A field study was conducted in the Italian context to examine the longitudinal effects of contact on improved intergroup relations, and to test whether the effects were different for majority and minority group members. Furthermore, we examined the processes underlying contact effects. Participants were 68 Italian (majority) and 31 immigrant (minority) secondary school students, who completed a questionnaire at two time points. The results of regression analyses showed that, consistent with the contact hypothesis (Allport, 1954), quantity and quality of contact longitudinally improved outgroup evaluation and increased the attribution of positive stereotypes to the outgroup; the reverse paths were non-significant. Notably, whereas quantity of contact improved intergroup attitudes and stereotypes for both majority and minority participants, quality of contact had reliable effects only for the majority group. Intergroup anxiety and empathy mediated the longitudinal effects of quantity of contact for both Italians and immigrants; the cross-lagged effects of contact quality on criterion variables for the Italian group were mediated by intergroup empathy. The theoretical and practical implications of findings are discussed. Copyright © 2010 John Wiley & Sons, Ltd.

Key words: intergroup contact; intergroup anxiety; intergroup empathy; intergroup relations; longitudinal mediation

Research concerning the beneficial effects of intergroup contact on relations between groups has a long tradition in social psychology. The contact hypothesis (Allport, 1954) states that repeated encounters between ingroup and outgroup members can reduce prejudice if they happen under optimal conditions (equal status, cooperation, common goals, institutional support). Research over the past 50 years has provided impressive support for the idea that contact has the potential to ameliorate intergroup relations, even in absence of the optimal conditions proposed by Allport (Pettigrew & Tropp, 2006).

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Despite the extensive supportive evidence, the contact hypothesis has some limitations. First, since cross-sectional studies prevail in this field, it is not clear if the direction of causality is from contact to improved intergroup attitudes or, in contrast, from initial intergroup attitudes to subsequent contact (Pettigrew, 1998). Second, although the contact effects ideally should not differ between groups, there is evidence suggesting that intergroup contact is more effective for majority than for minority group members (Tropp & Pettigrew, 2005). Third, the contact hypothesis does not specify the processes involved in the improvement of intergroup relations (Brown & Hewstone, 2005).

We conducted a field study to address these limitations, by testing the contact hypothesis for both the majority (Italians) and the minority (immigrants) group. In particular, we aimed to examine the longitudinal effects of frequent and cooperative contact within Italian schools and to investigate whether the causal effects of contact differ for Italian and immigrant students. An additional goal was to test whether longitudinal contact effects are mediated by intergroup anxiety and empathy (Pettigrew & Tropp, 2008). This is the first time, to our knowledge, that the differential panel effects of both quantity and quality of contact for the majority and the minority group are examined simultaneously in a single study (see Binder et al., 2009, for a similar investigation). Furthermore, we are not aware of other studies testing the longitudinal mediation effects of both intergroup anxiety and intergroup empathy.

CONTACT REDUCING PREJUDICE OR PREJUDICE LIMITING CONTACT?

Pettigrew (1998) highlighted the causal sequence problem associated with many cross-sectional studies: although the basic form of the contact hypothesis (Allport, 1954) implies that the direction of causality is from contact to improved intergroup relations, it is also possible that people with more negative intergroup attitudes avoid contact. Pettigrew suggested that the use of longitudinal designs can overcome this problem (e.g. Bijleveld & van der Kamp, 1998; Cohen, Cohen, West, & Aiken, 2003).

The evidence supporting the idea that the path from contact to improved intergroup attitudes is stronger than the reverse path is mixed. Some panel studies found that contact reduces prejudice, but prejudice does not predict subsequent contact. For instance, Brown and colleagues (Brown, Eller, Leeds, & Stace, 2007; see also, e.g. Eller & Abrams, 2003, 2004; Stephan & Rosenfield, 1978) examined attitudes of British state secondary school students towards students of a private school, located in the same town. The results showed that the amount of contact longitudinally increased desired closeness to the outgroup and reduced negative outgroup evaluation and infrahumanization (see Leyens, Demoulin, Vaes, Gaunt, & Paladino, 2007), whereas the reverse causal paths were non-significant. However, there is also evidence of a bi-directional causal relation between contact and prejudice. Binder and colleagues (2009) examined more than 1,600 school students from three European countries (Germany, Belgium, England), belonging to both ethnic majorities and minorities. Findings revealed that quantity and quality of contact with outgroup friends longitudinally reduced prejudice (negative emotions, social distance). Furthermore, initial prejudice influenced subsequent contact (see also, e.g. Levin, van Laar, & Sidanuus, 2003). Our prediction is that the longitudinal path from contact to improved intergroup attitudes will be stronger than the reverse path (Pettigrew,
1997). Crucially, we expect the cross-lagged contact effects to be different for majority and minority group members. This will be the focus of the next section.

THE MODERATING ROLE OF MAJORITY/MINORITY GROUP MEMBERSHIP

Generally, contact studies focused on majority group members (see Pettigrew & Tropp, 2006; Shelton, 2000; Tropp & Pettigrew, 2005). However, there are reasons to believe that the different perspectives of majority and minority groups may influence the strength of contact effects (Hyers & Swim, 1998). For instance, whereas members of minorities are generally concerned with the detection of prejudiced attitudes from individuals belonging to majorities (Mendoza-Denton, Downey, Purdie, Davis, & Pietrzak, 2002; Shelton, 2003; Tropp, 2003), the latter are less likely to pay attention to status differences (Dovidio, Gaertner, & Saguy, 2009; Leach, Snider, & Iyer, 2002), unless prompted to do so in certain situations (Shelton, Richeson, & Vorauer, 2006; Vorauer, 2006). This attention to features defining the respective group memberships by minority group members may then negatively affect the contact experiences (Shelton & Richeson, 2006; Shelton, Richeson, & Salvatore, 2005) and weaken the potential for intergroup contact to diminish prejudice (Tropp, 2007). In line with this argument, there is evidence showing that contact effects differ depending on one’s group membership. The results of the extensive meta-analysis by Tropp and Pettigrew (2005), including studies examining both majorities and minorities, revealed that contact improved intergroup attitudes more for majority than for minority groups, even when considering only inter-racial and inter-ethnic contact.

On the basis of the reviewed evidence, we expect stronger effects of contact for the majority than for the minority group, but only with respect to the quality of contact. Since majority group members can generally rely on fewer contact experiences than those belonging to the minority group (Nesdale & Todd, 1998), they should base their intergroup attitudes not only on the scarce (i.e. not frequent) and thus less informative contact they had, but also on additional information provided by the quality of their encounters with the outgroup (see also Cernat, 2010). In contrast, the minority group should be more confident in using the repeated contact experiences with the majority group as a basis for intergroup evaluations, because information obtained during highly frequent contact can be considered especially reliable. A complementary argument was made by Tropp and Pettigrew (2005). The authors argued that, to the extent that intergroup attitudes displayed by minority group members are often biased by prejudice expectations (e.g. Tropp, 2003), individuals belonging to minorities, compared to majority members, may be less convinced that optimal contact conditions are present within the contact situation and should attribute them less importance. Thus, the presence of optimal contact conditions (indicative of a high contact quality) should favour the development of positive attitudes more among majority than minority group members. Accordingly, the results of their meta-analysis showed that, whereas greater intergroup contact (i.e. quantity of contact) was associated with lower prejudice for both majorities and minorities, optimal conditions strengthened the contact-reduced prejudice relationship only for the majority group. The present research extends these meta-analytic findings, based on experimental and cross-sectional studies, by examining the longitudinal nature of the effects of quantity and quality of contact for both the majority and the minority group. Our expectation is that the intergroup attitudes developed by individuals belonging to
the minority should be primarily a function of contact quantity, whereas the attitudes held by
the majority should depend on both quantity and quality of contact.

In addition, since we predicted that quantity of contact should have similar longitudinal
effects for both the majority and the minority, we expect that intergroup emotions (see
below) will account as mediators of the effects of contact quantity for both majority and
minority participants. In contrast, since quality of contact should have stronger panel
effects for the majority than for the minority, we predict longitudinal mediation of the
effects of contact quality only for the former group.

INTERGROUP EMOTIONS

Recently, scholars devoted a growing attention to the processes underlying contact effects.
In the present study, we focused on affective mediators, since research showed that affect,
more than cognition, is central to the improvement of intergroup relations (Brown &
Hewstone, 2005; Pettigrew & Tropp, 2008). In particular, we examined the role played by
intergroup anxiety (Stephan & Stephan, 1985) and intergroup empathy (Batson et al.,
1997). There is now substantial evidence, especially from cross-sectional studies, suggesting
that contact improves intergroup relations partly because it reduces feelings of anxiety and
increases empathy towards the outgroup (Pettigrew, 1997; Voci & Hewstone, 2003; see
also Pettigrew & Tropp, 2008). There is only one study, to our knowledge, that addressed
the potential role of anxiety in mediating the longitudinal contact effects. In the mentioned
work by Binder and colleagues (2009), intergroup anxiety mediated (but only for the
majority group) the cross-lagged effects of quantity and quality of contact with outgroup
friends on negative emotions and social distance. Furthermore, as far as we know, evidence
for the mediational role of empathy has not yet been addressed in longitudinal studies in the
contact literature.

In the present research, we test the hypothesis that contact longitudinally reduces intergroup
anxiety and increases intergroup empathy; these two emotions, in turn, should mediate the
cross-lagged effects of contact on improved intergroup attitudes and stereotypes.

THE CURRENT RESEARCH

The study was performed in mixed classes of secondary schools of a Northern Italian
region, where Italian and immigrant students had daily contact. In the region where the
study was carried out, immigrants represent about 12.7% of the category of secondary
school students. The most numerous immigrant communities in the region are the
Moroccan, Albanian and Rumenian (Caritas/Migrantes, 2009).

Participants were administered an identical questionnaire at two time points, which
measured: quantity and quality of contact, intergroup anxiety, intergroup empathy,
outgroup evaluation, outgroup stereotypes.

The hypotheses are the following:

Hypothesis 1. Quantity and quality of contact at Time 1 (T1) should predict outgroup
evaluation and stereotypes at Time 2 (T2). The reverse longitudinal paths should be
weaker or non-significant.
Hypothesis 2. We expect similar longitudinal effects of quantity of contact for the majority and the minority, but stronger cross-lagged effects of quality of contact for the former than for the latter group.

Hypothesis 3. Intergroup anxiety and empathy at T2 should mediate the effects of quantity of contact at T1 on outgroup evaluation and stereotypes at T2 for the whole sample.

Hypothesis 4. Intergroup emotions should account as longitudinal mediators of contact quality only for the majority group.

METHOD

Participants

The sample, including participants who answered the questionnaire both at T1 and at T2, consisted of 99 students (52% males, 48% females) from secondary schools (two Italian participants completing the questionnaire only at T1 were excluded from the analyses). Classes comprised both Italian and immigrant students; participation was voluntary. Age ranged from 15 to 20 years ($M = 16.34; SD = 1.24$). Sixty-eight participants were Italians (Mean age = 16.03 years; $SD = 1.09$); 31 participants belonged to ethnic minorities (Mean age = 17.03 years; $SD = 1.30$): 58.1% from Africa, 29% from Eastern Europe, 9.7% from Asia, 3.2% from Central America.

Procedure

Two identical questionnaires were administered during classes to students in the second part of the school year, with an interval of approximately 10 weeks between the two. The study was presented as an investigation concerning social relationships.

Prior to the first wave, school teachers collected participants’ personal data, in order to determine whether they belonged to the majority or to the minority group. Participants born in Italy and whose parents were born in Italy were assigned to the majority group; participants whose parents were born abroad were assigned to the minority group. Each participant received a questionnaire on the basis of his/her belonging to the majority or to the minority group. On the questionnaire, there were no labels indicating participants’ classification as majority or minority group members.

The questionnaire distributed to Italians was parallel to that distributed to immigrants. The only difference concerned the target-group: Italians were asked about their relations with ‘immigrants’; immigrants were asked about their relations with ‘Italians’.

Measures

Quantity of contact. The amount of contact was assessed with the following item: ‘With how many immigrants [Italians] do you frequently associate?’ A 5-step scale was used from none (1) to more than six (5).

1The other degrees were: 2 = one or two, 3 = three or four, 4 = five or six.
Quality of contact. Cooperative contact was measured by using four bipolar scales (e.g. competitive/cooperative, hostile/friendly; see Capozza, Vezzali, Trifiletti, Falvo, & Favara, 2010). On the 5-step scale, 1 was given to the negative and 5 to the positive pole; 3 was the neutral point. The four items were averaged in a single measure of cooperative contact (alpha = .85 at T1, alpha = .83 at T2).

Intergroup anxiety. Participants were asked to rate anxiety towards the outgroup by using eight items (e.g. anxious, worried; see Capozza et al., 2010). A 5-step scale was applied, anchored by not at all (1) and very much (5). The eight items were combined: higher scores reflect stronger intergroup anxiety (alpha was .89 at T1 and .86 at T2).

Intergroup empathy. Empathy was assessed with four items (see Vezzali, Capozza, & Falvo, 2009). Participants were asked to rate on a 5-step scale (1 = not at all, 5 = very much) to what degree, when thinking to outgroup members, they ‘feel in tune with them’; ‘feel they share their emotions’; ‘understand their feelings’; ‘share their joys and sorrows’. Items were aggregated in a composite measure: the higher the score, the stronger the empathy felt towards the outgroup (alpha was .83 at T1 and .80 and T2).

Outgroup evaluation. Participants rated outgroup members on five semantic differential scales (e.g. undesirable/desirable, negative/positive). On the 5-step scale, 1 was given to the negative and 5 to the positive pole; 3 was the neutral point. Ratings were averaged to form a reliable measure of outgroup evaluation (alpha = .90 at T1, alpha = .91 at T2).

Positive outgroup stereotypes. Outgroup members were evaluated on eight items (e.g. competent; lazy, reverse-scored; friendly; insensitive, reverse-scored). A 5-step scale was used, ranging from 1 (not at all) to 5 (very much). The eight items were combined in a single measure of outgroup stereotypes (alphas = .44 and .67 at T1 and T2, respectively). Higher scores reflect more positive stereotypes associated with the outgroup.

We conducted a confirmatory factor analysis with latent variables for the measures at both time points in order to test convergent and discriminant validity of the constructs examined (Jöreskog & Sörbom, 2004). Factor loadings were satisfactory (all ≥ .63, ps < .001), indicating convergent validity. With respect to discriminant validity, correlations between latent variables were either non-significant or different from 1, p < .05, suggesting that the constructs measured were indeed distinct.

RESULTS

Introductory analyses

Means and standard deviations of measures are presented in Table 1. Correlations between measures at the two time points are shown in Table 2. As can be noted, participants generally became acquainted with approximately three/four outgroup members. Contact was perceived as friendly and cooperative. Empathy was moderate, anxiety was lower than empathy. Participants attributed positive stereotypes to outgroup members and evaluated them positively (Table 1).

With respect to differences between majority and minority members (Table 1), we ran a series of 2 (Group of belonging: majority vs. minority) × 2 (Time of measurement: T1 vs. T2) ANOVAs with repeated measures on the last factor for all our variables. We found a main effect of Group of belonging for all measures, Fs(1, 97) ≥ 14.32, ps < .001, with the

2Although the alpha for the measure of outgroup stereotypes at T1 was low, it was sufficient at T2. Moreover, the correlation between T1 and T2, test-retest reliability, was significant, r = .42, p < .001.

Table 1. Means and standard deviations of measures.

<table>
<thead>
<tr>
<th>Measures</th>
<th>Total sample</th>
<th>Majority</th>
<th>Minority</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
<td>T2</td>
<td>T1</td>
</tr>
<tr>
<td>Quantity of contact</td>
<td>2.90 (1.62)</td>
<td>3.04 (1.60)</td>
<td>2.25 (1.34)</td>
</tr>
<tr>
<td>Quality of contact</td>
<td>3.93*** (0.88)</td>
<td>3.83*** (0.94)</td>
<td>3.87*** (0.86)</td>
</tr>
<tr>
<td>Intergroup anxiety</td>
<td>2.60*** (0.90)</td>
<td>2.62*** (0.88)</td>
<td>2.82 (0.86)</td>
</tr>
<tr>
<td>Intergroup empathy</td>
<td>2.80^ (1.02)</td>
<td>2.85 (0.96)</td>
<td>2.60*** (0.94)</td>
</tr>
<tr>
<td>Outgroup evaluation</td>
<td>3.20* (0.82)</td>
<td>3.24** (0.85)</td>
<td>3.04 (0.80)</td>
</tr>
<tr>
<td>Positive outgroup stereotypes</td>
<td>3.15** (0.47)</td>
<td>3.19** (0.57)</td>
<td>3.06 (0.43)</td>
</tr>
</tbody>
</table>

Note: Asterisks indicate that the means differ from the central point of the scale, which is 3.

\[^{\text{p < .06.}}\]
\[^{\text{p < .05.}}\]
\[^{\text{p < .001.}}\]
\[^{\text{p \leq .001.}}\]
exception of quality of contact, $F < 1$. No other main effects or interactions emerged, $F_{s} < 1.69$, ns. As can be noted in Table 1, in line with previous research (e.g. Nesdale & Todd, 1998), quantity of contact was higher for immigrants than for Italians. Immigrant students had lower levels of anxiety and higher levels of empathy, compared to Italian students. Italians evaluated immigrants neither positively nor negatively (scores for both outgroup evaluation and outgroup stereotypes did not differ from the central point of the scale at both time points), whereas the evaluation of Italians by immigrants was positive for both outgroup evaluation and stereotypes. Thus, intergroup relations were generally perceived as more positive by immigrants, compared to Italians.

**Longitudinal effects**

To test if contact at T1 influenced outgroup evaluation and stereotypes at T2, multiple regression was applied. For each outcome variable (outgroup evaluation, positive outgroup stereotypes), one regression was run. When outgroup evaluation at T2 was the criterion measure, predictors were: quantity and quality of contact at T1, outgroup evaluation at T1. Similarly, outgroup stereotypes at T2 were regressed on quantity and quality of contact at T1, outgroup stereotypes at T1.

As shown in Table 3, both quantity and quality of contact at T1 increased outgroup evaluation at T2. Furthermore, contact quantity at T1 increased the attribution of positive stereotypes to outgroup members at T2.

To test the reverse path, that is, from outgroup evaluation and stereotypes at T1 on contact at T2, a similar procedure was adopted: quantity and quality of contact at T2 were regressed on outgroup evaluation and stereotypes at T1, controlling for quantity and quality of contact at T1, respectively. As can be noted (Table 3), neither outgroup evaluation nor outgroup stereotypes at T1 were predictors of quantity and quality of contact at T2.

In conclusion, our first hypothesis received full support: contact had positive longitudinal effects on outgroup evaluation and stereotypes, whereas the opposite causal paths were non-significant.

**Moderation by group of belonging**

In the second hypothesis, we predicted cross-lagged contact effects of quantity of contact on outgroup evaluation and positive outgroup stereotypes for both majority and minority
members; furthermore, we expected stronger longitudinal effects of quality of contact for the majority group. To test this prediction, hierarchical regression was applied. In the first step, dummy-coded group of belonging (1 for majority, 0 for minority) was entered as predictor, together with centred quantity and quality of contact at T1. As before, outgroup evaluation and stereotypes at T1 were controlled for. In the second step, we entered the two-way interactions of group of belonging with quantity and quality of contact, respectively.

As shown in Table 4, the expected interaction between contact quality and group of belonging emerged with respect to both criterion variables. Simple slope analyses showed that, consistent with predictions, quality of contact increased outgroup evaluation only for the majority group, $b = .47$, $t(98) = 4.44$, $p < .001$; the effect was non-significant for the minority group, $b = .07$, $t(98) < 1$ (Figure 1). Similarly, contact quality increased the attribution of positive stereotypes to the outgroup only for majority group members, $b = .20$, $t(98) = 2.80$, $p < .01$, but not for minority group members, for whom there was a non-significant tendency in the opposite direction, $b = -.18$, $t(98) = 1.78$, $p < .08$ (Figure 2).\(^3\)

Also consistent with our predictions, quantity of contact did not interact with group of belonging, thus indicating that the effects of contact frequency did not vary as a function of the participants’ group (Table 4).

### Mediation of longitudinal contact effects

To test whether intergroup anxiety and empathy mediated the longitudinal effects of contact, multiple regression was applied. The procedure used was similar to that adopted by Binder

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\(^3\)Additional analyses revealed that group of belonging did not moderate the path from outgroup evaluation and outgroup stereotypes (T1) to contact (T2).
Table 4. Multiple regression evaluating the interactive effects of predictors (T1) and group of belonging on criterion variables (T2) (standardized regression coefficients).

<table>
<thead>
<tr>
<th>Predictors (T1)</th>
<th>Outgroup evaluation</th>
<th>Positive outgroup stereotypes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantity of contact</td>
<td>.18</td>
<td>.15</td>
</tr>
<tr>
<td>Quality of contact</td>
<td>.33***</td>
<td>.11</td>
</tr>
<tr>
<td>Group of belonging</td>
<td>−.18</td>
<td>−.14</td>
</tr>
<tr>
<td>Outgroup evaluation</td>
<td>.23*</td>
<td></td>
</tr>
<tr>
<td>Positive outgroup stereotypes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>.42</td>
<td>.28**</td>
</tr>
<tr>
<td>$F$</td>
<td>17.36***</td>
<td>7.63***</td>
</tr>
<tr>
<td>$df$</td>
<td>(4, 94)</td>
<td>(4, 94)</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantity of contact</td>
<td>.08</td>
<td>.06</td>
</tr>
<tr>
<td>Quality of contact</td>
<td>.07</td>
<td>−.27</td>
</tr>
<tr>
<td>Group of belonging</td>
<td>−.25*</td>
<td>−.20</td>
</tr>
<tr>
<td>Outgroup evaluation</td>
<td>.20</td>
<td></td>
</tr>
<tr>
<td>Positive outgroup stereotypes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>.46</td>
<td>.32</td>
</tr>
<tr>
<td>$F$</td>
<td>13.24***</td>
<td>7.21***</td>
</tr>
<tr>
<td>$df$</td>
<td>(6, 92)</td>
<td>(6, 92)</td>
</tr>
<tr>
<td>$F_{change}$</td>
<td>3.30*</td>
<td>5.06**</td>
</tr>
<tr>
<td>$df$</td>
<td>(2, 92)</td>
<td>(2, 92)</td>
</tr>
</tbody>
</table>

Note. Group of belonging is represented by a dummy variable (1 = majority group; 0 = minority group).

*p < .05.

**p < .01.

***p ≤ .001.

Figure 1. Outgroup evaluation as a function of quality of contact and group of belonging. High score, low score of quality of contact are intended at a standard deviation above and a standard deviation below the mean.
and colleagues (2009). First, we tested whether contact affected the hypothesized mediators. We regressed intergroup anxiety and empathy at T2 on contact quantity and quality at T1, controlling for anxiety and empathy at T1, respectively. As can be noted in Table 3, quantity of contact at T1 decreased intergroup anxiety and increased intergroup empathy at T2, over and above the effects of the respective emotions at T1. Furthermore, quality of contact at T1 enhanced intergroup empathy at T2, even controlling for empathy at T1 (Table 3). Thus, both intergroup anxiety and intergroup empathy fulfilled the conditions for mediation to be examined (Baron & Kenny, 1986).

To test longitudinal mediation, we ran one regression for each criterion variable: outgroup evaluation, positive outgroup stereotypes. Predictors were: quantity and quality of contact at T1, intergroup anxiety and empathy at T1, intergroup anxiety and empathy at T2. Furthermore, the effects of outgroup evaluation and positive outgroup stereotypes at T1 were controlled for.

As shown in Table 5, intergroup anxiety (T2) reduced and intergroup empathy (T2) increased outgroup evaluation (T2), whereas the direct causal paths from quantity and quality of contact were lowered (partial mediation). Furthermore, the direct path from quantity of contact (T1) to positive outgroup stereotypes (T2) was reduced to non-significance when the proposed mediators were entered in the regression equation (total mediation), whereas the negative effect of intergroup anxiety (T2) on positive outgroup stereotypes (T2) remained significant.

To test if the mediation effects were significant, bootstrapping analyses were conducted (Shrout & Bolger, 2002). With bootstrapping procedures, a 95% confidence interval is computed around the path from the predictor to the criterion variable through the mediator.

4Although quality of contact proved to have longitudinal effects only for the majority group (see Figures 1 and 2), we included the measure of contact quality in the mediation analyses conducted on the whole sample as a control variable and to parallel the other analyses performed in this article. Results are virtually identical when excluding quality of contact as predictor.
Mediation can be said to exist if zero is excluded from this interval, $p < .05$. We used the SPSS macros provided by Preacher and Hayes (2008), which allow testing mediation with bootstrapping procedures by considering multiple mediators. Results are presented in Table 6. As can be noted, both anxiety and empathy were reliable mediators of the effect of quantity of contact on outgroup evaluation. In addition, the indirect effects of contact quantity on positive outgroup stereotypes via reduced anxiety, and of quality of contact on improved outgroup evaluation via increased empathy, were significant (the latter effect, however, cannot be considered as an evidence of mediation for the whole sample, since, as shown in Figures 1 and 2, contact quality did not influence outcome variables for the minority group; Baron & Kenny, 1986).

Table 5. Multiple regression evaluating longitudinal mediation of contact effects by intergroup anxiety and intergroup empathy (standardized regression coefficients).

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Outgroup evaluation (T2)</th>
<th>Positive outgroup stereotypes (T2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity of contact (T1)</td>
<td>.19*</td>
<td>.14</td>
</tr>
<tr>
<td>Quality of contact (T1)</td>
<td>.22*</td>
<td>.05</td>
</tr>
<tr>
<td>Outgroup evaluation (T1)</td>
<td>.29***</td>
<td></td>
</tr>
<tr>
<td>Positive outgroup stereotypes (T1)</td>
<td></td>
<td>.25*</td>
</tr>
<tr>
<td>Intergroup anxiety (T1)</td>
<td></td>
<td>.12</td>
</tr>
<tr>
<td>Intergroup empathy (T1)</td>
<td>-.19</td>
<td>.00</td>
</tr>
<tr>
<td>Intergroup anxiety (T2)</td>
<td>-.23*</td>
<td>-.34*</td>
</tr>
<tr>
<td>Intergroup empathy (T2)</td>
<td>.32**</td>
<td>.11</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.49</td>
<td>.31</td>
</tr>
<tr>
<td>$F$</td>
<td>12.60***</td>
<td>5.74***</td>
</tr>
<tr>
<td>$df$</td>
<td>(7, 91)</td>
<td>(7, 91)</td>
</tr>
</tbody>
</table>

*p < .05.
**p < .01.
***p < .001.

Mediation can be said to exist if zero is excluded from this interval, $p < .05$. We used the SPSS macros provided by Preacher and Hayes (2008), which allow testing mediation with bootstrapping procedures by considering multiple mediators. Results are presented in Table 6. As can be noted, both anxiety and empathy were reliable mediators of the effect of quantity of contact on outgroup evaluation. In addition, the indirect effects of contact quantity on positive outgroup stereotypes via reduced anxiety, and of quality of contact on improved outgroup evaluation via increased empathy, were significant (the latter effect, however, cannot be considered as an evidence of mediation for the whole sample, since, as shown in Figures 1 and 2, contact quality did not influence outcome variables for the minority group; Baron & Kenny, 1986).

Table 6. Indirect effects of quantity and quality of contact on criterion variables through intergroup anxiety and intergroup empathy.

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Mean bootstrap</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estimate</td>
</tr>
<tr>
<td>Quantity of contact (T1) – anxiety (T2), empathy (T2) – outgroup evaluation (T2)</td>
<td>.13 (.04)</td>
</tr>
<tr>
<td>Quantity of contact (T1) – anxiety (T2) – outgroup evaluation (T2)</td>
<td>.07 (.03)</td>
</tr>
<tr>
<td>Quantity of contact (T1) – empathy (T2) – outgroup evaluation (T2)</td>
<td>.06 (.03)</td>
</tr>
<tr>
<td>Quality of contact (T1) – empathy (T2) – outgroup evaluation (T2)</td>
<td>.14 (.05)</td>
</tr>
<tr>
<td>Quantity of contact (T1) – anxiety (T2) – positive outgroup stereotypes (T2)</td>
<td>.05 (.02)</td>
</tr>
</tbody>
</table>

Note. Mean bootstrap estimates are based on 2,000 bootstrap samples; standard errors are reported in parentheses. BC 95% CI = bias-corrected 95% confidence interval.
In conclusion, consistent with our third hypothesis, we found longitudinal mediation effects for the measure of quantity of contact by both intergroup anxiety and intergroup empathy.5

**Longitudinal mediation for the majority group**

To the extent that the panel effects of quality of contact were reliable only for majority group members, we examined for this group whether intergroup emotions longitudinally mediated the effects of contact quality on outgroup evaluation and positive outgroup stereotypes (Hypothesis 4).

First, we tested if intergroup anxiety and empathy at T2 fulfilled the conditions for mediation to be tested. The two mediators were regressed on quality of contact at T1, controlling for intergroup anxiety and empathy at T1, respectively. The results showed that quality of contact longitudinally increased intergroup empathy, $\beta = .22, t(67) = 2.46, p < .05$; the effects of contact quality (T1) on intergroup anxiety (T2) were non-significant, $\beta = -.08, t(67) = .76, ns$. Thus, only intergroup empathy accounted as potential mediator of longitudinal contact effects for the majority group (Baron & Kenny, 1986).

We then tested whether the longitudinal effects of quality of contact were mediated by intergroup empathy. When contact quality at T1, intergroup empathy at T1 and intergroup empathy at T2 were entered in the regression equation, controlling for outgroup evaluation and positive outgroup stereotypes at T1, respectively, the main effect of intergroup empathy at T2 remained significant: $\beta = .28, t(67) = 2.06, p < .05$, for outgroup evaluation; $\beta = .35, t(67) = 2.22, p < .05$, for positive outgroup stereotypes. The direct path from contact quality (T1) to criterion variables (T2) was still significant: $\beta = .46, t(67) = 4.19, p < .001$, for outgroup evaluation; $\beta = .28, t(67) = 2.29, p < .05$, for positive outgroup stereotypes. Since 0 was excluded from the 95% confidence interval (ranging from .01 to .23, for outgroup evaluation, from .02 to .18, for positive outgroup stereotypes), calculated with bootstrapping procedures (Preacher & Hayes, 2008), partially consistent with our fourth hypothesis, longitudinal (partial) mediation by intergroup empathy was significant, for the majority group, for both outgroup evaluation and positive outgroup stereotypes, $p < .05$.6,7

**DISCUSSION**

We conducted a field study to test the effectiveness of contact at school in the Italian context by examining both majority (Italians) and minority (immigrants) group members.

5We interchanged the order of mediators and criterion variables to test whether outgroup evaluation and stereotypes longitudinally mediated the effects of contact on intergroup emotions. We found that outgroup evaluation accounted as longitudinal mediator of the effects of contact quantity and quality on intergroup empathy. This result is not inconsistent with our predictions, but merely suggests that, in line with previous research, intergroup attitudes can be mediators of improved intergroup relations (see Pettigrew, 1998; Voci & Hewstone, 2003).

6To the extent that the majority sample was slightly younger than the minority sample, we ran all the analyses presented in this article by including age as a control variable. Since the pattern of results did not change, for ease of presentation, we showed the analyses without including the age variable.

7Additional analyses did not find evidence for neither mediated moderation (for the relationship between quality of contact and DVs) nor for moderated mediation (concerning the relation between quantity of contact and criterion measures). Indeed, the paths from quantity and quality of contact to intergroup anxiety and empathy were not moderated by group of belonging. In addition, group of belonging was not a moderator between intergroup emotions and dependent variables (see Muller, Judd, & Yzerbyt, 2005).
In particular, we were interested in determining the causal relation between contact and improved intergroup relations and whether these effects differed as a function of one’s group of belonging. Furthermore, we aimed to examine the processes underlying the longitudinal effects of contact.

In line with our first hypothesis, the findings strongly support the basic form of the contact hypothesis (Allport, 1954), implying that the direction of causality runs from contact to better intergroup relations. In particular, quantity and quality of contact improved intergroup evaluations and stereotypes, whereas the opposite causal paths were non-significant. It is possible that, in addition to the longitudinal contact effects, the reverse causal relation turns out to be significant only in certain situations, such as when participants have the possibility, if desired, to avoid contact. Intergroup evaluations and stereotypes did not affect subsequent contact in this study probably because contact was difficult to avoid (outgroup members studied in the same school of participants). In situations where group members are more free to ‘choose’ whether to engage in intergroup encounters, both causal directions may operate.

In our second hypothesis, we anticipated differential effects of contact for the majority and the minority group, but only with reference to contact quality. As predicted, the effects of quantity of contact were not moderated by one’s group of belonging. Thus, quantity of contact was equally effective for both majority and minority group members. Furthermore, in line with expectations, we found that quality of contact improved outgroup evaluation and the attribution of positive stereotypes to outgroup members only for Italians. A possible explanation for the differential effects obtained for Italians and immigrants is that the former have, on average, much less frequent contact than the latter (see Table 1) and thus base their intergroup attitudes also on additional information, that is, on the qualitative nature of contact. In contrast, since the minority group has very frequent encounters with outgroup members, it can be more confident in the informative value of these repeated contact experiences, without necessarily relying also on their cooperative nature. Furthermore, the heightened attention to status differences and detection of prejudiced attitudes by individuals belonging to minorities (Dovidio et al., 2009; Shelton, 2003; Tropp, 2003) may worsen the perceived quality of contact (e.g. Shelton & Richeson, 2006) and limit its importance as a basis for intergroup judgments (see Tropp & Pettigrew, 2005). The fact that the moderation effects were limited to contact quality is in line with the evidence showing that quality of contact is fundamental for improving intergroup relations (Pettigrew, 1997; Pettigrew & Tropp, 2006). These results extend the existing literature by showing that the quality of contact is especially relevant for majority group members and may thus be responsible for the typically stronger contact effects found among majorities than among minorities (Tropp & Pettigrew, 2005).

It should be noted that in some studies (e.g. Binder et al., 2009) not only quality, but also quantity of contact was not effective for minority group members. This difference may depend on the measures used and/or by the context in which the research was carried out. Indeed, the setting of our study was perceived as very positive, in that also immigrant participants with less frequent contact reported high levels of contact quality (reliably above the neutral point of the scale). It is possible that in less cooperative settings quantity of contact has no effects at all (or even detrimental consequences) on intergroup relations for individuals belonging to the minority group.

We predicted in Hypothesis 3 that intergroup anxiety and empathy would mediate the longitudinal effects of quantity of contact for all participants. In line with expectations, mediation effects emerged for both variables. Consistent with previous cross-sectional
(Voci & Hewstone, 2003) and longitudinal (Binder et al., 2009) research, intergroup anxiety mediated the cross-lagged effects of contact quantity on both outgroup evaluation and stereotypes. Furthermore, in line with the large cross-sectional evidence (Brown & Hewstone, 2005; Pettigrew & Tropp, 2008), the longitudinal relation between quantity of contact and outgroup evaluation was mediated by intergroup empathy. Partially consistent with our fourth hypothesis, the cross-lagged effects of quality of contact on both outgroup evaluation and stereotypes were mediated, for the majority group, by intergroup empathy. This is the first time, to our knowledge, that the role of intergroup empathy as mediator of contact effects is found in a longitudinal study. Unexpectedly, intergroup anxiety was not a longitudinal mediator between contact quality and outcome variables. This result may depend on the specific setting examined. For instance, the frequency of contact at school may have been sufficient, for the Italian group, to reduce anxious feelings and expectations concerning the immigrant outgroup.

It is worth noting that mediation effects were found despite the conservative methodology used, in that we tested longitudinal mediation by considering as simultaneous predictors not only quantity and quality of contact at T1, controlling for criterion variables at T1, but by also including in each regression equation both intergroup anxiety and empathy at the two time points.

These findings provide strong support for the intergroup contact model (Brown & Hewstone, 2005), which places a special importance on emotions, and in particular on emotions of anxiety and empathy, for improving intergroup relations. However, most of the mediation effects obtained were partial. It is possible that, in addition to intergroup anxiety and empathy, additional mediating processes are operating. For instance, other emotions, such as trust, might play a role (Tam, Hewstone, Kenworthy, & Cairns, 2009).

It should be noted that we obtained cross-lagged contact effects with respect to two outcome measures, one more affect-based (outgroup evaluation) and one more cognition-based (outgroup stereotypes). To the extent that intergroup contact reflects more an affective than a cognitive experience (Paolini, Hewstone, & Cairns, 2007; Pettigrew, 1997, 1998) and that research has generally revealed stronger contact effects for affective than cognitive indicators of prejudice (Dovidio et al., 2004; Wolsko, Park, Judd, & Bachelor, 2003), we believe our results are valuable, especially when taking into account the conservative methodology used to investigate longitudinal effects. Although untested in the present study, it is likely that stronger contact effects would emerge for those participants perceiving outgroup members as highly typical of their group (Binder et al., 2009; Brown & Hewstone, 2005).

The present study has important practical implications. Interventions aimed at improving intergroup relations in schools should focus on both the frequency of contact between group members as well as on its friendly and cooperative nature. To the extent that members of groups in contact bring different perspective to the interaction (Dovidio et al., 2009), special attention should be placed on creating a pleasant atmosphere, especially from the point of view of majority members, who can generally rely on fewer contact experiences compared to those belonging to the minority group (Nesdale & Todd, 1998). Importantly, practitioners must implement programs based on intergroup emotions, and in particular on intergroup anxiety and empathy, which are fundamental for ameliorating relationships between majority and minority group members (Pettigrew & Tropp, 2008).

Our findings contribute to the contact literature in several ways. First, they address the causal sequence problem (Pettigrew, 1998), by providing convincing evidence that the path from contact to improved intergroup attitudes is stronger than the reverse path. Second,
they confirm that contact effects are stronger for the majority than for the minority group. Specifically, they show that intergroup attitudes are a function of both quantity and quality of contact for majorities, but mainly of quantity of contact for minorities. Third, they support the role of intergroup anxiety and empathy in mediating longitudinal contact effects.

This research has some limitations. First, the interval between the two time points consisted of only 10 weeks. It is possible that the results would differ when longer time periods are considered. Second, the sample size was limited, thus reducing not only the statistical power of analyses, but also the generalizability of our findings. In addition, on the part of the Italian group, we assessed attitudes towards the whole immigrant category, which included individuals with very different cultural origins (for a similar choice, see, e.g. Binder et al., 2009; Voci & Hewstone, 2003). Since attitudes towards various minorities (e.g. Rumenians, Moroccans) may be different, future studies should investigate analytically how the evaluations towards different ethnic groups are shaped by intergroup contact.

In conclusion, the present study demonstrates that contact is effective in ameliorating intergroup relations over time, and that quality of contact is especially relevant for the majority group. Furthermore, the improvement of intergroup attitudes and stereotypes is facilitated by decreased anxiety and increased empathy towards the outgroup. Future research should address these and further issues, by testing additional mediating processes and by assessing which factors moderate the longitudinal effects of contact for majority and for minority group members.

REFERENCES


