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Two degrees of separation: A longitudinal study of actual and perceived extended international contact

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Abstract

Extended contact theory proposes that knowledge of ingroup-outgroup friendships leads to reductions of intergroup bias by reducing ignorance about the outgroup and intergroup anxiety, and by increasing awareness of positive *outgroup* exemplars (e.g., observation of friendly behavior towards an ingroup member), and inclusion of other in the self. Over a one-year period we examined extended contact among home country friends of international students who had direct contact with British people through their study period in Britain. This provides a stringent test of extended contact theory, both due to the longitudinal design, and the inclusion of both actual and perceived naturally arising extended contact. As predicted by extended contact theory, increases in extended contact over time predicted all variables but intergroup anxiety. There was also some evidence for (weaker) reversed causal influence between prejudice and other variables. Importantly, the quality of contact experienced by the direct contact sample (international students) predicted all dependent measures in the matched extended contact sample in their home countries. Results are discussed in terms of the promise of extended contact theory for intergroup relations.

Keywords

international students, extended contact, longitudinal, mediators, ignorance

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The *extended contact hypothesis* (Wright, Aron, McLaughlin-Volpe & Ropp, 1997) holds that "knowledge that an in-group member has a close relationship with an out-group member can lead to more positive intergroup attitudes" (p. 74). This prejudice-reducing mechanism should be particularly relevant and promising when opportunities for direct contact are

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scarce, might be difficult to achieve, or might induce anxiety.

The present study, comprising two independent cohorts of international students and their home-based friends, examines the effects of extended contact on prejudice reduction in several unique ways. First, previous field studies of extended contact have often used school children (Cameron, Rutland, & Brown, 2007; Cameron, Rutland, Brown, & Douch, 2006; De Tezanos-Pinto, Bratt, & Brown, 2010; Liebkind & McAlister, 1999) with a focus on majority group attitudes to minority groups in general. The present research involves adults, and focuses on a specific target outgroup (British people). Second, most extended contact research is cross-sectional (e.g., Paolini, Hewstone, Cairns, & Voci, 2004; Tam, Hewstone, Kenworthy, & Cairns, 2009; Turner, Hewstone, & Voci, 2007; Turner, Hewstone, Voci, & Vonofakou, 2008), or longitudinal but over a limited time frame (Feddes, Noack, & Rutland, 2009). The present research examines effects over a one-year period. Third, it is unique in assessing extended contact both as perceived by home-based friends and the actual self-reported contact among the international students themselves (the "direct contact sample"). To our knowledge, alongside a cross-sectional study in Norwegian schools by De Tezanos-Pinto et al. (2010), the present research is the only research to provide a stringent test of extended contact theory by using self-reported quality of contact in one sample of people to predict effects on a related sample.

Extended contact

Wright et al. (1997) suggested that three mechanisms mediate the impact of extended contact on intergroup attitudes and behavior. First, observing one's ingroup friend (a *positive ingroup exemplar)* engaging in a positive relationship with an outgroup member reduces ignorance of, and anxiety about, interactions with, the outgroup. Second, observing *positive outgroup exemplars* (e.g., friendly behavior by an outgroup member towards an ingroup friend) should help to ameliorate potentially negative stereotypes of the outgroup. Finally, *inclusion of other in the self* (IOS; Aron, Aron & Smollan, 1992) can occur by extending the idea that "my friend's friend is my friend," (Aronson & Cope, 1968) to the sense that "my group member's friend's group is my friend." The present research examines how extended contact affects these three theoretical mediators. Wright et al. (1997) conducted two questionnaire-type survey studies, a laboratory-constructed group conflict study, and a minimal group experiment, both with (racial) majority and minority group participants in the USA. They found substantial overall support for their model.

To date, in contrast to well over 500 studies of direct contact (Pettigrew & Tropp, 2006), there are fewer than 20 published studies of the distinct effects of extended contact while controlling for direct contact. These show, for example, extended contact can have positive effects in school settings, with outgroups ranging from "foreigners" in general (Liebkind & McAlister, 1999) to refugees (Cameron et al., 2006, 2007) to disabled children and adults (Cameron & Rutland, 2006; Cameron et al., 2007). De Tezanos-Pinto et al. (2010) conducted a survey study of school students' contact with and attitudes towards ethnic minorities in Norway (aggregating direct contact with three different minority groups). Perceived norms of contact were partly affected by the proportion of ethnic minority members within each class. At the individual level, effects of extended contact on general attitudes were mediated by intergroup anxiety and ingroup norms.

In cross-sectional surveys in Northern Ireland, Tam et al. (2009) showed that extended contact related to outgroup trust, which, in turn, was associated with positive behavioral tendencies. Paolini et al. (2004) revealed that both direct and extended positive contact were related to lower levels of anxiety and prejudice and to increased perceived outgroup variability. Turner et al. (2007) found that white–South Asian extended contact was associated with reduced anxiety, increased self-disclosure, and more positive outgroup attitudes. Similarly, Turner et al. (2008) examined all of Wright et al.'s (1997) proposed mediators,

except for the mediator of *reducing ignorance*, and found them to be significant.

Combining extended contact theory and crossed-categorization, Eller, Abrams, Viki, and Imara (2007) showed how extended contact can improve students' views of the police. Gomez and Huici (2008) showed that extended contact improved outgroup and meta-stereotype evaluations relative to a no-contact condition, particularly when contact was supported by an authority figure.

Taken together, prior extended contact research encompasses laboratory and field experiments and surveys involving participants in the US, UK, Norway, Finland, Germany, and Spain. It suggests that extended contact may improve intergroup relations among social categories, such as racial, ethnic, religious, and national groups, as well as the public and police and non-disabled vs. disabled children. The evidence is also shows that the extended contact–reduced intergroup bias relationship can be mediated by IOS, intergroup anxiety, self-disclosure, and norms.

However, most prior evidence is cross-sectional, providing limited scope to examine temporal processes and causality. Additionally, prior research has been conducted in single cultures and has considered only effects on majority members in relation to a minority, not allowing for an assessment of the cross-cultural or wider generalizability and applicability of the evidence. We are aware of one only published longitudinal study that examined both direct and extended contact, and that involved 76 German and 75 Turkish children in German elementary schools (Feddes et al., 2009). Over a period of 7 months direct intergroup friendship predicted more positive outgroup evaluations, but only among majority group (i.e., German) children. There were no effects of extended contact for either group.

Finally, much cross-sectional survey research has examined *perceptions of extended contact*. Very little cross-sectional and no prior longitudinal research has examined the predictive effects both of the *actual contact experience* of a directly involved group member and of the non-involved friend's perceptions outside of the direct contact situation (*actual* and *perceived* extended contact, respectively).

Prior research on international students

Research on international students has increased dramatically over the last decade. According to Web of Science, there were 228 studies in the 50-year period from 1950 to 2000, and that number has been exceeded (264) in the 8 years from 2001 to 2008, including 194 studies in psychology alone (Ramos, 2009). Most of that research has been conducted in 'countries of the new world' such as the USA and Canada, although there is also some within the UK (Bailey, 2005; Pelletier, Leonard, & Morley, 2003; Ramos, 2009).

In social psychological research, Schmitt, Spears, and Branscombe (2003) found that international students in the US identified more strongly as international students if they thought US society was prejudiced. Stangor, Jonas, Stroebe, and Hewstone's (1996) longitudinal study of US college students who spent one year studying in Germany or the UK revealed that stereotypes and attitudes toward host country members were positively affected by levels of contact with those members, and these changes persisted 9 months after they returned home.

Although direct contact might generally have positive effects, longitudinal research of ERASMUS[1] students in the UK and continental Europe (Sigalas, 2010) suggests that students who study abroad often socialize with other non-host country Europeans rather than with host-country students. There is likely to be substantial variability in the amount of direct contact these students have, and it is highly likely that they will report their experiences to friends back in their home countries, with whom they maintain regular contact.

The present research

International students make up 13% of all students in UK Higher Education (Higher Education Statistics Agency, 2004; The Council for International Education [UKCOSA], 2004). Agencies such as the British Council assume that such contact helps to promote positive relationships with foreign countries via improving

the reputation and awareness of the UK among peers of the students back in their home countries. However, this (extended contact) assumption has never actually been tested directly. The present study is the first to investigate how extended contact via international students in the UK impacts the perceptions, feelings and attitudes of their friends in their home countries.

There were two sets of participants in the present research. The "direct contact" sample comprised international students pursuing a one-year postgraduate degree at a UK Higher Education institution. They were surveyed before they left their home countries and a boost sample was obtained shortly after the academic year had commenced[2]. These Baseline sample participants were surveyed again at the end of their sojourn in Britain (End of Sojourn), and again 3–4 months after they had returned to their home countries (Post-Sojourn).

These participants were asked to provide the contact details of a close friend or family member who had never lived in Britain and who was not going to go to Britain during the course of the study. The nominated persons comprised the sample of "extended contact participants". The contact between "direct" and "extended" contact participants took place by means of email and telephone communication throughout the year. During this contact among friends, extended contact participants learned about direct contact participants' interactions with the British.

The extended contact sample was surveyed at Baseline and Post-Sojourn time points, and effects on this sample are the primary focus of the present article. (Analyses focusing on the direct contact sample are elaborated elsewhere; Eller, Abrams, & Zimmermann, 2010.) Thus, uniquely, the present design allowed us to examine whether extended contact participants' views about Britain and the British would change *as a function of* direct contact participants' sojourn and experiences in the UK. In order to control for extraneous effects due to the particular cohort of participants, we included two independent cohorts in consecutive years.

Analyses and hypotheses

The main analyses are divided into two parts. First, within the extended contact sample, we examine how change (over 1 year) in perceived extended contact impacts on theoretical mediating and outcome variables. Extended contact theory predicts that positive increases in extended contact will predict lower ignorance about the outgroup, lower intergroup anxiety, more positive perceived outgroup behavior, greater extended IOS, and more positive general outgroup evaluation. Further, changes in (perceived) ignorance, anxiety, perceived outgroup behavior, and IOS should predict general outgroup evaluation. We also test whether these longitudinal relationships among dependent variables are uni- or bidirectional.

Second, we examine cross-sample effects of extended contact at the end of the direct contact participants' sojourn in the UK (End of Sojourn) when their relationships with British people should be most firmly established. We examine how self-reported quality of contact among the international students ("actual extended contact") affects dependent variables among their matched extended contact participants several months later. We hypothesize that higher quality of direct contact will predict lower self-perceived ignorance about the outgroup, lower intergroup anxiety, more positive perceived outgroup behavior, greater extended IOS, and more positive general outgroup evaluation in the extended contact sample.

Method

Participants

Direct contact participants These were international students from 30 countries world-wide, who spent 1 year at a UK university to complete a postgraduate degree. Two cohorts were sampled in successive academic years. At Baseline/Boost the sample numbers were $N = 351/480$ in the first cohort and $N = 239/280$ in the second. End of Sojourn *N*s for the two cohorts were 247 and 332, respectively. Males comprised 43 per cent of the first cohort and 39 per cent of the second cohort.

Mean ages were 26.5 and 26.9 years (*SD* = 4.06, 4.22) in the two cohorts, respectively.

Extended contact participants These were nominated friends of international students who remained in the home country throughout the duration of the study. The Baseline sample numbers were *N* = 165 and 109 and the Post-Sojourn numbers were *N* = 64 and 70 in the two cohorts, respectively. In the first cohort, 40% were male, and in the second cohort, 47% were male. Mean ages were 26.6 and 27.2 (*SD* = 4.4, 4.75) respectively. The discrepancy between the *N*s of this matched dataset and that of Post-Sojourn extended contact participants as a whole is mainly due to missing or inaccurate matching information provided by participants.

Measures

Direct contact participants We asked direct contact participants whether their contact with British people was voluntary, pleasant, intimate, cooperative, on an equal status basis (Islam & Hewstone, 1993), personally important to the participant (Van Dick et al., 2004), easy or difficult to engage in (*very difficult—very easy*), and whether participants would count any British people among their friends (*not at all—definitely*; cf. Pettigrew, 1998). Responses were scored on 7-point Likert-type scales (1 = *not at all*, 7 = *very much*), with higher scores indicating qualitatively higher contact. Given the diversity of the measure of quality of contact, we ran principal components analysis. All eight items loaded on one factor, which explained 55.5% of the variance. Cronbach's alphas for this scale for Baseline and End of Sojourn were .88 and .88 for Cohort 1 and .86 and .87 for Cohort 2.

Extended contact participants *Extended contact* was assessed with an open-ended measure of the number of British friends that the extended contact participants estimated their (international student) friend had.[3] A control variable about direct contact asked: "If you currently have any contact with British people, would you count any of these people among your friends?" (1 = not at all, 7 = definitely). Theoretically, extended contact should produce effects on all other measures.

Self-perceived ignorance about the outgroup was measured by asking participants how much they knew about Britain and British people. Responses were reverse-scored on a 7-point scale (1 = *nothing*, 7 = *very much*), such that higher scores indicated higher self-perceived ignorance. Although this was a one-item measure, it was normally distributed. A separate study (*N* = 39) with a comparable sample (Eller & Abrams, 2002) showed that self-perceived ignorance correlated highly and negatively with accuracy of answers to a battery of questions assessing knowledge of a range of aspects of British life ($r = -.52$, $p < .001$).

Intergroup anxiety was measured with a shortened version of Stephan, Diaz-Loving, and Duran's (2000) scale. Respondents were asked to indicate "how you think you would feel when interacting with British people: Comfortable, threatened, confident, anxious, at ease, awkward". Items were scored on 7-point scales (1 = *not at all*, 7 = *very much*). Three items were reverse-scored so that higher scores indicate higher anxiety. Item 2 was eliminated to increase reliability; Baseline and Post-Sojourn αs = .71 and .67 for Cohort 1 and αs = .70 and .74 for Cohort 2.

Perceived outgroup behavior was measured as in Eller and Abrams (2004), by asking whether participants perceived the behavior of their friend's British friends to be: friendly, reserved, cautious, understanding, patient, and open-minded. Responses were scored on 7-point scales (1 = *not at all*, 7 = *very much*), and recoded so that higher scores indicated more positive behavior, baseline and Post-Sojourn αs = .72 and .79 for Cohort 1 and .70 and .81 for Cohort 2.

Inclusion of Other in the Self (IOS) was measured using the IOS Scale (Aron, et al., 1992; Wright et al., 1997), modified to consist of five pairs of overlapping circles of increasing degrees of overlap. Note that this is a *vicarious* form whereby the ingroup–outgroup relationship, not the self–outgroup relationship, is assessed for IOS. Participants were instructed to select the pair of

circles that best described the relationship between their friend and the British person to whom their friend would feel closest. Possible responses ranged from 1 to 5, with higher numbers indicating higher perceived IOS. The measures of (perceived) ignorance, anxiety, perceived behavior, and IOS are all theoretically assumed to be mediators in extended contact theory. The two remaining measures focused on theoretical outcomes of extended contact.

General evaluation of the British was measured using Wright et al.'s (1997) General Evaluation Scale, which asks participants to "indicate how you feel about [the British] in general" by using the following bipolar adjective pairs separated by a 7-point scale (1–7): *cold—warm*, *negative—positive*, *friendly—hostile*, *suspicious—trusting*, *respect—contempt*, *disgust—admiration*. Responses were scored such that the more positive adjective received the higher score, baseline and Post-Sojourn αs = .79 and .79 for Cohort 1 and .81 and .82 for Cohort 2.

Procedure

Direct contact participants were recruited (via e-mail) prior to their departure to the UK through the British Council, international offices of universities in the UK and abroad, as well as professional mailing lists. Most of these participants provided contact details of a close friend or family member who had never lived in Britain, and was not going to go there during the course of the study (extended contact sample). Baseline response rates were 55% and 48%, for Cohorts 1 and 2, respectively, for the direct contact sample, and 60% and 38%, for Cohorts 1 and 2, respectively, for the extended contact sample.

Direct and extended contact participants completed online questionnaires via a specially designed website that allowed them to answer the questionnaire in their native language. All versions were professionally translated and back-translated using an external agency employed by the British Council, and subsequently double-checked for meaning by British Council employees in the relevant countries. Completion of the questionnaire took about 20 minutes and at the end of the study, participants were debriefed and thanked. Participants were asked to complete the questionnaire alone and in one single session. Participation was voluntary. Throughout the study, there were several monetary incentives in their own currency for participants to remain in the sample (the equivalent of $20 USD in Amazon book vouchers at End of Sojourn and draws to win the equivalent of $100 USD at baseline and Post-Sojourn. The majority of Baseline responses were provided before participants had left their home country (thus, prior to direct contact), while the End of Sojourn survey was conducted at the end of the academic year but while students were still in the UK, and the Post-Sojourn survey was conducted after students had returned home.

Results

As a preliminary step we checked whether the two cohorts were generally comparable in their scores on the variables. A multivariate analysis of variance (MANOVA) across the Post-Sojourn measures of the extended contact sample showed no significant differences between cohorts, $F(6, 127) = .37$, $p = .90$, $\eta^2 = .02$. Similarly, a MANOVA on the contact measures of the direct contact sample at End of Sojourn (when matched with the extended contact sample at Post-Sojourn) did not show a significant effect, $F(2, 57) = .09$, $p = .91$, $\eta^2 = .00$. Inspection of univariate effects confirmed these patterns. Based on these findings, we decided to analyze both cohorts in conjunction, thereby increasing sample size and power. Cronbach's alphas for the combined-cohort sample were: direct contact sample Baseline and End of Sojourn quality of contact αs = .87 and .86. For the combined extended contact sample Baseline and Post-Sojourn, perceived behavior αs = .71 and .79, intergroup anxiety αs = .71 and .70, general evaluation of the British αs = .79 and .81, respectively. The Post-Sojourn extended contact dataset included $N = 134$ participants. The matched End of Sojourn-direct to Post-Sojourn-extended dataset contained $N = 46$ participants.

Table 1. Changes of means over time within the extended contact sample

Measure	Baseline (N = 274)	Post-Sojourn (N = 134)	Mean change	$F(1, 78)$	Partial η^2
Extended contact	3.33 (3.12)	6.08 (9.62)	2.75	6.04*	.07
Self-perceived ignorance	4.13 (1.44)	4.05 (1.19)	–0.08	0.28	.00
Anxiety	2.63 (1.04)	2.73 (0.84)	0.10	0.80	.01
Behavior	4.83 (0.97)	4.58 (1.00)	–0.25	3.92*	.05
IOS[1]	2.09 (1.00)	2.57 (1.05)	0.48	14.02***	.15
General evaluation	4.94 (1.04)	4.94 (0.85)	0.00	0.00	.00

Note: Numbers are means, standard deviations are in parentheses. The longitudinally matched dataset is N = 70; [1] Five-point scale; * $p < .05$; ** $p < .01$; *** $p < .001$.

Analytic strategy

Preliminary analyses compared Baseline data from participants who remained in the extended contact sample over time versus those who dropped out of the study. We then examined change in the direct and extended contact participants' sample scores between the two time points (Baseline and End of Sojourn and Baseline and Post-Sojourn, respectively). Further, to deal with missing data longitudinally, we performed multiple imputation of data. The main analyses then focus on the effect of extended contact on theoretical mediating and outcome variables within the extended contact participant sample, and between the direct and extended contact samples.

Panel attrition and comparison of participants

An analysis of variance (ANOVA) on quality of contact in the direct contact sample at Baseline and Boost did not show a significant difference between the people who later (at End of Sojourn) dropped out of the study and those who stayed in the sample up to this time point, $F(1, 472) = 3.46$, $p > .05$, $\eta^2 = .01$.

A MANOVA across the extended contact sample set of measures at Baseline revealed significant differences between the people who later (at Post-Sojourn) dropped out of the study and those who stayed in the sample at both time points, multivariate $F(6, 225) = 2.63$, $p < .02$, $\eta^2 = .07$. Participants who dropped out had higher anxiety (M = 3.05, SD = 1.26 vs. M = 2.63, SD = 1.04), $F(1, 230) = 6.54$, $p = .01$, $\eta^2 = .03$, perceived outgroup behavior to be less positive (M = 4.43, SD = 1.20 vs. M = 4.83, SD = .97), $F(1, 230) = 6.59$, $p < .02$, $\eta^2 = .03$, and expressed less positive general outgroup evaluation (M = 4.50, SD = 1.23 vs. M = 4.94, SD = 1.04), $F(1, 230) = 7.26$, $p < .01$, $\eta^2 = .03$, than participants who remained in the sample. Therefore, participants who remained in the sample self-selected to a certain extent. However, our primary interest is in relationships among variables rather than mean differences.

Change over time

A repeated-measures MANOVA revealed that scores on the extended contact sample measures changed significantly over time (from Baseline to Post-Sojourn), $F(6, 73) = 4.59$, $p = .001$, $\eta^2 = .27$. Table 1 shows that there were significant univariate effects of time for three variables. Extended contact and perceived interpersonal closeness (IOS) between the friend and the British both increased over the course of the study, but perceived behavior became less positive over time.

Using multiple imputation to deal with missing data

There was sample attrition within the longitudinal extended contact sample and in the matched direct to extended contact samples. We therefore considered the options of list-wise deletion of cases or using multiple imputation as a compensatory

Table 2. Correlations among variables in extended contact sample at Post-Sojourn (N = 134)

Measure	1.	2.	3.	4.	5.	6.
1. Extended contact	—	.02	.04	.05	.29**	−.01
2. Ignorance		—	.28**	−.21*	−.01	−.20*
3. Anxiety			—	−.33**	−.02	−.43***
4. Behavior				—	.22*	.35***
5. IOS[1]					—	.03
6. General evaluation						—

Note: Numbers are correlation coefficients (r). Ignorance = self-perceived ignorance; [1] Five-point scale; * $p < .05$; ** $p < .01$; *** $p < .001$.

method of analysis (Al Ramiah, Hewstone, Little, & Lang, under review; Enders, 2010). Typically, and particularly in longitudinal datasets (Brown, Eller, Leeds, & Stace, 2007; Eller & Abrams, 2004), missing data are dealt with by deletion of missing participants, which compromises the power of the tests. List-wise deletion procedures are based on the assumption of Missing Completely At Random (MCAR), which could result in seriously biased estimates with present levels of missingness.

SPSS was used to calculate the fraction of missing data. This weights the proportion of missing information in the dataset by the number and quality of data imputations. We used 100 imputations to estimate the fractions missing. These were 35.1% in the longitudinal extended contact sample (averaged across two waves), and 46.2% for the cross-sample analysis (averaged across the two waves of the extended contact sample and the one wave of the direct contact sample).

Multiple imputation, which is based on the assumption of Missing at Random (MAR), is superior to the method of participant deletion (Rubin, 1987). Data are MAR "if missingness is related to other measured variables in the analysis model, but not to the underlying values of the incomplete variable (i.e., the hypothetical values that would have resulted had the data been complete)" (Baraldi & Enders, 2010, p. 7).

Given sufficient numbers of covariates to aid imputation (in the present research these included age, sex, marital status, level of education), the assumption of MAR provides results that are less biased than list-wise deletion (Graham, 2003; Schafer & Olsen, 1998). Thus we were able to treat missing data as MAR and to impute the missing data using all variables present in the different datasets.

Schafer and Graham (2002) recommend 20 imputations in order to generate an accurate final imputed dataset. In each imputation a copy of the dataset is created containing unique imputed values. The multiple sets of parameter estimates and standard errors across imputed data sets are subsequently combined into a single set of results (Baraldi & Enders, 2010). Given the relatively high level of missingness across the measures and waves, we conservatively imputed our dataset 100 times, using SPSS (see Graham, Olchowski, & Gilreath, 2007).

Intercorrelations among variables

Table 2 shows the bivariate correlations between variables in the extended contact sample at Post-Sojourn. All significant relationships are in expected directions. More extended contact was related to higher interpersonal closeness. Higher self-perceived ignorance about the outgroup was associated with higher anxiety, and less positive perceived behavior and general outgroup evaluation. More positive behavior, in turn, was related to higher interpersonal closeness, lower anxiety, and more positive general evaluation. Finally, higher anxiety was associated with more positive general evaluation.

Extended contact sample: Longitudinal effects of perceived extended contact

Using a series of regression analyses, we examined whether change in perceived extended contact

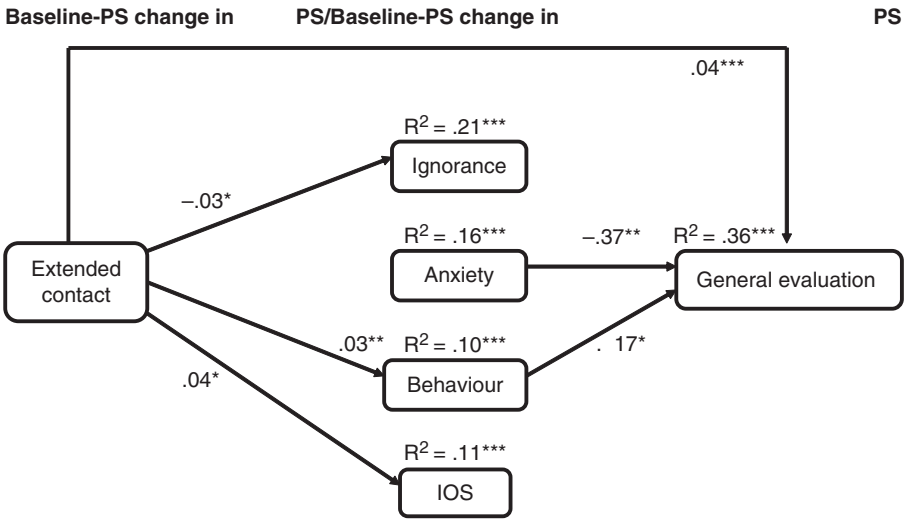

Figure 1. Path analysis showing longitudinal effects of extended contact on mediating and criterion variables within extended contact sample.

Note: Baseline to Post-Sojourn change in extended contact predicts self-perceived ignorance, anxiety, behavior, IOS, and general evaluation at Post-Sojourn. Baseline to Post-Sojourn change in anxiety and behavior predicts general evaluation at Post-Sojourn. Baseline N = 274, Post-Sojourn N = 134, Longitudinally matched N = 70. Significant paths only are shown. Unless otherwise indicated, numbers are unstandardized partial regression coefficients (b). PS = Post-Sojourn, Ignorance = self-perceived ignorance. * $p < .05$; ** $p < .01$; *** $p < .001$.

predicted theoretical mediating variables (self-perceived ignorance, IOS, intergroup anxiety, and perceived behavior) and outcome variable (general outgroup evaluation; Finkel, 1995). Change was operationalized by subtracting Baseline from Post-Sojourn scores (see Table 1). We also tested whether change in the theoretical mediating variables predicted theoretical outcomes at Post-Sojourn. In all analyses we controlled for the dependent variable at Baseline and for change in extended contact participants' own direct contact as friends.

As shown in Figure 1, increases in extended contact produced significant effects in all the predicted directions—lower self-perceived ignorance about the outgroup, b[4] = –.03, $t = -2.09$, $p < .04$, $R^2 = .21$, $F(3, 302) = 26.82$, $p < .001$, more positive perceived outgroup behavior towards their friend, b = .03, $t = 2.68$, $p < .01$, $R^2 = .10$, $F(3, 302) = 12.42$, $p < .001$, greater extended IOS, b = .04, $t = 2.27$, $p < .03$, $R^2 = .11$, $F(3, 302) = 12.73$, $p < .001$, and more positive general outgroup evaluation, b = .04, $t = 3.41$, $p < .001$, $R^2 = .36$, $F(3, 302) = 55.39$, $p < .001$.

Considering the relationships between theoretical mediators and outcome, analyses revealed that more positive general outgroup evaluation was predicted by reduction in anxiety and increased perception of positive outgroup behavior, b = –.37, $t = -3.14$, $p = .002$, $R^2 = .32$, $F(3, 302) = 47.06$, $p < .001$, and b = .17, $t = 1.95$, $p = .05$, $R^2 = .28$, $F(3, 302) = 38.47$, $p < .001$, respectively.

Reversed analysis: Longitudinal relationships among dependent variables

Because it is not very plausible that attitudes and emotions could cause greater extended contact, the reversed analysis was restricted to extended contact theory's proposed mediating and outcome variables. We performed regression analyses to test whether change in general outgroup evaluation predicted Post-Sojourn self-perceived ignorance, anxiety, perceived behavior and IOS, controlling for each dependent variable at Baseline as well as controlling for change in own direct contact as friends. The results revealed that

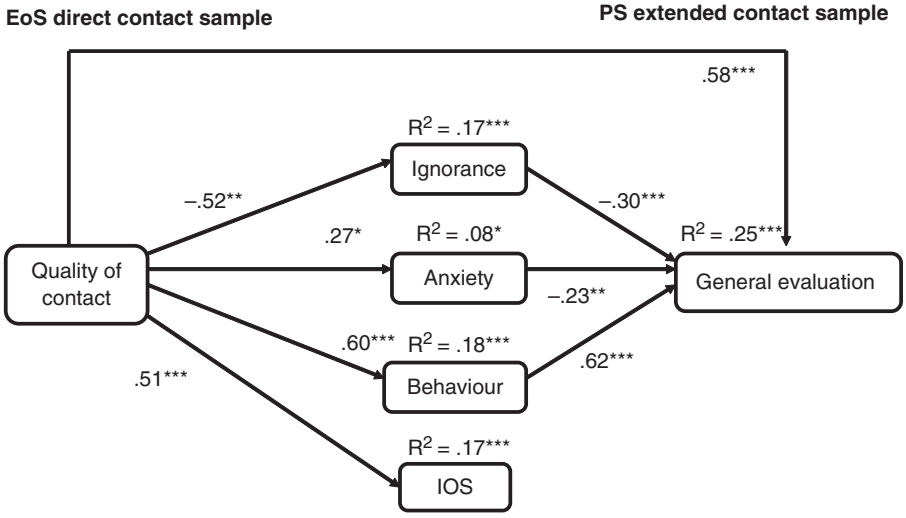

Figure 2. Path analysis showing longitudinal cross-sample effects of quality of contact of the direct contact sample on mediating and criterion variables within the extended contact sample.
Note: This figure summarizes an analysis using quality of contact in the direct contact sample (at their End of Sojourn) to predict mediating and criterion variables in the extended contact sample at Post-Sojourn. Quality of contact in the direct contact sample at End of Sojourn predicts mediating and criterion variables in the extended contact sample at Post-Sojourn, controlling for direct contact as friends of extended contact sample at Post-Sojourn. At Post-Sojourn, general evaluation is cross-sectionally predicted by ignorance, anxiety, and behavior. End of Sojourn direct contact sample N = 579, Post-Sojourn extended contact sample N = 134, longitudinally matched cross-sample N = 46. Significant paths only are shown. Unless otherwise indicated, numbers are unstandardized partial regression coefficients (b). EoS = End of Sojourn, PS = Post-Sojourn, Ignorance = self-perceived ignorance. * $p < .05$; ** $p < .01$; *** $p < .001$.

increasingly positive general outgroup evaluation predicted lower intergroup anxiety, b = −.35, t = −3.18, $p < .01$, $R^2 = .28$, F (3, 302) = 36.26, $p < .001$, and more positive perceptions of outgroup behavior, b = .30, t = 2.11, $p < .05$, $R^2 = .23$, $F(3, 302) = 30.18$, $p < .001$.

Actual extended contact: Longitudinal cross-sample analysis

Extended contact theory proposes that extended contact can improve intergroup attitudes if there is awareness of a positive relationship between another ingroup member and an outgroup member. However, no previous extended contact research has examined the role of the quality of the direct contact as perceived by the person engaged in that contact, i.e., the actual contact experience that can be extended. Based on extended contact theory, we expect that more positive experiences of direct contact should have a positive effect on the observer's (extended) expectations and attitudes towards the outgroup.

Using regression analysis, we investigated the effect of quality of direct contact reported by international students at End of Sojourn (the end of their stay in Britain) on responses to the mediating and dependent variables among their friends (the extended contact participants) at Post-Sojourn (after direct contact participants had returned home).

First, and most importantly, more positive direct contact predicted more positive general outgroup evaluation among the extended contact sample of their friends at home, b = .58, t = 4.27, $p < .001$, $R^2 = .25$, $F(3, 284) = 9.16$, $p < .001$ (see Figure 2). Moreover, more positive direct contact predicted greater extended IOS, b = .51, t = 4.38, $p < .001$, $R^2 = .17$, $F(3, 284) = 6.33$, $p < .001$, less self-perceived ignorance about the outgroup,

b = –.52, t = –2.69, p = .008, R^2 = .17, F(3, 284) = 6.49, p < .001, and more positive perceived behavior, b = .60, t = 3.32, p = .001, R^2 = .18, F(3, 284) = 5.18, p < .001. Surprisingly, however, it also predicted higher intergroup anxiety, b = .27, t = 2.53, p < .05, R^2 = .08, F(3, 284) = 2.62, p < .05. Although brief to report, these very clear links between the experiences of students who had direct contact and the subsequent attitudes and feelings of their home country friends (effects that straddle both samples and time) represent notable and quite unique evidence for the impact of actual extended contact.[5]

Of secondary importance, at Post-Sojourn, lower ignorance, b = –.30, t = –4.21, p < .001, more positive perceived outgroup behavior, b = .62, t = 8.49, p < .001, and lower intergroup anxiety, b = –.23, t = –2.86, p < .005, all cross-sectionally related to more positive general outgroup evaluation.

Discussion

This two-cohort study examined how international students' contact with the British affected the intergroup attitudes and feelings of their friends in their home country over a one-year period—a strong test of extended contact theory. We will first discuss the findings of both longitudinal within-sample and cross-sample analyses in light of the hypotheses, followed by an outline of the study's limitations, strengths, and implications, and end with a discussion of the research's implications for future theory, research, and application.

In the extended contact sample analysis, increased perceived extended contact led to lower self-perceived ignorance about the outgroup, awareness of more positive outgroup behavior, higher extended IOS, and more positive general outgroup evaluation. Also, decreased anxiety and more positive outgroup behavior led to more positive general outgroup evaluation. However, changes in extended contact did not predict lower intergroup anxiety. We note that the number of theory-consistent significant relationships is impressive, given that the effects span one whole year and that we controlled both for the respective dependent variable at baseline and also for incidental changes in direct contact as friends within the extended contact sample. In contrast, there is a general absence of theory-inconsistent relationships.

The cross-sample analyses showed that the quality of contact experienced by international students (the basis of actual extended contact) affected all the dependent variables among their friends in the extended contact sample several months later, even when controlling for incidental or independent direct contact that had occurred in the extended contact sample. The presence of these relationships is striking given the diverse cultural and national backgrounds of the participants and the limited sample size. More positive direct contact conveyed positive effects in terms of lowered self-perceived ignorance, higher extended IOS, more positive perceptions of outgroup behavior, and more positive general evaluation of the outgroup. However, it also was associated with higher intergroup anxiety.

Moreover, although we were not able to perform a classical mediation analysis (Baron & Kenny, 1986), perceptions of outgroup behavior, intergroup anxiety, and self-perceived ignorance about the outgroup were related to both extended contact and prejudice (in the cross-sample model; behavior also in the within-sample model), consistent with their theoretical role as mediators (Wright et al., 1997). To our knowledge, this is the first evidence showing that reductions in (self-perceived) ignorance about the outgroup can mediate between extended contact and prejudice.

In summary, the present evidence revealed four clear longitudinal effects of perceived extended contact, and five longitudinal effects that flowed directly from actual extended contact (via experiences of direct contact participants). This evidence demonstrates that extended contact can improve intergroup relations even when it takes place over time and both when extended contact is measured via perceptions or via the person directly involved in contact.

Contrary to predictions and at odds with De Tezanos-Pinto et al.'s (2010) cross-sectional findings, more positive direct contact predicted higher anxiety in the extended contact sample. It is possible that extended contact participants in the present research anticipated performance anxiety about potential contact, for example, because of the need to communicate in a second language. Extended contact participants may have been aware that their international student friends were relatively proficient users of English with high-quality contact with the British, which may have made them more acutely aware of their own lack of proficiency. This suggests interesting avenues for future research into when and why the role of anxiety might be different in the case of extended than direct contact effects.

Causal direction

The reversed longitudinal analysis showed that all relationships among theoretical mediators and outcomes were bidirectional. This makes sense given that prejudice may itself increase anxiety and lead a person to ignore positive examples of outgroup behavior. Moreover, the pattern of bidirectionality is consistent with the longitudinal direct contact literature (Binder et al., 2009; Eller & Abrams, 2003, 2004; Levin, van Laar, & Sidanius, 2003).

Limitations, strengths, and implications

Sample attrition is almost unavoidable in longitudinal research, and sustaining the involvement of people across many different countries where the initial introduction is via a third person raises the potential for attrition exponentially. Attrition may also have been augmented because we used an online rather than face-to-face survey. This was done both for economy and to avoid experimenter effects (e.g., due to gender, first language, nationality, etc.). However, we recognize that there is possibly unaccounted variation in the circumstances under which questions were answered and possibly less personal engagement and commitment than with face-to-face or questionnaire surveys.

The longitudinal extended contact sample was comparatively large (N = 134) but the resultant sample size for the cross-sample analysis (N = 46) was relatively small, even having combined both cohorts. We thus acknowledge restricted power. Nonetheless, a power analysis reveals a power of .8 to detect an effect size of .35 and above with this sample size. Moreover, the use of multiple imputation allowed a certain degree of confidence in the findings despite the low N. Further, the fact that the majority of results were highly consistent with extended contact theory strongly suggests that the data provided reasonable estimations of meaningful relationships among variables.

We also note that participants with less favorable intergroup attitudes were more likely to drop out of the study. This is understandable, but actually would work against finding predicted effects because of the reduced scope for contact to improve attitudes due to potential restriction of range. Hence, it is more impressive that we found consistent effects and it seems likely that true population effects could be under- rather than over-estimated by our data. On the other hand, self-exclusion from contact is an important phenomenon in its own right and points to the risk that extended contact interventions to reduce prejudice might have diminished impact on precisely those at whom they are targeted, namely people who are most prejudiced. Future research should investigate this important issue.

We also recognize that this research is different from the more usual settings for intergroup contact research, such as black–white contact in US American schools. Understanding effects of contact between majority–minority groups, or groups in conflict, is undoubtedly important, but in an increasingly globally connected world people will encounter members of many different social groups and categories. The present research reflects that diversity of intergroup contact and shows that extended contact with one group can

have positive effects on members of many different other groups.

Finally, self-perceived ignorance was measured with a single item and thus, any findings associated with it, should be interpreted cautiously. The single-item measure was used rather than a multiple-item knowledge checklist for two reasons. First, participants were volunteers and it was important not to burden them with excessive numbers of items. Second, a knowledge checklist potentially highlights certain information and may obscure, or have unintended effects on recall of, other information. We did not want induce thoughts about specific concrete information which might have interfered with or overwhelmed other measures. Moreover, no participants raised any queries of the single-item measure and therefore we are confident that it has good face validity and good construct validity.

Implications for future theory, research, and application

With the exception of De Tezanos-Pinto et al. (2010), previous research has only measured extended contact using self-report, asking participants how many ingroup–outgroup friendships or relationships they *perceive* there to be. That methodology may be prone to biases, in terms of memory, perceived ingroup norms and perhaps social projection from self to other ingroup members. A key innovation of the current research is that it established a direct basis for operationalizing extended contact by asking the ingroup protagonists themselves to report on their actual relationships with outgroup members. This approach, which more closely specifies the *actual* extended contact, adds an important dimension to the emerging literature and enables a very rigorous test of the theory.

On an applied level, there have been numerous studies investigating the experience of international students (e.g., Schmitt et al., 2003; Stangor et al., 1996), but to our knowledge none have explored the *indirect* effects of international student exchange on intergroup attitudes of uninvolved actors. We have established that direct contact experiences of international students have wider-ranging, primarily positive, effects on the intergroup attitudes of their friends at home. Hence, we expand the literature on cross-cultural understanding and international students and also illustrate that indirect forms of contact can be effective when there is no opportunity for direct contact. Nonetheless, we note that if international students have negative contact experiences, extended contact can also have negative effects. Surprisingly, there seems to be no research on this important question.

Conclusion

The present research is the only study to date to establish a longitudinal improvement of intergroup relations based on extended contact (cf. Feddes et al., 2009). The research demonstrates that prolonged contact between international students and a host community positively affects the intergroup attitudes of their close friends from home who have not been directly exposed to this contact. Thus, in a natural setting, based on actual as well as perceived extended contact, the present research provides important longitudinal and cross-cultural support for extended contact theory, and points to many exciting avenues for future research.

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Notes

1 The Erasmus Programme (European Region Action Scheme for the Mobility of University Students), is a European Union (EU) student exchange programme established in 1987. It forms a major part of the EU Lifelong Learning Programme 2007–2013, and is the operational framework for the European Commission's initiatives in higher education.

2 To boost sample size additional participants were recruited from the same population within each cohort shortly after the initial Baseline sample. Because there were no differences between the boost participants and original Baseline participants (ANOVA on quality of contact, $F(1, 431) = 1.57$, $p > .05$, $\eta^2 = .00$) we have combined these into a single Baseline sample for analyses in this article. In Cohort 1 the boost sample added 129 participants, and in Cohort 2 it added 41 participants.

3 Attesting to the importance of assessing both actual and perceived extended contact, the correlation between actual extended contact at End of Sojourn and perceived extended contact at Post-Sojourn and (i.e., matched direct contact - extended contact sample) was non-significant, $r(60) = -.15$, $p = .25$. We are not sure why these two measures are not more strongly related. However, the fact that both indices of extended contact predict positive effects provides strong convergent validity for the extended contact theory.

4 Pooled multiple imputation results only provide the unstandardized regression coefficient (b), not the standardized one (ß).

5 The main emphasis of this paper was on the dependent variable of general outgroup evaluation. However, we also assessed *perceived intergroup differences* (cf. Pettigrew & Meertens, 1995). These were measured by asking participants whether they thought that 'the British and people of your own nationality' were similar or different (7-point scale, 1–7) in terms of their culture, their ways of living, and their personality. Responses were scored such that higher scores indicated more perceived differences, Baseline and Post-Sojourn αs for the combined cohorts = .81 and .68, respectively.

In the longitudinal within-sample analysis increased perceived extended contact was associated with marginally *greater* perception of intergroup differences, b = .04, $t = 1.91$, $p < .06$. The perception of intergroup differences was also predicted by reduced self-perceived ignorance and anxiety, b = –.43, $t = -2.69$, $p < .01$ and b = –.63, $t = -3.58$, $p < .001$, respectively. The latter two relationships were bidirectional.

In the longitudinal cross-sample analysis, more positive direct contact predicted *higher* perceived intergroup differences, b = .50, $t = 2.68$, $p = .008$. These findings suggest that extended contact participants may interpret differences as a positive form of mutual intergroup differentiation (Brown & Hewstone, 2005) rather than difference in terms of status. The mutual intergroup differentiation model asserts that, under some conditions, increased salience of group boundaries provides an important basis for beneficial contact effects to generalize to the outgroup as a whole (also cf. Judd & Park, 2005). Thus, a question for future research is whether mutual differentiation might play a different, or stronger, role as a positive outcome of extended contact than in the case of direct contact.

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