

How does intergroup contact reduce prejudice? Meta-analytic tests of three mediators[†]

THOMAS F. PETTIGREW^{1*} AND LINDA R. TROPP²

¹*University of California, Santa Cruz, USA*

²*University of Massachusetts, Amherst, USA*

Abstract

Recent years have witnessed a renewal of interest in intergroup contact theory. A meta-analysis of more than 500 studies established the theory's basic contention that intergroup contact typically reduces prejudices of many types. This paper addresses the issue of process: just how does contact diminish prejudice? We test meta-analytically the three most studied mediators: contact reduces prejudice by (1) enhancing knowledge about the outgroup, (2) reducing anxiety about intergroup contact, and (3) increasing empathy and perspective taking. Our tests reveal mediational effects for all three of these mediators. However, the mediational value of increased knowledge appears less strong than anxiety reduction and empathy. Limitations of the study and implications of the results are discussed. Copyright © 2008 John Wiley & Sons, Ltd.

Recent decades have witnessed an intense renewal of research and theoretical interest in Allport's (1954) intergroup contact hypothesis. Hundreds of papers have appeared since the publication of Hewstone and Brown's (1986) *Contact and Conflict in Intergroup Encounters*. This work has advanced the hypothesis into a developed theory (Brown & Hewstone, 2005; Pettigrew, 1998), shown its applicability to a wide variety of groups and settings, and firmly established its basic contention that intergroup contact typically diminishes intergroup prejudice (Pettigrew & Tropp, 2006). These results, combined with their direct policy implications, have encouraged a concentrated research effort to understand the processes involved and how this established effect can be maximized (Brown & Hewstone, 2005).

A meta-analysis of 515 studies involving a quarter of a million participants in 38 nations estimates the mean effect size between contact and prejudice as a correlation coefficient of $-.21$. Greater intergroup contact typically corresponds with lower levels of intergroup prejudice, and 94% of the studies reveal an inverse relationship between contact and prejudices of many types. Moreover, the more rigorous experimental studies yield a stronger mean effect of $r = -.33$ (Pettigrew & Tropp, 2006).

Contact theory has now been extended in new directions. Pettigrew and Tropp's (2006) meta-analytic work shows that contact effects hold equally well for groups other than races and ethnicities for whom contact theory was originally developed. Additionally, researchers have begun to examine moderators of contact's effects. For example, contact in the form of cross-group friendships (Levin, van Laar, & Sidanius, 2003; Paolini, Hewstone, Cairns, & Voci, 2004; Pettigrew, 1997) or structured under Allport's optimal conditions (Pettigrew & Tropp, 2006) typically promotes greater reductions in intergroup prejudice. Additionally, affective indices of prejudice tend to yield stronger contact effects than such cognitive indices as stereotypes (Tropp & Pettigrew, 2005a). And the effects of contact are significantly stronger for majority group members than for members of minority status groups (Tropp, 2007; Tropp & Pettigrew, 2005b).

*Correspondence to: Thomas F. Pettigrew, Department of Psychology, University of California, Santa Cruz, Santa Cruz, CA 95064, USA.
E-mail: pettigr@ucsc.edu

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MEDIATORS OF THE CONTACT-PREJUDICE EFFECT

These consistent and widespread findings raise a central question: just *how* does intergroup contact reduce prejudice? A number of different processes have been proposed and tested in the research literature. Consider the three most commonly tested mediational processes.

Knowledge

The original idea of early theorists was that intergroup contact facilitated learning about the outgroup, and this new knowledge in turn reduced prejudice (see Allport, 1954). This emphasis was in keeping with popular thinking in the United States at the middle of the 20th century. The Human Relations Movement advocated formal settings of intergroup contact – such as “Brotherhood Dinners” each February (Pettigrew, 2004). The explicit idea was that this kind of interaction would allow the different groups to learn about each other and see how similar they really were. Note this approach focused on information as a means of lessening prejudice, while virtually denying actual group differences. But these well-meaning efforts carefully avoided tackling intergroup conflict at the societal level and politically explosive issues of institutional change. Nevertheless, the Human Relations Movement directly influenced American social psychology, and throughout much of the late 20th century contact research followed Allport’s (1954) emphasis on knowledge as a key mediator.

Anxiety

More recently, researchers have been testing other potential mediators of the contact-prejudice association. The Stephans and Stephans (1985), in a much cited paper, drew attention to the role of threat in intergroup contact and the corresponding arousal of anxiety. Research inspired by their analysis has demonstrated repeatedly that intergroup contact typically reduces intergroup threat and anxiety (Blascovich, Mendes, Hunter, Lickel, & Kowai-Bell, 2001; Page-Gould, Mendoza-Denton, & Tropp, submitted; Paolini et al., 2004; Pettigrew, 1998; Stephan, Stephan, & Gudykunst, 1999; Stephan et al., 2002; Voci & Hewstone, 2003).

Particularly strong evidence comes from the research of Blascovich and his colleagues (2001). In a laboratory setting, they showed that interaction with physically stigmatized partners caused threat and anxiety responses measured physiologically, behaviorally, and subjectively. Moreover, these and other authors have found that Whites who have had contact with members of other racial and ethnic groups show lower levels of physiological stress and self-reported anxiety than Whites without such contact experiences (Blascovich et al., 2001; Page-Gould et al., submitted).

Empathy and Perspective Taking

Inspired by the work of Batson and his colleagues (Batson, Early, & Salvarani, 1997; Batson, Lishner, Cook, & Sawyer, 2005; Batson, Polycarpou, Harmon-Jones, & Imhoff, 1997), additional work has examined empathy and perspective taking as possible mediators of the association between intergroup contact and prejudice. Intergroup contact, and especially close, cross-group friendship, may enable one to take the perspective of outgroup members and empathize with their concerns. This new perspective could in turn contribute to improved intergroup attitudes, thereby acting as a mediator in contact’s reduction of prejudice.

This contention is consistent with recent findings that intergroup contact can involve self-expansion processes, in which individuals extend their sense of self to include the outgroup (Aron & McLaughlin-Volpe, 2001; Wright, Aron, & Brody, in press). Similarly, in an experimental setting, Vescio, Sechrist, & Paolucci (2003) found that perspective taking can promote more favorable racial attitudes. These perspectives also mesh with McFarland’s (1999) research using both student and adult samples showing that empathy is an important negative correlate of prejudice together with the positive correlates of authoritarianism and social dominance orientation.

We now have sufficient numbers of studies that have tested one or more of these mediators to examine their roles using meta-analytic procedures. The present research tests which of these three key concepts – knowledge, anxiety, and empathy/perspective taking – are the most effective mediators in accounting for intergroup contact's effects on prejudice.

METHOD

Data Collection

We built upon our extensive file of 515 intergroup contact studies conducted through the year 2000, using the same data collection procedures employed in our previous meta-analytic study (Pettigrew & Tropp, 2006). Specifically, we began with computer searches of the psychological (*PsycINFO*), sociological (*SocAbs* and *SocioFile*), political science (*GOV*), education (*ERIC*), dissertation (*UMI Dissertation Abstracts*), and general research periodical (*Current Contents* and the *Social Science Citation Index via the Web of Science*) abstracts through June 2005. These searches employed a large series of combined terms (e.g., “prejudice and contact and anxiety”), rather than using wild card search terms. With the *Social Sciences Citation Index*, we also checked on later citations of seminal contact studies, following the “descendancy approach” described by Cooper (1998) and Johnson and Eagly (2000).

To reach the “invisible college” of intergroup contact researchers, we wrote personal letters and e-mails to researchers who had published relevant, seminal, and frequently cited research. We requested pertinent unpublished data and conference papers, along with suggestions for others to be contacted. Those whose names they supplied, often their graduate students, were then contacted for further material. Reference lists from located studies and previous reviews also proved an invaluable resource. We also requested relevant materials via e-mail networks of social psychologists in Australia, Europe, and North America. With these various cross-cutting methods, we sought to extend the widest net possible for gathering relevant studies.

Using these same search procedures, we added to our files studies of contact and prejudice conducted since 2000 and through June 2005 that used one or more of our target variables – knowledge, anxiety reduction, and/or empathy and perspective taking – so that these could be considered as mediators in the relationships between contact and prejudice.

These search efforts uncovered 11 studies with 17 independent samples and 2543 participants that tested knowledge as a mediating process; nine studies with 14 independent samples and 2362 participants that tested empathy and perspective taking as a mediating process; and 45 studies with 60 independent samples and 13 343 participants that tested anxiety reduction as a mediating process. In total, we uncovered 54 studies with 91 independent samples; some studies tested two of the mediators, but only one tested all three.

On the basis of our decade-long meta-analytic work with the intergroup contact literature (see Pettigrew & Tropp, 2006), we estimate that there are now more than 750 published and unpublished studies of intergroup contact that meet our original inclusion criteria. Yet earlier studies rarely investigated mediation. Thus, we are confident that the 54 studies and 91 samples we uncovered comprise the great majority of relevant cases. Note also that the number of participants involved with each potential mediator is far greater than that required to detect mediational effects (Fritz & MacKinnon, 2007).

Inclusion Criteria

We employed the same inclusion criteria used in our previous meta-analysis of contact studies (Pettigrew & Tropp, 2006), with one addition pertinent to mediation.

- (1) We consider *only those empirical studies in which intergroup contact acts as the independent variable and intergroup prejudice as the dependent variable*. Eligible studies include both experimental studies that test for the effects of intergroup contact on prejudice and correlational studies that use reported intergroup contact as a predictor of prejudice.
- (2) *Only research that involves contact between members of discrete groups is included*. This rule insures that we examine *intergroup* outcomes of contact rather than interpersonal outcomes.
- (3) *The research must report on some degree of direct intergroup interaction*. For inclusion, the intergroup interaction must be observed directly or reported by participants. This third rule removes research that utilizes rough proximity or

group proportions to *infer* intergroup interaction. Proximity is a necessary but not sufficient condition for social contact (Festinger & Kelley, 1951).

- (4) *The prejudice dependent variables must be collected on individuals rather than simply being represented as a total aggregate outcome.*
- (5) Finally, relevant to our analysis of mediators, we use *only those studies that report data on the relationships between contact and prejudice, along with reporting their relationships to indicators of knowledge, anxiety, and/or empathy and perspective taking.* Unfortunately, only a small fraction of the huge intergroup contact research literature meets this criterion.

Computation and Analysis of Effect Sizes

We employed random effects models in our initial analyses of these data. This choice is a conservative procedure that sharply reduces the probability levels obtained. The random effects approach holds that part of the differences in effects across studies is essentially random whose sources we cannot identify (Hedges, 1994; Hedges & Olkin, 1985; Lipsey & Wilson, 2001; Mosteller & Colditz, 1996; Raudenbush, 1994). This approach is especially appropriate when meta-analytic samples are comprised of studies that are heterogeneous with effects that are likely to be determined by multiple factors (Cook et al., 1992). An additional advantage of the random effects approach is that it allows our findings to be generalized to other contact studies beyond those employed in our analysis.

We report Pearson's r as the effect size indicator throughout our analyses. If the studies do not report this measure, we derived it from other statistics by use of the conversion formulas provided by Johnson's (1993) DSTAT software. A negative mean effect size indicates that greater intergroup contact is associated with lower prejudice. We employ independent samples as our unit of analysis, because they are more numerous than studies.

Calculating the Mediation Effects

This method is a relatively new application of meta-analysis to exploit the vast research literature accumulated in social psychology (Shadish, 1996).

Consequently, we list the four steps we employed to estimate the mediation effects in some detail.

- [1] *First, we weighted each sample's effect size by the inverse variance* (see Hedges & Olkin, 1985). This weighting was achieved using SPSS macros and guidelines developed by Wilson (2002), which provide the appropriate parameters and probability values for meta-analytic data (see also Lipsey & Wilson, 2001). This procedure ensures that the larger and more reliable samples contribute proportionately more to the mean.
- [2] *We next obtained the three-variable matrix for each of the three mediators from the nine meta-analyses.* Table 1 shows these results using all samples – with the correlations between contact and the mediator, contact and prejudice, and the mediator and prejudice for the three mediators. Table 2 shows them for just homogeneous samples.
- [3] *Using these matrices, we then employed a structural equation model (SEM) for each mediator to obtain the two coefficients and their standard errors necessary to test for mediation: one unstandardized regression coefficient and its standard error for the IV (contact) to mediator path, the other unstandardized regression coefficient and its standard error for the mediator to the DV (prejudice) path controlling for the IV to DV relationship.* This method has been previously employed by Premack and Hunter (1988) and discussed by Shadish (1996, p. 54).
- [4] *Armed with these four statistics, we were then able to employ the Sobel test to estimate the mediational effects* (Preacher & Hayes, 2004; Preacher & Leonardelli, 2006; Sobel, 1982). Note that the Sobel test cannot be directly made from the initial mean correlations of Tables 1 and 2; they must be first used in SEMs to obtain the needed data shown in Table 3.

Following our initial analysis using all relevant samples, we then repeated these four steps using only data from sub-samples that contained homogeneous effects. These additional analyses are useful in that they focus only on sub-sets of samples whose mean effects show no more variation around the mean than would be expected from sampling error alone. As such, this approach eliminates the need for the random effects model and addresses the issue of outliers by removing them.

Table 1. Random effects estimates of mean correlations for mediating processes

Mediating variable	Number of samples	Number of subjects	Random effects model			
			Mean <i>r</i>	SE	Z	<i>p</i>
KNOWLEDGE	17	2543				
Contact to knowledge			+ .22	.048	4.48	<.0001
Knowledge to prejudice			- .14	.039	-3.64	<.0003
Contact to prejudice			- .30	.032	-9.14	<.0001
ANXIETY	60	13 343				
Contact to anxiety			- .29	.018	-16.20	<.0001
Anxiety to prejudice			+ .37	.027	14.04	<.0001
Contact to prejudice			- .29	.021	-14.72	<.0001
EMPATHY	14	2362				
Contact to empathy			+ .35	.044	7.88	<.0001
Empathy to prejudice			- .41	.061	-6.59	<.0001
Contact to prejudice			- .37	.030	-12.62	<.0001

Table 2. Mean correlations for mediating processes using only homogeneous sub-sets of cases

Mediating variable	Number of samples	Number of subjects	Effects			
			Mean <i>r</i>	SE	Z	<i>p</i>
KNOWLEDGE						
Contact to knowledge	11	1946	+ .33	.023	15.05	<.0001
Knowledge to prejudice	10	1363	- .16	.027	-5.85	<.0001
Contact to prejudice	12	1301	- .22	.028	-8.10	<.0001
ANXIETY						
Contact to anxiety	43	9045	- .23	.011	-21.82	<.0001
Anxiety to prejudice	30	3940	+ .29	.016	18.45	<.0001
Contact to prejudice	36	5046	- .24	.014	-17.51	<.0001
EMPATHY						
Contact to empathy	8	1120	+ .35	.044	7.88	<.0001
Empathy to prejudice	8	1068	- .47	.031	-16.47	<.0001
Contact to prejudice	9	1419	- .35	.027	-13.41	<.0001

Table 3. Structural equation and Sobel test results

Mediating variable	Contact to mediator coefficient (SE)	Mediator to prejudice coefficient with contact to prejudice held constant (SE)	Sobel test for mediation	<i>p</i>
KNOWLEDGE				
All samples	+ .220 (.019)	- .078 (.019)	-3.87	<.001
Homogeneous samples only	+ .330 (.024)	- .098 (.026)	-3.64	<.001
ANXIETY				
All samples	- .290 (.008)	+ .312 (.008)	-26.60	<.0001
Homogeneous samples only	- .230 (.013)	+ .248 (.012)	-13.44	<.0001
EMPATHY				
All samples	+ .350 (.019)	- .320 (.019)	-4.38	<.0001
Homogeneous samples only	+ .350 (.027)	- .396 (.026)	-9.87	<.0001

We obtained homogeneous samples by use of Johnson's (1993) DSTAT program. One by one, we removed the most extreme outliers until homogeneity was obtained in each of our nine sub-sets of samples. The homogeneity of each sub-set of effect sizes was tested with the homogeneity statistic Q that has an approximate chi-square distribution with $k-1$ degrees of freedom, where k is the number of effect sizes (Hedges & Olkin, 1985). When Q is no longer significant ($p > .05$), the null hypothesis of homogeneity cannot be rejected.

Finally, we checked on the possibility of publication biases in our data. As with all research reviews, meta-analytic or qualitative, there is always the possibility of a publication bias. Published studies may form a biased sub-set of the relevant studies actually conducted, as the statistical significance of a study's results may influence the probability of it being submitted and published. Indeed, investigators have often demonstrated this bias in both the social science and medical research literatures (e.g., Coursol & Wagner, 1986; Dickersin, 1997; Lipsey & Wilson, 1993). Researchers may not send in studies with modest or counter-theory findings. And journals may publish studies with large effects and reject studies with small or no effects. Thus, reviews may systematically overestimate effect sizes since they rely heavily on published work.

By assiduously collecting relevant unpublished research, we reduced the possibility of a serious publication bias. These efforts also allow for tests of publication bias by comparing samples from published and unpublished studies. Five of the 17 knowledge samples, 10 of the 14 empathy samples, and 14 of the 60 anxiety reduction samples were unpublished, thereby providing opportunities to test whether publication status moderates the paths between contact and prejudice, contact and each mediator, and each mediator and prejudice. Significantly larger coefficients for the published samples would indicate publication bias.

RESULTS AND DISCUSSION

Mediation Effects

Table 1 presents the basic meta-analytic results and provides estimates of mean correlations for the nine paths that are needed for the SEMs. Using the SEM results shown in Table 3, knowledge, the initial possibility advanced by early theorists, reveals significant mediation as indicated by the Sobel mediation test (Preacher & Leonardelli, 2006; Sobel, 1982) – $Z = -3.87$, $p < .001$. This effect is restrained by the mean correlation between knowledge and reduced prejudice. It is the smallest in magnitude among the three mediators, with weighted r 's ranging between $+.13$ and $-.38$ for the 17 samples. Thus, simply knowing more about the outgroup typically does not have a major effect on reducing prejudice as demonstrated by the effects observed in these samples. Yet there is still significant mediation as originally posited.

By contrast, anxiety reduction emerges as a much stronger mediator. Table 3 shows that its Sobel test rendered a Z of -26.55 and $p < .0001$. Contact eases the initial anxiety that often accompanies the initiation of cross-group interaction (Blascovich et al., 2001), and this reduction in anxiety allows a concomitant reduction in prejudice. This result is consistent with several key findings of the intergroup contact research literature, demonstrating that affect is critical in determining the effects of intergroup contact (Christ, Mansel, Wagner, Asbrock, Schleuter, & Pettigrew, submitted; Esses & Dovidio, 2002; Miller, Smith, & Mackie, 2004; Tropp & Pettigrew, 2004, 2005a).

Finally, empathy and perspective taking also yield strong mediational effects. For these 14 samples, the Sobel test provides a $Z = -12.43$ with a $p < .0001$ (Table 3). It should be noted that the magnitude of the mean correlations in Table 1 involving empathy and perspective taking tend to be stronger than those for the other mediators; however, given the smaller number of samples and subjects available for the analysis, the significance level for the mediational test for empathy is smaller than that observed for anxiety. We do not have enough studies to detach the effects of empathy from those of the closely related variable of perspective taking – which represents a more cognitive dimension of empathy. But these results are consistent with much of the developing literature on the robust effects of empathy and perspective taking (see Batson, Ahmad, & Stocks, 2004).

Supplementary analyses also revealed that the three mediating variables are themselves intercorrelated. In those few studies where two or three of the mediators are used with the same samples, anxiety correlates significantly and negatively with both knowledge ($r = -.24$; $p < .01$) and empathy ($r = -.32$; $p < .01$). Knowledge and empathy, however, are generally unrelated ($r = +.05$, n.s.).

We have only a limited number of samples ($N = 9$) with which to test a saturated path model, using both anxiety and empathy as mediators for the contact-prejudice relationship. Here we repeat the procedures described in the methods

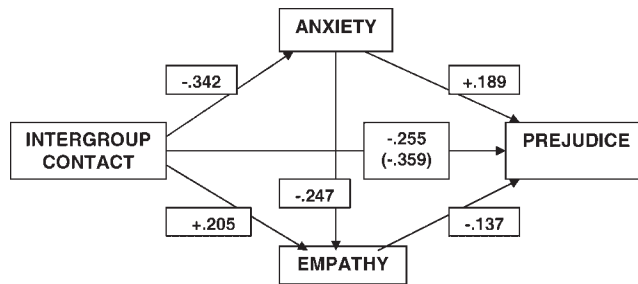


Figure 1. Saturated path model of mediation of the contact-prejudice association by anxiety reduction and empathy for nine samples with all four variables. All paths are standardized betas and statistically significant at $p < .001$

section; but this time we are using just nine-sample meta-analyses to develop a four-variable matrix for the SEM. Figure 1 presents the results. Note that while anxiety and empathy are significantly and negatively related, the two variables both mediate the contact-prejudice association in this combined model. Together they account for roughly half of the covariance between contact and prejudice.

Observe, too, that the contact-to-prejudice relationships in these analyses are considerably larger than the $r = -.21$ mean effect we observed in our larger meta-analysis of intergroup contact effects (Pettigrew & Tropp, 2006). This difference in magnitude reflects the fact that half of the current studies were conducted after 2000 and not included in our earlier study. Our previous analysis found that the mean effect size between contact and prejudice rose from every decade after 1970 – largely a function of more rigorous research methods used in recent contact research (see Pettigrew & Tropp, 2006). And this trend continued for the studies conducted after 2000.

Mediation for Homogeneous Sub-Sets of Samples

Thus far, we have used the full list of samples and heterogeneous mean effects in our analysis. Table 2 repeats the analyses using only effects that are homogeneous across samples, with outliers removed. The same pattern of results emerge. As shown in Table 3: For knowledge, the Sobel test yields a $Z = -3.64$ with $p < .001$; for anxiety, $Z = -13.44$ with $p < .0001$; and for empathy, $Z = -9.87$ with $p < .0001$.

Publication Status as a Moderator for the Mediated Effects

We then examined the role of publication status as a moderator by comparing mean effects for published and unpublished samples testing each mediational path. Comparisons between published and unpublished samples for the six paths involving knowledge and empathy showed no significant effects, $Q_B(1) = .08-2.29$, $p > .10$. At the same time, results showed that the contact-to-anxiety relationship was moderated by publication status, but in the opposite direction of what publication biases would commonly predict. Specifically, the contact-to-anxiety association was significantly stronger among the 13 *unpublished* samples (mean $r = -.36$) than among the 47 published samples (mean $r = -.28$), $Q_B(1) = 3.72$, $p = .05$. However, the anxiety-to-prejudice association did not significantly differ depending on whether the samples were published (mean $r = +.38$) or unpublished (mean $r = +.41$), $Q_B(1) = .24$, $p = .62$. Given the typical concern that estimates of mean effects would be greater for published studies than for unpublished studies (see Coursol & Wagner, 1986; Dickersin, 1997), these results suggest that a strong publication bias is not operating among intergroup contact studies examining the mediational processes of anxiety reduction, empathy, and knowledge.¹

¹This conclusion is strengthened further by the fact that with six comparisons for publication bias (two mediational paths for each of the three mediators), there is a 26% chance that one of the comparisons would be expected to be significant at the .05 level by chance alone.

Limitations of the Study

Several potential limitations of this study should be pointed out before we consider the broader implications of the results. First, we have used a relatively new form of analysis – assembling data from multiple meta-analyses to develop SEMs for determining mediation effects. While acknowledging its usefulness, Shadish (1996) emphasizes two potential problems with this method. First, difficulties can arise when diverse sub-sets of studies are used to estimate the coefficients for the same mediational effect. We avoided this problem in our first analysis by employing only the same sets of independent samples for all three paths of each mediational test. At the same time, we do use somewhat different, though overlapping, sets of samples for the three separate mediational tests. Thus, differences found between the three mediators could partly reflect the diverse sub-sets of samples.

A second issue involves the homogeneity of effects. Shadish (1996) notes that it is optimal if homogeneity of effects across samples is achieved – that is, if the estimated correlations are similar across samples testing each mediational path. As is typical of most meta-analytic data sets, none of the original sub-sets of cases showed homogeneous effects (see Table 1). We therefore calculated and presented in Table 2 the mediational paths for homogeneous sub-sets of cases, which yielded very similar patterns of results. Knowledge remains the weakest by far of the three mediators tested. While the homogeneity tests eliminate problems with outliers, they necessarily involve fewer samples as well as slightly different sets of samples within the same mediational analysis. Nonetheless, the comparability of the results shown in Table 3 provides additional confidence for our basic findings.

A third limitation is that there are many more mediators and moderators that exist in the complex relationship between intergroup contact and prejudice beyond those tested in this research (see Stephan, 1987). In Figure 1, we saw that the two principle mediators – anxiety-reduction and empathy – explained only about half of the contact-prejudice association. To predict the remaining variance, many other mediators should be considered. For example, self-disclosure, linked to friendship and empathy, mediates both direct and indirect contact effects (Turner, Hewstone, & Voci, 2005). Broadened views of the ingroup (Gaertner & Dovidio, 2000; Pettigrew, 1998), the perceived importance of the contact (Van Dick et al., 2004), the perception of greater outgroup variability (Islam & Hewstone, 1993; Oaker & Brown, 1986; Paolini et al., 2004) and threat (Tausch, Hewstone, Kenworthy, Cairns, & Christ, 2007; Wagner, Christ, Pettigrew, Stellmacher, & Wolf, 2006; Wagner, Christ, & Pettigrew, 2008) have also been shown to mediate intergroup contact effects. The mediating power of both empathy and anxiety reduction in the present analysis, together with the emerging emphasis on affective dimensions of intergroup contact (Tropp & Pettigrew, 2005a), suggest that additional mediators and moderators to be uncovered in future research will likely be affective in nature.

A final concern is that we cannot directly infer causal influences from these findings. But we know that non-recursive paths exist in the complex relationship between contact and prejudice that we have not considered here. Prior work shows that prejudice restricts intergroup contact at the same time contact reduces prejudice; still, the path from contact to prejudice is typically stronger than the path from prejudice to contact (see Butler & Wilson, 1978; Irish, 1952; Pettigrew, 1997; Powers & Ellison, 1995; Sherif, 1966; Van Dick et al., 2004; Wilson, 1996).

Implications of the Results

Despite these limitations, several important implications can be drawn from these meta-analytic results. Affective factors, such as anxiety reduction and empathy, are clearly major mediators relative to the more cognitively oriented mediator of knowledge. As noted, this finding is consistent with the growing research literature on the central role of affect in intergroup processes in general and intergroup contact in particular (see Tropp & Pettigrew, 2004, 2005a).

The significant correlations between anxiety reduction and both empathy and knowledge are suggestive. There may be a causal sequence operating whereby initial anxiety must first be reduced with intergroup contact before increased empathy, perspective taking, and knowledge of the outgroup can effectively contribute to prejudice reduction. Such a sequenced process must be tested longitudinally and experimentally in future work (see Blascovich et al., 2001; Page-Gould et al., submitted).

More work on empathy and perspective taking in contact research is also indicated. We found only nine studies with 14 samples through June 2005. But the meta-analyses involving these few studies strongly suggest that this is an important process underlying the positive effects of intergroup contact. Future research should distinguish more sharply between the

effects of empathy and perspective taking – something we could not attempt with the paucity of research to date. But the patterns of effects observed in the present analysis suggest that greater emphasis on processes involved in empathy and perspective taking would be a fruitful direction for future research.

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*1 = used in anxiety meta-analysis; 2 = used in empathy/perspective taking meta-analysis; and 3 = used in knowledge meta-analysis.