

Vicarious intergroup contact effects: Applying social-cognitive theory to intergroup contact research

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Abstract

This contribution examines the role of vicarious contact (observing in-group members having successful cross-group contact) as a tool to improve intergroup relations. Expanding previous research on indirect intergroup contact, vicarious contact (1) integrates and applies concepts of social-cognitive theory (Bandura, 1986) to the field of intergroup contact research; (2) broadens the study of indirect contact effects to the observation of successful cross-group interactions; and (3) proposes to increase people's intention for direct cross-group contact. Two video-based experiments indicate that vicarious contact improves attitudes towards the out-group and increases participants' willingness to engage in direct cross-group contact. These studies provide evidence that the relation between vicarious contact and intergroup attitudes (and willingness to engage in direct contact) is sequentially mediated by self-efficacy expectancy and perceived intergroup uncertainty. Implications of these findings for further research on the (indirect) contact hypothesis and their application will be discussed.

Keywords

intergroup contact, prejudice reduction, vicarious contact, social learning, self-efficacy

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Direct contact between members of different groups has been described as one of social psychology's best strategies to improve intergroup relations (Pettigrew & Tropp, 2006; Wright, 2009). Following Allport's (1954) formulation of the contact hypothesis, over 50 years of research has contributed to a comprehensive understanding of the optimal conditions for direct contact and of the psychological processes that mediate the relationship between direct contact and intergroup attitudes (Brown & Hewstone, 2005). Moreover, a rapidly growing research literature

has shown that indirect forms of cross-group contact (contact strategies that do not involve *actual* interaction with a member of the other group) also have the potential to create more

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positive relations between social groups. For instance, knowing about in-group members having out-group friends (extended contact: Wright, Aron, McLaughlin-Volpe, & Ropp, 1997) or mentally simulating a meeting with out-group members (imagined contact: Crisp & Turner, 2009) can influence attitudes about the out-group.

In this paper, we seek to add to the work on indirect contact by integrating and applying social-cognitive theory (Bandura, 1986) and in so doing propose additional mechanisms by which the positive effects of indirect contact can affect intergroup attitudes and behaviors. Expanding on the body of work that has emerged out of Wright et al.'s (1997) extended contact hypothesis, we examine the influence of vicarious learning resulting from the observation of in-group members having successful cross-group contact on attitudes towards the out-group and on willingness to engage in direct cross-group contact. Applying basic premises from Bandura's theorizing (1986, 1997), we propose that observing proficient in-group models can lead to the acquisition of behavioral scripts about how to behave in similar cross-group situations, and can also increase the observer's self-efficacy expectancy (personal judgment of one's own abilities to have a successful cross-group interaction). Knowing how to behave and feeling competent about one's capability during cross-group contact situation can reduce feelings of uncertainty and awkwardness that are often experienced when envisaging or engaging in cross-group contact (Plant & Devine, 2003; Stephan & Stephan, 1985). Thus, vicarious contact effects are thought to improve intergroup attitudes and to increase willingness to engage in direct cross-group contact through modeling *that* and *how* cross-group contact can take place.

We present two studies that extend research and theory on indirect cross-group contact. First, they provide an integration of concepts from social-cognitive theory (Bandura, 1986) to the field of intergroup contact, introducing and demonstrating that self-efficacy expectancy can be an important mediator of indirect contact effects. In addition, they show that vicarious contact effects

cannot only improve intergroup attitudes but may also increase people's willingness to engage in direct contact.

Indirect intergroup contact

One of the most important advancements in research on intergroup contact is the emerging evidence of a number of indirect intergroup contact effects. We use the term "indirect intergroup contact" as an umbrella term to describe the set of contact effects that do not involve *actual* interaction with a member of the other group. For instance, inspired by Pettigrew's (1997) research on the important role of cross-group friendships, Wright and colleagues (1997) proposed and reported evidence supporting the "extended contact hypothesis," which postulates that the mere "knowledge that an in-group member has a close relationship with an out-group member can lead to more positive intergroup attitudes" (p. 73). Subsequent research using a variety of research methods in different intergroup contexts has provided additional evidence that extended contact improves intergroup relations (e.g., Cameron & Rutland, 2006; De Tezanos-Pinto, Bratt, & Brown, 2010; Paolini, Hewstone, Cairns, & Voci, 2004). Wright et al. (1997) also discuss five mechanisms that might account for extended contact effects. They proposed that extended contact can improve intergroup attitudes because the in-group partner could provide a "positive in-group exemplar" who could generate perceptions of positive in-group norms towards the out-group, lessen feelings of anxiety about interactions with the out-group (what they call "anxiety reduction"), and provide a more accurate representation of the out-group (what they call "reducing ignorance"). They also proposed that the out-group partner could serve as a positive "out-group exemplar" who could undermine negative stereotypes about the out-group and demonstrate the existence of positive out-group norms towards the in-group. Finally, they proposed a transitive inclusion of the out-group in the self process, whereby the perceived closeness of the observed friendship and the existing psychological

connections between the self and the in-group member could lead the observer to experience the out-group member and the out-group as a whole as to some degree included in her or his own self-concept. Subsequent research continues to investigate these mechanisms and evidence supports the claim that most of them can play a role (e.g., De Tezanos-Pinto et al., 2010; Turner, Hewstone, Voci, & Vonofakou, 2008; Wright, Aron, & Brody, 2008).

Another example of indirect contact effects, imagined intergroup contact, focuses on the mental simulation of a positive social interaction with an out-group member (Crisp & Turner, 2009). Imagining having a positive cross-group interaction can decrease in-group bias and can lead to social projection of positive traits onto the out-group (Stathi & Crisp, 2008; Turner, Crisp, & Lambert, 2007).

The evidence supporting these different forms of indirect intergroup contact is appealing and optimistic because it implies that intergroup attitudes can be improved without everyone having to have their own direct cross-group contact (Wright et al., 2008). This makes indirect intergroup contact strategies particularly appealing for contexts in which direct cross-group contact is difficult to implement. Indeed, Christ and colleagues (2010) showed, in two different intergroup contexts, that extended contact is particularly effective when individuals live in segregated areas and/or have few or no direct friendships with the out-group.

Moreover, despite knowing a great deal about what happens when different group members come into contact (Brown & Hewstone, 2005), much less is known about the conditions and processes that make contact between groups more likely in the first place (Esses & Dovidio, 2002). We do know that when envisaging or engaging in direct contact with out-group members, people often experience uncertainty about how they should behave, resulting in feelings of apprehension and awkwardness. The result is that, if given the opportunity, they may avoid or break off contact (Avery, Richeson, Hebl, & Ambady, 2009; Plant & Devine, 2003; Stephan &

Stephan, 1985). Thus, we propose that the specific mechanisms proposed by our vicarious contact effects may provide the needed tools not only to directly improve intergroup attitudes, but also to overcome some of these psychological barriers to engaging in direct contact.

Vicarious intergroup contact

Social-cognitive theory (Bandura, 1986) can explain how people acquire attitudes, values, emotional propensity, and new ways of behaving by observing relevant others, and thus appears clearly relevant to indirect intergroup contact. However, it has only recently been discussed in this research area (Gómez & Huici, 2008; Ortiz & Harwood, 2007; Turner, Hewstone, Voci, Paolini, & Christ, 2007). We suggest that consistent with Bandura's use of the term vicarious learning, the label "vicarious contact" be used to describe the specific mediators of indirect contact effects that emerge from the application of social-cognitive theory (Bandura, 1986).¹

Our primary proposal is that observing in-group members engaging successfully in cross-group contact can be conceptualized as a vicarious learning event (Bandura, 1965) in which an in-group role model shows *that* and *how* cross-group contact is possible. This application of social-cognitive theory offers numerous novel testable hypotheses. In our work we will focus on two related but distinct new mechanisms that social-cognitive theory (Bandura, 1986, 1997) offers to the study of indirect contact: (a) acquisition of behavioral knowledge; and (b) self-efficacy expectancy.

Acquisition of behavioral knowledge

As research within the social-cognitive framework has shown, observing proficient models can lead to the acquisition of social behaviors that have the potential to improve interpersonal relations (e.g., Baker, Lang, & O'Reilly, 2009; Baldwin, 1992; Erwin, 1994; Thelen, Fry, Fehrenbach, & Frautschi, 1979). Consequently, we propose that observing an in-group member

having a successful interaction with an out-group member can result in the acquisition of new cross-group behavior that was previously not part of the observer's behavioral repertoire. In addition, vicarious learning from a competent in-group member can also lead observers to apply to interactions with out-group members behaviors that were part of their existing behavioral repertoire but were previously reserved for interactions with in-group members. According to Bandura (1986), three psychological processes are required for the acquisition of new behavior: first, the observer needs to pay attention to the modeled behavior; second, the observer needs to encode and mentally represent it; and, third, the observer needs to be able to translate the mental representation into an appropriate action. In addition, people do not perform all behaviors they observe, and social-cognitive theory distinguishes between the *acquisition* and the *performance* of modeled behavior. Crucial for performance of the modeled behavior are motivational incentives. For instance, observing the consequences of the model's behavior can lead to specific outcome expectancy (beliefs about the likelihood that the behavior will lead to a specific outcome). Observers are more likely to exhibit a modeled behavior if it results in valued outcomes rather than unrewarding or punishing outcomes. Of course, observers must assume that similar consequences would result if they, themselves, were to engage in similar courses of action.

Self-efficacy expectancy

However, learning about appropriate behavioral scripts and their outcome expectancy are not necessarily enough for people to transform these acquired scripts into concrete courses of action. Crucial, therefore, is also the subjective judgment about one's own capabilities to master the observed behavior. For these judgments, people rely on their own previous mastery experience as well as vicarious experience of *similar* social models, since attainments of similar others are diagnostic for one's own capabilities (Bandura, 1977, 1997).

Self-efficacy expectancy influences the action people choose, how much effort and energy they invest in these actions, how long they will persist when confronted with challenges or initial failure, and whether their thoughts hinder or facilitate reaching the desired outcomes (Bandura, 1997). We propose that this self-efficacy expectancy plays a crucial role in how people think and feel about the possibility of their own direct cross-group contact and, given the opportunity, whether they will seek out or avoid direct cross-group contact. Self-efficacy expectancy should also influence the degree to which they will show persistence and optimism when these contact experiences present challenges. More specifically, we assume that increased self-efficacy expectancy will influence intergroup attitudes and willingness for direct contact by decreasing the level of perceived intergroup uncertainty.

Cross-group interactions when anticipated and experienced can invoke feelings of uncertainty, anxiety, and even a state of physiological threat in some individuals (Blascovich, Mendes, Hunter, Lickel, & Kowai-Bell, 2001; Plant & Devine, 2003; Stephan & Stephan, 1985). These feelings can result from concerns about whether one knows how to behave competently while navigating cross-group contact situations (Stephan & Stephan, 1985) or when one perceives that the psychological demands of a particular encounter seem to outweigh one's available resources (Trawalter, Richeson, & Shelton, 2009). The strength of one's self-efficacy beliefs determine, in large part, how one interprets the demands of situation as well as one's capacity to cope with those demands (Bandura, 1997). Feeling incompetent will increase concerns, while feeling competent will diminish concerns. For example, Plant and Butz (2006) experimentally manipulated non-black participants' self-efficacy expectancy and showed that negative self-efficacy expectancy compared with positive self-efficacy expectancy led to higher perceived intergroup uncertainty and the desire to avoid interactions with blacks. Thus, we propose a sequential mediational model, where observation of successful cross-group interactions leads to the acquisition of behavioral scripts

and increased self-efficacy expectancy; these in turn, reduce feelings of uncertainty, which then allows for more positive out-group attitudes and greater openness to direct cross-group interaction (Bandura, Grusec, & Menlove, 1967; Bandura & Menlove, 1968).

The current research

In our initial investigation of vicarious contact effects, we focus on the role of self-efficacy expectancy and intergroup uncertainty as mechanisms that account for the positive effects of observing interactions across ethnic groups. Furthermore, although several authors have proposed that indirect intergroup contact may prepare people for direct contact (Christ et al., 2010; Turner, Hewstone et al., 2007), this paper is one of the first to experimentally test the effect of indirect intergroup contact on behavioral intentions to engage in direct cross-group contact (see also Shelton & Richeson, 2005). Consistent with social-cognitive theory (Bandura, 1986, 1997), we hypothesize that observing a successful interethnic interaction will lead to more positive out-group attitudes and increased willingness to engage in cross-group interactions, and that these effects will be sequentially mediated by increased self-efficacy expectancy and reduced intergroup uncertainty.

In the following studies, we used Chinese–German relations as the intergroup context for three reasons: (1) although there are few Chinese people living in Germany, Chinese students are present and very salient at the ethnically homogeneous East-German University where these studies were conducted (Friedrich-Schiller-Universität Jena, 2009); (2) most German students have little direct contact with Chinese people, and the absence of direct contact is beneficial when studying indirect contact effects (Christ et al., 2010); and finally (3) one of the biggest difficulties faced by international students in Germany is the lack of contact with German students (Federal Government Department for Education and Research [Bundesministerium für Bildung und Forschung, 2008]), making this research

relevant and potentially useful in the solution of this important social issue.

Experiment 1

In Experiment 1, participants observed successful interactions between an ethnic in-group and an ethnic out-group member, or, in a control condition, they observed successful interaction between two ethnic in-group members. We predicted that participants in the vicarious contact condition would have more positive intergroup affect, greater willingness for future contact, higher self-efficacy expectancy, and lower perceived intergroup uncertainty than those in the control condition. We further predicted that self-efficacy expectancy and perceived intergroup uncertainty would mediate sequentially the effect of vicarious contact on intergroup attitudes and willingness for contact.

Method

Participants Participants were recruited in first-year courses at a German university of applied sciences. Participants were asked to take part in two psychological studies for €5.00. The sample consisted of 48 first-year German students (19 women) between 18 and 28 years ($M = 21.81$; $SD = 2.47$).

Procedure and materials Upon arrival in the laboratory, participants were informed that they would take part in two independent short studies. The “first study” was computer-based and included the manipulation. The “second study”, carried out by a different investigator, was paper-pencil-based, and served to assess the dependent variables of interest. The “two-study-technique” was used to undermine potential demand characteristics. Leading participants to believe that the procedures containing the vicarious contact manipulations and those containing the dependent measures were entirely separate studies, we should greatly reduce the chances that participants would answer more positively in the vicarious contact condition, compared with the control

condition, because they believed these were the desired responses of the experimenter. In addition, we included two questions at the end of the experiment asking participants to write down what they thought was the purpose of the second study and if they had any comments or questions.

The "first study" was introduced as a marketing study. Participants were told that the university planned to post short video clips on its internet homepage in order to promote the university. The participant's task was to watch three video clips that were being considered and to rate each on several items (e.g., "Does the movie transmit a positive image of the student life?"). In order to enhance the credibility of the movies, participants were told that the video clips were randomly selected from a database of clips made and submitted by students. In the *vicarious contact* condition, two of the three video clips depicted successful interactions between a German and a Chinese student. The cover story of this experiment was consistent with recent marketing efforts of the University to recruit potential students from China. The first video clip showed a German and a Chinese student meeting in a coffee shop and walking through the city center. The second video clip showed a German and a Chinese student cooking and playing guitar together in a student residence. In both clips the original sounds of the interaction were dubbed over by a narrator, who gave information about the university and student life. In the *control condition*, two of the three clips depicted the same scenarios as the vicarious contact condition with one difference; the Chinese actor was replaced by a second German student. The third video clip, shown in both conditions, reported on the university library facilities and was used as neutral filler. We used two critical movies because the exposure to multiple skilled models produces stronger belief in one's efficacy to perform the observed task, more than observing a single skilled model (Bandura & Menlove, 1968; Schunk, Hanson, & Cox, 1987). The gender of the models was matched to the gender of the participant in order to foster feelings of similarity between observer and model, and because models of the same gender are viewed more credibly and instill

stronger efficacy beliefs and behavioral intentions than models of a different gender (Rosenthal & Bandura, 1978). Participants were randomly assigned to one of the two conditions and were tested individually in cubicles. At the end of the first study participants were asked to inform the experimenter in order to continue with the second study.

The "second study" was introduced as a preliminary effort to develop a professional training that would assist people working in situations where they would be interacting with members of different social groups. Participants were instructed to imagine working in a market research institute and being faced with the task of conducting unstructured interviews with members of two ethnic groups. Participants were then told that they would be asked to describe their feelings and behavioral intentions towards these groups. The first group was always Chinese and the second group was either Turkish or Russian. Only results for the target group, Chinese people, will be presented in this paper. After completion of the "second study" participants received their compensation. Participants were then thanked and fully debriefed.

Mediator variables *Self-efficacy expectancy* was measured using three items ($\alpha = .78$), with participants responding on seven-point scales (1 = *strongly disagree*; 7 = *strongly agree*) (e.g., "I am confident, that I have the skills to develop positive relationships with Chinese" and "Even under difficult circumstances, I can trust my abilities to have a positive interaction with Chinese"). Participants' scores were computed by averaging across items, with higher scores reflecting greater self-efficacy expectancy. *Perceived intergroup uncertainty* was measured with 5 items ($\alpha = .82$). Participants were asked "Please think of how you would feel if you are in a room with only Chinese people." They then indicated the extent to which they would feel: awkward, accepted (reverse scored), impatient, certain (reverse scored), and irritated (1 = *not at all*; 7 = *very*). These items were adapted from Stephan and Stephan (1985). Scores were computed by averaging across items, with higher scores reflecting greater uncertainty.

Dependent variables Since affectively-based measures of intergroup attitudes have been identified as especially predictive of willingness to engage in intergroup contact (Dovidio, Esses, Beach, & Gaertner, 2003), *intergroup affect* was measured using the widely-used feeling “thermometer” (Campbell, 1971). Participants were asked to provide a number between 0° and 100° that best represents their overall feeling towards that specific group. The ends of the scale (0° and 100°) were labeled “*extremely cold*” and “*extremely warm*”. The midpoint (50°) was labeled “*neither cold nor warm*”. *Willingness for contact* was measured using five items ($\alpha = .83$), with participants responding on seven-point scales (1 = *strongly disagree*; 7 = *strongly agree*) (e.g., “I would be happy to personally get to know more Chinese people” and “I would not hesitate to attend a cultural event that is organized by the Chinese cultural association”). Scores were computed by averaging over items, with higher scores reflecting greater willingness for contact.²

Results and discussion

Suspicious and demand characteristics

Participants were asked, at the end of the study, to write down the purpose of the study and if they had any comments or questions about it. None of the participants expressed suspicion or correctly guessed the purpose of the study. It appears that suspicion about the purpose of the study and resulting demand characteristics did not play a role in the effects.

Tests of experimental effects Table 1 provides means and standard deviations, and Table 2 provides intercorrelations, for all measures. In line with our predictions, *t*-tests revealed that compared to those in the control condition, participants exposed to vicarious contact showed significantly more positive intergroup affect, $t(46) = -2.47, p = .017$ ($r = .34$); significantly greater willingness for contact, $t(46) = -2.91, p = .006$ ($r = .39$); significantly greater self-efficacy expectancy, $t(46) = -2.25, p = .030$ ($r = .31$); and significantly less perceived intergroup uncertainty, $t(46) = 3.68, p = .001$ ($r = .48$).³

Table 1. Means and standard deviations (in parentheses) for measured variables in Experiment 1 as well as planned comparisons between conditions

Variable	Vicarious contact ($n = 25$)	In-group control ($n = 23$)	$t(46)$	p
	$M (SD)$	$M (SD)$		
Intergroup affect	64.80 (17.11)	53.13 (15.43)	-2.47	.017
Willingness for contact	5.73 (1.24)	4.70 (1.22)	-2.91	.006
Self-efficacy expectancy	5.80 (0.84)	5.14 (1.17)	-2.25	.030
Perceived intergroup uncertainty	3.37 (1.17)	4.56 (1.05)	3.68	.001

Note. Intergroup affect (0 = *extremely cold*, 100 = *extremely warm*), Willingness for contact (1 = *strongly disagree*, 7 = *strongly agree*), Self-efficacy expectancy (1 = *strongly disagree*, 7 = *strongly agree*), Perceived intergroup uncertainty (1 = *not at all*, 7 = *very*).

Table 2. Correlations for manipulated and measured variables in Experiment 1

Variable	1	2	3	4
1. Condition	—			
2. Intergroup affect	.34*	—		
3. Willingness for contact	.39**	.43**	—	
4. Self-efficacy expectancy	.31*	.39**	.43**	—
5. Perceived intergroup uncertainty	-.48**	-.58**	-.53**	-.53**

Note. Condition was coded 1 = vicarious contact, and 0 = in-group control. * $p < .05$; ** $p < .01$.

Mediation analyses Mediation analyses were then used to assess whether the effects of the manipulation on intergroup affect and willingness for contact were mediated by variations in self-efficacy expectancy and perceived intergroup uncertainty. To test for the sequential effect of two mediators, we utilized the regression-based procedure outlined by Taylor, MacKinnon, and Tein (2008). For the regression analysis, we coded the vicarious contact condition with 1 and the control condition with 0. The analysis was performed twice, once using intergroup affect and once using willingness for contact as a dependent variable.

Intergroup affect The sequential mediation model for intergroup affect as dependent variable is depicted in Figure 1. Estimating the model requires that three regression equations be estimated: We first estimated the impact of the manipulation on the first mediator (self-efficacy expectancy): path 1; $b_1 = 0.66$, $SE_1 = 0.29$, $\beta_1 = .31$, $p = .030$. Second, the impact of the first mediator (self-efficacy expectancy) on the second mediator (perceived intergroup uncertainty) was estimated, while controlling for the manipulation: path 2; $b_2 = -0.50$, $SE_2 = 0.15$, $\beta_2 = -.42$, $p = .001$. Finally, we estimated the impact of the second mediator (perceived intergroup uncertainty) on the dependent variable (intergroup affect) while controlling for the manipulation and the first mediator: path 3; $b_3 = -6.75$, $SE_3 = 2.11$, $\beta_3 = -.49$, $p = .003$. We applied bootstrapping procedure (10,000 re-samples) using Mplus (version 5.2; Muthén & Muthén, 1998–2007) to test if the proposed sequential indirect effect differs from zero. The point estimate for the sequential indirect effect equated to 2.21 ($SE = 1.46$), with the 95% bias corrected confidence interval (BC CI) bounded by 0.381 and 6.814. The fact that zero falls outside this interval indicates the presence of a significant sequential indirect effect of the manipulation on intergroup affect via self-efficacy expectancy and perceived intergroup uncertainty. Including the two mediators in the regression analysis weakened substantially the

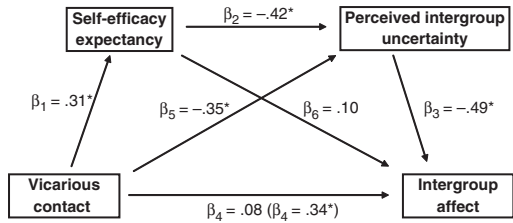


Figure 1. Path model of the effect of vicarious contact on intergroup affect, showing sequential mediation via self-efficacy expectancy and perceived intergroup uncertainty (Experiment 1).

Note: * $p < .05$; $N = 48$. Coefficients are standardized regression weights.

strength between the manipulation and intergroup affect (before inclusion of mediators: path 4; $b_4 = 11.67$, $SE_4 = 4.72$, $\beta_4 = .34$, $p = .017$; after inclusion of mediators path 4; $b_4 = 2.57$, $SE_4 = 4.72$, $\beta_4 = .08$, $p = .588$).

Willingness for contact We then estimated the same model for our second dependent variable – willingness for contact (see Figure 2). The first two paths (from the manipulation to the first mediator and from the first to the second mediator) are identical to those in the analyses involving intergroup affect. To obtain the third indirect path, we estimated the impact of the perceived intergroup uncertainty on willingness for contact while controlling for the manipulation and the first mediator: path 3; $b_3 = -0.36$, $SE_3 = 0.17$, $\beta_3 = -.34$, $p = .036$. Results from the bootstrapping procedure (10,000 re-samples) indicated that also using willingness for contact as dependent variable the proposed sequential indirect effect differed significantly from zero. The point estimate for the sequential indirect effect equated to 0.12 ($SE = 0.10$), with the 95% BC CI bound by 0.011 and 0.462. Including the mediators in the regression analysis weakened substantially the strength between the manipulation and willingness for contact (before inclusion of mediators path: 4; $b_4 = 1.03$, $SE_4 = 0.36$, $\beta_4 = .39$, $p = .006$; after inclusion of mediators path 4; $b_4 = 0.44$, $SE_4 = 0.37$, $\beta_4 = .17$, $p = .235$).

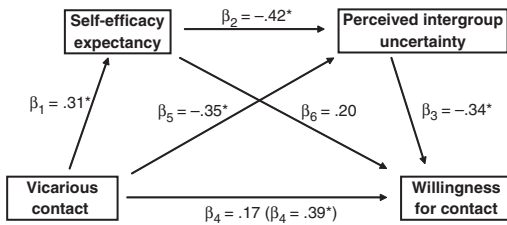


Figure 2. Path model of the effect of vicarious contact on willingness for contact, showing sequential mediation via self-efficacy expectancy and perceived intergroup uncertainty (Experiment 1).

Note. * $p < .05$; $N = 48$. Coefficients are standardized regression weights.

In addition to the significant sequential indirect effect of vicarious contact on intergroup affect (and willingness for contact), the direct path from vicarious contact on perceived intergroup uncertainty was also significant: path 5; $b_5 = -0.86$, $SE_5 = 0.31$, $\beta_5 = .35$, $p = .007$. This indicates that vicarious contact influences perceived intergroup uncertainty beyond the first mediator, self-efficacy expectancy.

Alternating the sequence of the mediators (putting perceived intergroup uncertainty first followed by self-efficacy expectancy) produced non-significant sequential indirect effects.⁴ This supports the proposed order of the two mediators.

In sum, this experiment provided evidence that observing *successful* intergroup interactions can increase positive intergroup affect as well as willingness for direct contact with the out-group. Furthermore, this experiment yields initial evidence that the relationship between the observation of cross-group contact and intergroup affect (and willingness for contact) is sequentially mediated by a novel set of mediators (self-efficacy expectations and intergroup uncertainty) derived directly from social-cognitive theory (Bandura, 1986, 1997).

One potential concern with this study is that the positive effect of the manipulation of vicarious contact may not have resulted from the observation of successful cross-group interactions, but

rather is due merely to exposure to a positive out-group exemplar (Zajonc, 1968). In Experiment 1, the manipulation of vicarious contact included a positive interaction between two students, but simultaneously (and unavoidably) it also included a positive depiction of an out-group exemplar. It is possible that depicting an interaction may be unnecessary to produce the positive effects on intergroup attitudes (and willingness to interact). Perhaps these positive effects result from the mere exposure to a positive depiction of an out-group member in a familiar situation, disconfirming stereotypic views about the out-group (Hewstone, Johnston & Aird, 1992; Johnston & Hewstone, 1992). To address this potential concern, we conducted a second experiment in which we included a third condition that included the depiction of a positive out-group member without interaction with an in-group model.

Experiment 2

In Experiment 2, we sought to replicate the findings of Experiment 1 with a different sample. Showing consistency in the effects of vicarious contact across different subject population demonstrates the robustness of the effect and increases confidence in the external validity of the findings (Brewer, 2000). More importantly, we also aimed to address a potential alternative explanation for our results, that mere exposure to a positive out-group member (Zajonc, 1968) is responsible for the vicarious contact effects found in Experiment 1. In addition to the two conditions used in Experiment 1, a third condition was introduced, in which an out-group member was depicted engaging in the same activities as seen in the other two conditions, but he/she did so alone. In line with social-cognitive theory, we assume that in order for vicarious contact to affect intergroup attitudes and behavior, the observation of an in-group member modeling *that* and *how* cross-group contact can occur is necessary. Thus, the observation of out-group members is not enough to drive these effects. This prediction is also in line with recent

research on stereotype change showing no change in stereotyping after exposure to a single out-group member (e.g., Hamburger, 1994; Paolini, Hewstone, Rubin, & Pay, 2004).

In addition to testing the mere exposure hypothesis, the *positive out-group member* condition provides an additional experimental means of excluding the possibility that the positive effects of the vicarious contact found in Experiment 1 were driven by social desirability. Both the vicarious contact and the positive out-group member conditions clearly depict the out-group member positively and thus should be equally likely to elicit positive demand characteristics.

If, as we predicted, vicarious contact cannot be explained by simple observation of a positive out-group member, but requires the observation of a proficient in-group model, the vicarious contact condition should produce more positive intergroup attitudes, greater willingness for contact, higher self-efficacy expectancy and lower perceived intergroup uncertainty compared to both the two in-group members condition and the single positively depicted out-group member condition. In fact, we predicted no effect of mere exposure, and thus expected no significant differences between the in-group control and the positive out-group member conditions.

Method

Participants Participants were recruited from community visitors to an open house at a German university. The sample consisted of 53 German participants (40 women) between 16 and 54 years ($M = 24.45$; $SD = 11.22$). Twenty-eight (53%) participants were secondary students, nine (17%) university students, eleven (21%) employed adults, and five (9%) unemployed adults.

Procedure and materials The procedures used in Experiment 2 were identical to those used in Experiment 1 except for the addition of the third condition, in which a single out-group member was depicted in the same situations as in the other two conditions. The actors, depicting

out-group members, were identical in the vicarious contact and positive out-group condition.⁵

Mediator variables The measures of *self-efficacy expectancy* ($\alpha = .79$), and *perceived intergroup uncertainty* ($\alpha = .82$), were identical to those used in Experiment 1.

Dependent variables *Intergroup attitudes* were measured by an adapted version of the General Evaluation Scale (Wright et al., 1997). Participants were asked to describe how they feel about Chinese people in general by using three bipolar adjective pairs separated by a seven-point scale ($\alpha = .83$): *negative–positive*, *unpleasant–pleasant*, *suspicious–trusting*. Scores were computed by averaging across items, with higher scores reflecting more positive attitudes towards Chinese people in general. Compared to the intergroup attitudes measure used in Experiment 1, the General Evaluation Scale is less affective and more evaluative in its nature. Using different measures of attitudes allowed us to investigate the generality of the vicarious contact effects across several components of out-group attitudes. The measure of *willingness for contact* was identical to the one used in Experiment 1 ($\alpha = .80$).

Results and discussion

Table 3 displays the means and standard deviations, and Table 4 provides the intercorrelations for all the measures. Although there are several high intercorrelations between these variables we will treat them separately as they are conceptually distinct, are normally treated as such, and there are very good reasons why these correlations should be inflated by the experimental procedures used in the current study.⁶

Tests of experimental effects Orthogonal contrasts were utilized to test our two primary predictions. First, replicating and extending findings from Experiment 1, the vicarious contact condition should result in more positive intergroup attitudes, greater willingness for contact, higher self-efficacy expectancy and lower perceived intergroup uncertainty than either the in-group control

Table 3. Means and standard deviations (in parentheses) for measured variables in Experiment 2 as well as planned comparisons between conditions

Variable	Vicarious contact (<i>n</i> = 19)	In-group control (<i>n</i> = 17)	Positive out-group member (<i>n</i> = 17)	1. Comparison (1–1 0)		2. Comparison (1 0–1)		3. Comparison (0–1 1)	
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>t</i> (50)	<i>p</i>	<i>t</i> (50)	<i>p</i>	<i>t</i> (50)	<i>p</i>
Intergroup attitudes	5.28 (0.72)	4.67 (0.90)	4.22 (1.07)	2.04	.047	3.54	.001	−1.46	.151
Willingness for contact	5.60 (0.85)	4.82 (1.17)	4.75 (1.36)	2.05	.045	2.24	.030	−0.19	.854
Self-efficacy expectancy	5.21 (0.69)	4.37 (1.10)	4.71 (1.20)	2.49	.016	1.50	.139	0.97	.339
Perceived intergroup uncertainty	3.41 (1.03)	4.27 (1.06)	4.32 (1.46)	−2.16	.035	−2.28	.027	0.12	.909

Note: All scales are 7-point scales, higher scores are indicative of more extreme responding in the direction of the construct assessed.

Table 4. Correlations for manipulated and measured variables in Experiment 2

Variable	1	2	3	4
1. Condition	–			
2. Intergroup attitudes	.41**	–		
3. Willingness for contact	.33*	.65**	–	
4. Self-efficacy expectancies	.31*	.53**	.57**	–
5. Perceived intergroup uncertainty	–.34*	–.70**	–.56**	–.50**

Note: Condition was coded 1 = vicarious contact, 0 = in-group control and positive out-group member. * $p < .05$; ** $p < .01$.

or the positive out-group member condition. Second, we predicted that mere exposure to a single positive out-group member should have no effect on any of the dependent measures of mediators and thus this condition should not differ significantly from the in-group control.

Orthogonal contrast analysis provides an effective, parsimonious and powerful method to test these hypotheses (Furr & Rosenthal, 2003; Rosenthal, Rosnow, & Rubin 2000). For the first contrast we assigned the vicarious contact condition a weight of 2 and the in-group control and positive out-group member condition were each assigned a weight of –1. The second contrast compared the positive out-group member condition (weighted 1) with the in-group control condition (weighted –1; vicarious contact condition weighted 0).

As predicted, the first contrast showed that, compared with participants in both the in-group control and positive out-group member

conditions, participants in the vicarious contact condition had significantly more positive intergroup attitudes, $t(50) = 3.25$, $p = .002$ ($r = .42$), significantly greater willingness for contact, $t(50) = 2.50$, $p = .016$ ($r = .33$), significantly higher self-efficacy expectancy, $t(50) = 2.33$, $p = .024$ ($r = .31$), and less perceived intergroup uncertainty, $t(50) = –2.59$, $p = .013$ ($r = .34$).

Also as predicted, the second contrast showed that participants in the in-group control condition and those in the positive out-group member conditions did not differ significantly on intergroup attitudes, $t(50) = –1.46$, $p = .151$ ($r = .20$), willingness for contact, $t(50) = –0.19$, $p = .854$ ($r = .03$), self-efficacy expectancy, $t(50) = 0.97$, $p = .339$ ($r = .14$), or perceived intergroup uncertainty, $t(50) = –0.12$, $p = .909$ ($r = .02$).

Mediational analyses As in Experiment 1, we tested for the predicted sequential mediation model using the procedure described by Taylor

et al. (2008). For the regression analyses we coded the vicarious contact condition with 2 and the control and the positive out-group condition were each coded with -1. The analysis was performed twice, once using intergroup attitudes and once using willingness for contact as a dependent variable.

Intergroup attitudes The sequential mediation model for intergroup attitudes as dependent variable is depicted in Figure 3. We first estimated the impact of the manipulation on self-efficacy expectancy: path 1; $b_1 = 0.22$, $SE_1 = 0.10$, $\beta_1 = .31$, $p = .024$. Second, the impact of self-efficacy expectancy on perceived intergroup uncertainty was estimated, while controlling for the manipulation: path 2; $b_2 = -0.52$, $SE_2 = 0.15$, $\beta_2 = -.44$, $p = .001$. Finally, we estimated the impact of perceived intergroup uncertainty on out-group attitudes while controlling for the manipulation and the first mediator: path 3; $b_3 = -0.43$, $SE_3 = 0.09$, $\beta_3 = -.54$, $p < .001$. Results from the bootstrapping procedure (10,000 re-samples) indicated that using intergroup attitudes as dependent variable, the proposed sequential indirect effect differed significantly from zero. The point estimate for the sequential indirect effect via self-efficacy expectancy and perceived intergroup uncertainty equated to 0.05 ($SE = 0.03$), and the 95% BC CI did not include zero [0.009, 0.141]. Including the two mediators in the regression analysis weakened substantially the effect of the manipulation on intergroup attitudes (before inclusion of mediators: path 4; $b_4 = 0.28$, $SE_4 = 0.09$, $\beta_4 = .41$, $p = .002$; after inclusion of mediators: path 4; $b_4 = 0.11$, $SE_4 = 0.07$, $\beta_4 = .16$, $p = .129$).

Willingness for contact We then estimated the same model for our second dependent variable—willingness for contact (see Figure 4). The first two paths (from the manipulation to the first mediator and from the first to the second mediator) are identical to those in the analyses involving intergroup attitudes. To obtain the third indirect path, we estimated the impact of perceived intergroup uncertainty on willingness for contact

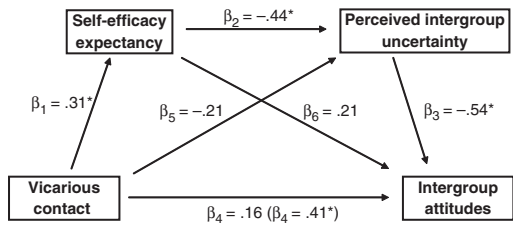


Figure 3. Path model of the effect of vicarious contact on intergroup attitudes, showing sequential mediation via self-efficacy expectancy and perceived intergroup uncertainty (Experiment 2).

Note: * $p < .05$; $N = 53$. Coefficients are standardized regression weights.

while controlling for the manipulation and the first mediator: path 3; $b_3 = -0.33$, $SE_3 = 0.12$, $\beta_3 = -.34$, $p = .010$. Results from the bootstrapping procedure (10,000 re-samples) indicated that also using willingness for contact as dependent variable, the proposed sequential indirect effect differed significantly from zero. The point estimate for the sequential indirect effect equated to 0.04 ($SE = 0.03$), and the 95% BC CI did not include zero [0.005, 0.107]. Including the mediators in the regression analysis weakened substantially the effect of the manipulation on willingness for contact (before inclusion of mediators: path 4; $b_4 = 0.27$, $SE_4 = 0.11$, $\beta_4 = .33$, $p = .015$; after inclusion of mediators: path 4; $b_4 = 0.08$, $SE_4 = 0.09$, $\beta_4 = .10$, $p = .383$).

Besides the described indirect effect of self-efficacy expectancy on willingness for contact, there was also a significant direct path from self-efficacy expectancy to willingness for contact: path 5; $b_5 = 0.41$, $SE_5 = 0.14$, $\beta_5 = .36$, $p = .006$. This indicates that self-efficacy expectancy directly influenced willingness for contact in addition to its indirect effect through perceived intergroup uncertainty.

Switching the sequence of the mediators so that perceived intergroup uncertainty predicts self-efficacy expectancy, in this case, yielded similar results as the proposed model (i.e. significant sequential indirect effects did emerge with the reversed order of mediators).⁷ This implies that

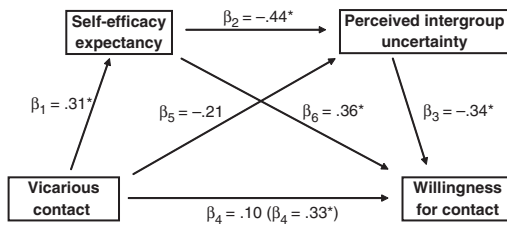


Figure 4. Path model of the effect of vicarious contact on willingness for contact, showing sequential mediation via self-efficacy expectancy and perceived intergroup uncertainty (Experiment 2).
Note. * $p < .05$; $N = 53$. Coefficients are standardized regression weights.

either order of the two mediational effects (first self-efficacy, then intergroup uncertainty as well as first perceived uncertainty, then self-efficacy expectancy) can account for the positive effects of vicarious contact on intergroup attitudes and willingness for contact. Given the correlational nature of these analyses and these results, causal inferences about the order of these mediators must be made with considerable caution and these findings clearly call for follow up involving experimental research.

In sum, the findings from Experiment 2, replicate with a very different sample, the positive impact of vicarious contact on intergroup attitudes and willingness for contact as well as the mediational effect of self-efficacy expectancy and perceived intergroup uncertainty observed in Experiment 1. This replication across samples increases confidence in the robustness and external validity of vicarious contact effects (Brewer, 2000).

This experiment excludes the alternative explanation that the effect of vicarious contact found in Experiment 1 resulted from the mere depiction of a positive out-group member. Moreover, because the vicarious contact and the positive out-group conditions both present participants with an out-group member in a very positive light, they should therefore be comparable in terms of possible demand characteristic. Thus, the significant differences between these two conditions speak

against the claim that the vicarious contact effects result from demand characteristics.

General discussion

We have introduced and shown in two experiments, using two different samples, that vicarious contact can improve observers' intergroup attitudes as well as increase their willingness to engage in direct cross-group contact. It appears that in vicarious contact situations, an in-group member can model for the observer *that* and *how* successful cross-group contact is possible. In both experiments, the data supported the predicted sequential mediational model, where the observation of successful cross-group interactions increased the observer's self-efficacy expectancy, which, in turn, reduced feelings of uncertainty, which then led to more positive out-group attitudes and greater openness to direct cross-group interaction.

Generally, these findings add experimental support for the effectiveness of indirect contact strategies as tools to improve intergroup relations. As noted earlier, we use the term "indirect intergroup contact" as an umbrella term for the many forms of contact that do not involve *actual* interactions between members of two groups. However, by integrating and applying concepts from social-cognitive theory (Bandura, 1986), this research also demonstrated that self-efficacy expectancy can be an important mechanism by which observing cross-group interactions produces changes in intergroup attitudes and behavior. In particular, vicarious contact can increase feelings of confidence about one's own behavior in cross-group situations which then can decrease uncertainty and awkwardness, which can increase motivation to enter direct contact situations (Avery et al., 2009; Plant & Devine, 2003; Stephan & Stephan, 1985). Thus, vicarious contact has the potential to overcome some of the psychological barriers that reduce motivation to engage in direct contact.

In addition, demand characteristics, as well as the mere depiction of positive out-group members (Zajonc, 1968), appear not to provide a

reasonable alternative explanation for the findings. We reduced the potential role of demand characteristics by using the "two-study-technique", leading participants to believe that they were taking part in two different and independent studies. Moreover, none of the participants in either experiment reported suspicion about the experiment or guessed the correct aim of the study. Finally, in Experiment 2, we found significant differences between the vicarious contact and the positive out-group conditions, both of which clearly exposed participants to positive representations of an out-group member, and thus any demand characteristics should have been compatible across these two conditions.

Future research

Vicarious contact shares three basic assumptions with theories of direct intergroup contact and other indirect intergroup contact effects (e.g., imagined contact, extended contact). First, the valence of the cross-group contact matters. In order for any indirect or direct contact strategy to improve intergroup relations the observed or experienced interaction must be subjectively *perceived* as positive (Allport, 1954; Crisp & Turner, 2009; Wright et al., 1997). Similarly, we postulate that in order for vicarious contact effects to occur the observed cross-group interaction must be *successful*; there must be a clear demonstration that the interaction accomplishes the concrete goals of the partners (e.g., working together on a common task), and is marked by good relations between the members of the groups. Second, as with extended contact effects, vicarious contact effects require that there be some perceived connection between the observer and the observed in-group member such that the actions of the in-group member are seen to be self-relevant for the observer (Wright et al., 2008). Third, in order to generalize from the observed out-group members to the out-group as a whole, it is important that group memberships be salient (Hewstone & Brown, 1986) and that the in-group and out-group

members are seen to be good representatives (prototypical) for their respective groups (Weber & Crocker, 1983; Wright et al., 2008).

Despite these shared assumptions, the application of social-cognitive theory expands our understanding of indirect contact beyond what has been proposed by extended contact theory by broadening the array of observed cross-group interactions that should improve intergroup attitudes. Extended contact, by definition (as provided by Wright et al., 1997), refers to the observation (or the awareness) of a cross-group *friendship*. Although the observation of a cross-group friendship should also influence the processes derived from social-cognitive theory, this theoretical approach suggests that vicarious contact effects can also result from the observation of more casual contact (e.g., contact between co-workers or contact between neighbors) if that contact meets the criteria for vicarious learning (Bandura, 1965). In other words, vicarious learning offers mechanisms by which the positive effects of indirect contact need not be limited to the observation of friendship. However, it is important to recognize that a single situation could lead to attitude change through several psychological processes, for example, through processes related to social learning (e.g., self-efficacy expectancy, acquisition of behavioral knowledge) as well as processes related to interpersonal closeness (e.g., inclusion of the other in the self).

Given the material used in our experiments, depicting cross-group contact situations within a typical student life context (e.g., meeting in a coffee shop and living together in a student residence) it is likely that a number of participants inferred friendship between the two students in the videos, and thus that feelings of interpersonal closeness were also involved in the effects (Wright et al., 1997). In order to investigate the effects of observing unstructured forms of everyday contact that are less likely to confound social learning and interpersonal closeness effects, future studies might include depictions of successful cross-group interactions that are more clearly not friendship-like (e.g., observing how cross-group colleagues work together on a project).

Moreover, a promising avenue for future research is to investigate, in an integrative way, when and how various contact processes occur along with other mechanisms associated with indirect contact and how these processes affect each other.

In our initial application of social-cognitive theory (Bandura, 1986, 1997), we focused on self-efficacy expectancy and on its crucial mediational role. Future research should investigate other social learning processes that could also underlie vicarious contact effects. For instance, in the mediational models presented in both experiments, in addition to the predicted sequential mediation, other diagonal paths were also significant. In Experiment 1, it was the path from vicarious contact to perceived intergroup uncertainty, and in Experiment 2 it was the path from self-efficacy expectancy to willingness for contact. Although these effects were less stable, they may be indicative of additional mediational processes which were not measured in these studies. As described in the introduction, social-cognitive theory would also propose the acquisition of new behavioral knowledge (scripts) as an outcome of vicarious contact that should also reduce perceived intergroup uncertainty (e.g., Avery et al., 2009; Bandura, 1986).

In addition, future research could explore whether self-efficacy expectancy influences people's willingness for contact beyond its effect on perceived intergroup uncertainty. For instance, self-efficacy may also produce positive approach-related emotions, like excitement and challenge, which could also produce greater willingness to engage in direct contact.

The proposed causal ordering of the mechanisms is consistent with the well-researched theoretical claims of social-cognitive theory (Bandura, 1997). In addition, we replicated the predicted sequential mediational model (with increased self-efficacy expectancy reducing perceived intergroup uncertainty) using different samples and different dependent variables (one affective and one evaluative measure of intergroup attitudes as well as the willingness for contact measure). This kind of multiple replication has been recently

suggested as a good source of evidence for a causal relation between mediators and the dependent variable (MacKinnon, Pirlott, & Moser, 2010). However, it should, of course, be noted that except for the direct effects of the manipulation, all other effects are based on correlational data and caution is always advised when making causal claims from correlational data. Moreover, although not significant in Experiment 1 (thus, clearly less reliable) the alternative sequential model with a reversed order of the mediators did result in a significant indirect effect in Experiment 2. Thus, future research might follow Spencer, Zanna, and Fong's (2005) suggestion for fully testing the causal order by systematically manipulating the proposed mediators.

Given the very different samples, measures, and analytical strategies, it is difficult to directly compare effect sizes across the two experiments. However, if the two experiments are compared only on the basis of the comparison between the vicarious contact condition and the in-group control condition (conditions common to both studies), the effect sizes in Experiment 1 are higher in three out of four analyses (r Experiment 1/ r Experiment 2): intergroup attitudes, .34/.28; willingness for contact, .39/.28; perceived intergroup uncertainty, .48/.29 and self-efficacy expectancy, .31/.33. These results could indicate that, as suggested by social-cognitive theory, similarity to the observed role model moderates the effects of vicarious contact. Participants in Experiment 1 were university students and thus more similar to the depicted model compared to participants in Experiment 2 who included secondary school students and adult members from the general community. However, future research should more systematically investigate this proposed moderation.

Practical implications

In both experiments we showed that vicarious contact can increase people's intention to have cross-group contact. In the absence of the possibility to measure actual behavior, behavioral

intentions are a promising proxy (see Sheeran, 2002). However, to fully explore the practical relevance of vicarious contact effects, future research should go beyond behavioral intentions and commitments and investigate actual cross-group interactions. In addition, it would be beneficial to know if experimental effects of vicarious contact created in the laboratory can influence subsequent real-world cross-group interactions. To our knowledge, there are no studies that examined the long-term stability of experimentally induced indirect contact effects and whether they can facilitate direct cross-group interactions.

Nonetheless, the concept of vicarious contact has clear potential for application, for example, to mass communication. Although somewhat dated, a review of the literature on American television (Graves, 1999) showed that diverse racial/ethnic groups as well as interethnic interactions were underrepresented in programming and advertising, and the author concluded that television was an unlikely source of information on how to interact successfully in cross-ethnic situations. Moreover, as demonstrated by Weisbuch, Pauker, and Ambady (2009) exposure to televised non-verbal behaviors can also have negative effects on intergroup relations by subtly transmitting race biases. However, the presented research suggests that observing *successful* cross-group interactions can have positive effects. If properly represented, depictions of cross-group interactions in the mass media could serve as a source of information on how to interact successfully in cross-group situations and could thus improve intergroup attitudes, increase direct in-group contact and in so doing contribute to positive social change (cf. Bandura, 2004).

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Notes

- 1 The term "vicarious contact" has been used in the literature to describe a number of very different interventions (e.g., Gómez & Huici, 2008; Herek & Capitanio, 1997; Katz & Zalk, 1978). We propose using the term vicarious contact, in line with Bandura's usage of the concept "vicarious learning", to refer to the effects of observing successful cross-group interactions, in which "new responses are acquired or the characteristics of existing response repertoires are modified as a function of observing the behavior of others and its reinforcing consequences" (Bandura, 1965, p. 3).
- 2 We also included a second measure of participants' intention to engage in cross-group contact. Before the debriefing, when the study seemed to be over, participants were offered the chance to take part in a communication study, where they would communicate with and get to know Chinese people for four hours. This *behavioral commitment measure of willingness for direct contact* represents a more concrete commitment than the more hypothetical willingness for contact scale. The measure provided further evidence of the effectiveness of vicarious contact (coded 1 if the participants wrote down their email and 0 if participants did not). In the vicarious contact condition, 72% of the participants expressed willingness to take part in a study in which they would meet and communicate with Chinese people, compared to only 48% in the control condition. Based on the odds ratio, participants were 2.82 times more likely to sign up to have contact with Chinese people if they had experienced vicarious contact than if they observed only in-group members interacting. The resulting Chi-square was significant ($\chi^2 = 2.93, p = .044$, one-tailed).
- 3 Effect-sizes are given in Pearson's correlation coefficients, r , as a measure of the strength of the relationship between the experimental manipulation and the dependent variable. The coefficients are constrained to lie between 0 (no effect) and ± 1 (a perfect effect). We chose this measure because it is one of the most commonly used effect-size measures, very versatile in its applicability and easily interpreted (see Field, 2009; Rosenthal & DiMatteo, 2001).
- 4 We first estimated the impact of the manipulation on perceived intergroup uncertainty: path 1; $b_1 = -1.19, SE_1 = 0.32, p < .001$. Second, the impact of perceived intergroup uncertainty on self-efficacy expectancy was estimated, while controlling for the

manipulation: path 2; $b_2 = -0.41$, $SE_2 = 0.12$, $p = .002$. Third, the impact of self-efficacy expectancy on intergroup affect while controlling for the manipulation and the first mediator: path 3; $b_3 = 1.65$, $SE_3 = 2.34$, $p = .485$. Using *intergroup affect* as dependent variable, bootstrapping procedure (10,000 re-samples) revealed that the indirect effect via the reversed order of mediators did not differ significantly from zero ($PE = 0.80$; $SE = 1.28$) and the 95% BC CI included zero $[-1.283, 4.166]$. For *willingness for contact*, we estimated the impact of self-efficacy expectancy on this outcome variable, while controlling for the manipulation and the first mediator: path 3; $b_3 = 0.25$, $SE_3 = 0.18$, $p = .173$. Bootstrapping procedure (10,000 re-sample) indicated that the indirect effect on willingness for contact via the reversed order of the mediators did also not differ significantly from zero ($PE = 0.12$; $SE = 0.12$) and the 95% BC CI did include zero $[-0.052, 0.416]$.

- 5 Pre-tests showed that participants did not differ systematically in how positive the interactions were perceived, depending on the intra-/intergroup context, nor did participants differ in their post-experimental mood ratings, depending on the experimental condition (vicarious contact, positive out-group member and control).
- 6 Running a factor analysis would have been inappropriate given the small sample size (Comrey & Lee, 1992) and the absence of procedures to correct for the experimental inflation of inter-item correlations in an experiment with three conditions.
- 7 We first estimated the impact of the manipulation on perceived intergroup uncertainty: path 1; $b_1 = -0.30$, $SE_1 = 0.11$, $p = .012$. Second, the impact of perceived intergroup uncertainty on the self-efficacy expectancy was estimated, while controlling for the manipulation: path 2; $b_2 = -0.38$, $SE_2 = 0.11$, $p = .001$. Third, the impact of self-efficacy expectancy on intergroup attitudes while controlling for the manipulation and the first mediator: path 3; $b_3 = 0.20$, $SE_3 = 0.11$, $p = .064$. Using *intergroup attitudes* as dependent variable, bootstrapping procedure (10,000 re-samples) indicated, that the indirect effect via the reversed order of mediators significantly differed from zero ($PE = 0.02$; $SE = 0.02$) and the 95% BC CI did not include zero $[0.003, 0.070]$. For *willingness for contact*, we estimated the impact of self-efficacy expectancy on this outcome variable, while controlling for the

manipulation and the first mediator: path 3; $b_3 = 0.41$, $SE_3 = 0.14$, $p = .006$. Bootstrapping procedure (10,000 re-samples) indicated that the indirect effect on willingness for contact via the reversed order of the mediators also significantly differed from zero ($PE = 0.05$; $SE = 0.03$) and the 95% BC CI did not include zero $[0.006, 0.146]$.

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