Research Report

They All Look the Same to Me (Unless They're Angry)

From Out-Group Homogeneity to Out-Group Heterogeneity

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ABSTRACT—*People often find it more difficult to distinguish ethnic out-group members compared with ethnic in-group members. A functional approach to social cognition suggests that this bias may be eliminated when out-group members display threatening facial expressions. In the present study, 192 White participants viewed Black and White faces displaying either neutral or angry expressions and later attempted to identify previously seen faces. Recognition accuracy for neutral faces showed the out-group homogeneity bias, but this bias was entirely eliminated for angry Black faces. Indeed, when participants' cognitive processing capacity was constrained, recognition accuracy was greater for angry Black faces than for angry White faces, demonstrating an out-group heterogeneity bias.*

People readily confuse individuals from other races and ethnic groups with one another—the "they all look the same to me" phenomenon. This pattern may reflect a more general cognitive bias toward perceiving the membership of other groups as less variable than the membership of one's own group—the out-group homogeneity bias (Anthony, Copper, & Mullen, 1992; Ostrom & Sedikides, 1992). This bias is generally interpreted as resulting from constraints on perceptual processing capacity and perceivers' tendency to allocate limited perceptual resources in a functional way (e.g., Rodin, 1987; Sporer, 2001). Here, we elaborate on this functional approach to the out-group homogeneity bias, reporting a study in which we tested novel predictions about circumstances in which this bias may be eliminated or even reversed.

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FUNCTIONAL APPROACH TO PERCEPTION OF IN-GROUP AND OUT-GROUP MEMBERS

Cognitive resources are famously limited: People cannot attend to, encode, and remember all information available in their social environments (e.g., Todd, Hertwig, & Hoffrage, 2005). Thus, they selectively allocate cognitive resources to processing stimuli likely to have functional implications (Kenrick, Sadalla, & Keefe, 1998). For instance, snakes capture and hold attention more readily than do benign objects (Öhman, Flykt, & Esteves, 2001). In social situations, one attends more closely to some people than to others, favoring individuals whose physical appearance suggests greater benefits to one's own reproductive fitness or threats to one's well-being (Maner et al., 2003; Oda, 1997).

Whether explained in psychological terms (e.g., needs and goals), economic terms (e.g., costs and benefits), or evolutionary terms (e.g., reproductive fitness), perceptual and cognitive resources are selectively allocated toward individuals who appear to have the most profound functional implications for perceivers. Historically, the interpersonal interactions that mattered most to individuals' outcomes (e.g., mate selection, reciprocal exchange, and negotiation of status hierarchies) occurred within coalitional groups. Today, these interpersonal interactions continue to occur primarily within cultural and ethnic groups (Fiske, 1992). Contacts with out-group members tend not only to be less frequent, but also to involve group-level rather than individual-level interactions. Thus, we suggest that whereas the costs of allocating cognitive resources to processing in-group members are often offset by the benefits, the functional benefits of allocating cognitive resources to individual out-group members are typically outweighed by the costs.

BUT WHAT IF THEY ARE ANGRY?

Social cognitive processes are typically sensitive to functional aspects of dyadic and group ecology (Haselton, Nettle, & Andrews, 2005; Neuberg, Kenrick, Maner, & Schaller, 2004; Schaller, Park, & Faulkner, 2003). Although individuals' outcomes may depend more on interactions with in-group members than on interactions with out-group members, there are circumstances in which out-group members may have greater functional importance.

One circumstance in which the functional significance of out-group members increases is when those out-group members are angry. Research has shown that angry facial expressions capture and hold attention (e.g., Fox et al., 2000; Öhman et al., 2001). Two further considerations suggest that perception of anger may lead perceivers to allocate resources toward processing the individuating features of angry target persons. First, anger is an interpersonal emotion; it implies threatening intent held by a specific individual (the person expressing anger) toward another specific individual (the person perceiving the expression). Second, angry expressions, like all emotional expressions, are fleeting; the angry expression may disappear even when the threatening intention persists. Therefore, just as it is functional to attend to people with angry facial expressions (so one can detect and avoid those who intend one harm), it is also functional to encode individuating features of those individuals (so one can detect and avoid them later even when the overt anger cue is gone). This reasoning suggests that angry individuals from both in-groups and out-groups are likely to command an enhanced proportion of available cognitive resources, and such allocation of resources might lead to the attenuation of the out-group homogeneity bias.

An additional functional consideration suggests that perceivers may devote even more processing resources to angry out-group members than to angry in-group members: Angry out-group members may be judged to pose an even greater potential threat than angry in-group members. Various factors mitigate the actual threat posed by angry in-group members. For example, people more readily empathize with in-group members than with out-group members (Stürmer, Snyder, & Omoto, 2005), and empathy inhibits aggression (Loudin, Loukas, & Robinson, 2003). Moreover, high interdependency makes it more costly to harm in-group members than to harm out-group members. Interactions between groups, in contrast, are more frequently competitive (Wildschut, Pinter, Vevea, Insko, & Schopler, 2003). Thus, anger expressed by an out-group member may be perceived as more threatening than anger expressed by an in-group member. If so, angry out-group members may receive enhanced scrutiny, and subsequently be better differentiated from one another in memory than are angry in-group members. That is, in the case of perceived anger, there may be an *out-group heterogeneity bias*.

EXPLORATORY EVIDENCE AND THE PRESENT RESEARCH

Though designed to test conceptually unrelated hypotheses, two studies from our research program allowed for preliminary exploration of the effects of angry facial expressions on the out-group homogeneity bias. In one study, 168 White participants sequentially viewed single male faces varying in ethnicity (White, Black) and emotional expression (neutral, angry). Participants were later asked to distinguish these faces from previously unseen foils. A second study presented 206 participants with similar stimuli under more cognitively demanding circumstances: Two faces were presented simultaneously and for a shorter duration. In both of these studies, a significant interaction of ethnicity and facial expression emerged, $F(1, 205) = 48.38$, $p < .001$, $p_{rep} = 1.0$, $\eta_p^2 = .19$, and $F(1, 167) = 4.93$, $p < .05$, $p_{rep} = .91$, $\eta_p^2 = .03$, respectively. Results for neutral faces were consistent with the usual out-group homogeneity bias—lower recognition accuracy for neutral Black faces than for neutral White faces. For angry faces, however, the results diverged. In the first study, the usual homogeneity bias was eliminated: Angry Black faces were recognized just as accurately as angry White faces. In the second study, angry Black faces were recognized *more* accurately than angry White faces; that is, participants exhibited an out-group heterogeneity bias.

Results of these studies provided initial evidence that the out-group homogeneity bias might be eliminated, and perhaps even reversed, for angry facial expressions. However, neither study was specifically designed to test these possibilities. We therefore designed an experiment to test the hypotheses directly and to investigate one factor that may have led to the reversal of the out-group homogeneity bias in the second study—cognitive constraint. Previous research suggests that functional biases are often revealed more strongly when cognitive resources are limited (e.g., Maner et al., 2003; Meissner & Brigham, 2001). Applying this logic, a finding that processing constraints are associated with a reversal (and not merely the mitigation) of the out-group homogeneity bias would be consistent with the notion that angry out-group faces are functionally important enough to demand even more immediate processing than in-group faces.

METHOD

Participants, Design, and Stimuli

One hundred ninety-two White undergraduate students (117 male) participated in exchange for course credit.

The experiment was a 2 (target race: Black, White) × 2 (target expression: neutral, angry) × 2 (distractor presence: present, absent) × 3 (presentation duration: 500 ms, 1,000 ms, 4,000 ms) mixed design. Target race and target expression were manipulated within participants, and presentation duration and distractor presence were manipulated between participants.

Presentation stimuli included sixteen 5-in. × 3.5-in. gray-scale front-oriented male faces (Black and White faces that were either angry or neutral). For participants in the distractor-present condition, 16 similarly sized gray-scale images of abstract art were randomly paired with the faces. Sixteen new faces (also Black and White faces that were either angry or neutral) were employed as foils in the recognition memory test. The foils and studied faces were counterbalanced across participants.

Procedure

Each participant was seated at a computer, and an electrode was attached to his or her arm (purportedly to assess galvanic skin response, but the electrode was actually just a ruse). Participants then viewed the stimulus faces presented randomly in slide-show format with a 3,000-ms delay between successive slides.

Participants next watched a 5-min distractor film clip (consisting of landscapes) and then completed the recognition memory task (including previously presented faces and foils). For each photograph, participants responded on a 6-point scale ranging from *definitely did not see* to *definitely did see*.

Recognition was assessed by transforming these confidence ratings into binary yes/no judgments and computing nonparametric signal detection measures of sensitivity (A') and response bias ($B''d$; for computational details, see Stanislaw & Todorov, 1999, and Donaldson, 1992). *Sensitivity* reflects recognition accuracy and reveals the extent to which participants are able to differentiate previously seen stimuli from newly presented foils. *Response bias* reflects a participant's general threshold for responding "did see" versus "did not see" to a stimulus category. These statistics were calculated for each combination of target race and target expression.

RESULTS

Table 1 summarizes results for sensitivity (A') and response bias ($B''d$), as well as the hit and false alarm rates from which these measures were derived. Participant's sex produced no significant effects on these measures (all Fs < 1); therefore, we collapsed across sex for all analyses reported. For statistical tests, we report both p_{rep} values and standard p values, as indicators of replicability and significance, respectively (see Killeen, 2005).

Sensitivity (Recognition Accuracy)

Our focal hypotheses were tested via a 2 (target race) × 2 (target expression) repeated measures analysis of variance on sensitivity (A'). The predicted two-way interaction emerged, $F(1, 191) = 44.90$, $p < .001$, $p_{rep} > .99$, $\eta_p^2 = .19$.

Planned contrasts revealed better recognition accuracy for neutral White faces than for neutral Black faces, $F(1, 191) = 36.72$, $p < .001$, $p_{rep} > .99$, $\eta_p^2 = .16$—the familiar out-group homogeneity bias. In particular, the false alarm rate was higher for the neutral Black faces than for the neutral White faces, $F(1, 191) = 192.50$, $p < .001$, $p_{rep} > .99$, $\eta_p^2 = .50$, indicating that participants had difficulty differentiating the previously seen neutral Black faces from the neutral Black foils. In contrast, recognition accuracy was better for angry Black faces than for angry White faces, $F(1, 191) = 7.27$, $p < .01$, $p_{rep} = .957$, $\eta_p^2 = .04$—the predicted out-group heterogeneity bias. There were fewer false alarms to angry Black faces than to angry White faces, $F(1, 191) = 5.37$, $p = .02$, $p_{rep} = .924$, $\eta_p^2 = .03$, meaning participants had relatively little difficulty differentiating between previously seen angry Black faces and angry Black foils. Indeed, participants were much better at differentiating among angry Black faces than differentiating among neutral Black faces, $F(1, 191) = 60.04$, $p < .001$, $p_{rep} > .99$, $\eta_p^2 = .24$.

TABLE 1
Recognition Memory for Target Faces as a Function of Target Race and Target Expression

Target face	Hit rate	False alarm rate	A'	$B''d$
White, neutral	.677 (.28)	.121 (.21)	.844 (.17)	−.406 (.71)
Black, neutral	.793 (.24)	.421 (.28)	.742 (.23)	.371 (.69)
White, angry	.773 (.24)	.223 (.26)	.833 (.19)	.022 (.98)
Black, angry	.802 (.24)	.178 (.23)	.873 (.15)	−.058 (.75)

Note. A' = sensitivity (recognition accuracy); $B''d$ = response bias. A' typically ranges from .5 to 1 (.5 = chance, 1 = perfect accuracy). For ease of interpretation, we report $B''d$ values on a scale from −1 (*did not see*) to 1 (*did see*). Standard deviations are in parentheses.

Figure 1 presents the results for recognition accuracy in each of the six conditions defined by the manipulation of processing constraints (distractor presence/absence, presentation duration). A planned contrast comparing the Target Race × Target Expression interaction in the most highly constrained condition (500-ms duration, distractor present) and the least constrained condition (4,000-ms presentation, distractor absent) indicated a significant change in the strength of the memory crossover, $F(1, 186) = 4.51$, $p < .05$, $p_{rep} = .88$, $\eta_p^2 = .02$. These results support the idea that the out-group heterogeneity bias for angry faces may emerge primarily when processing ability is limited.

Response Bias

Research on cross-race identification reveals a more general set of response biases in addition to biases in recognition accuracy (e.g., Slone, Brigham, & Meissner, 2000; Sporer, 2001). Perceivers tend to show a low threshold for indicating recognition of out-group faces (i.e., typically reporting "did see" to out-group faces regardless of whether they have previously been encountered), whereas they show a more stringent threshold for indicating recognition of in-group faces (i.e., typically reporting "did not see" to in-group faces regardless of whether they have previously been encountered).

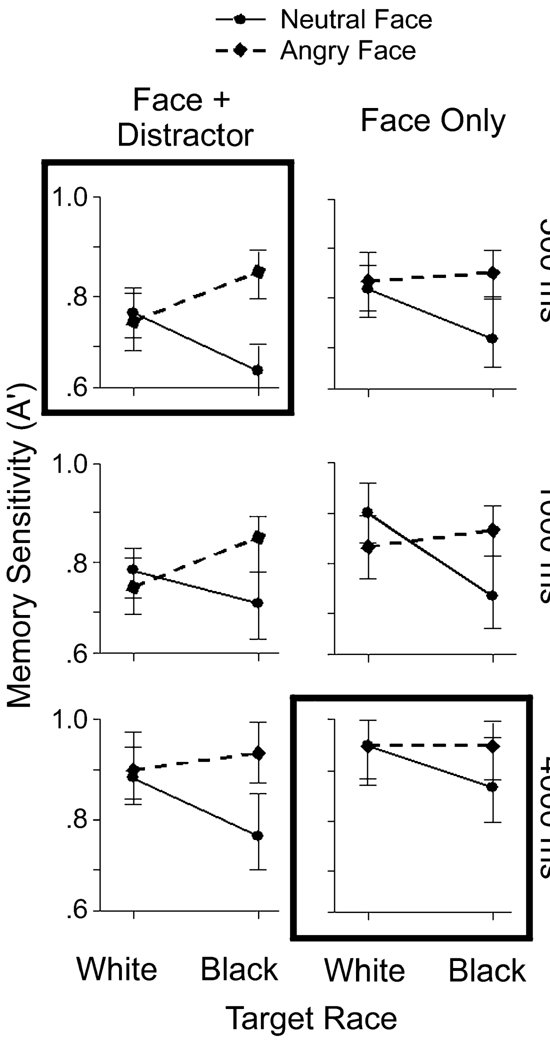

Fig. 1. Memory sensitivity (A') as a function of target race and target expression. Results for the distractor-present condition (on the left) and for the distractor-absent condition (on the right) are shown for exposure durations of 500 ms, 1,000 ms, and 4,000 ms (from top to bottom). The effects of processing constraints are highlighted by comparing the outlined panels, which present the results for the conditions with the greatest processing constraints (distractor present, 500-ms presentation) and the least processing constraints (distractor absent, 4,000-ms presentation). Error bars represent 95% confidence intervals.

A 2 (target race) × 2 (target expression) repeated measures analysis of variance on the response-bias measure revealed an interaction of target race with target expression, $F(1, 191) = 70.43$, $p < .001$, $p_{rep} > .99$, $\eta_p^2 = .27$ (see Table 1). Planned contrasts revealed the expected pattern of response biases for neutral faces, $F(1, 191) = 134.66$, $p < .001$, $p_{rep} > .99$, $\eta_p^2 = .41$: Participants exhibited a liberal threshold for recognizing neutral Black faces and a conservative threshold for recognizing neutral White faces. However, these response biases were entirely absent for responses to angry faces (as indicated by $B''d$ scores that were not meaningfully different from zero; all ps > .35). These effects were not moderated by either of the two processing-constraint manipulations (all ps > .17).

DISCUSSION

People often have unusual difficulties accurately identifying previously encountered members of ethnic out-groups, relative to members of their own ethnic group. In reviewing the evidence, Chance and Goldstein (1996) observed that "the number of studies that have replicated [this effect] is impressive. Few psychological findings are so easy to duplicate" (p. 171). Indeed, our results duplicated this effect exactly—but only for target individuals with affectively neutral facial expressions. The out-group homogeneity bias disappeared entirely for angry faces. In fact, angry Black faces were identified more accurately than were angry White faces—indicating an out-group heterogeneity bias.

Recent research suggests other limits to the out-group homogeneity bias. Johnson and Fredrickson (2005) found a mitigation of this bias in memory for neutral faces when perceivers experienced positive emotion. The findings presented here differ in an important way: We have demonstrated a circumstance in which there is no such bias to remediate—when the targets' faces are angry.

Our findings are consistent with a functional perspective on person perception. According to this perspective, cognitive resources are selectively allocated (often without conscious awareness or intent) to individuals who, on the basis of superficial characteristics or environmental setting, appear especially relevant to perceivers' functional outcomes (e.g., Kurzban, Tooby, & Cosmides, 2001; Maner et al., 2003; Öhman et al., 2001; von Hippel, Sekaquaptewa, & Vargas, 1995). A growing body of research suggests that threat cues trigger elevated stereotypical beliefs about ethnic out-groups along trait dimensions associated with danger. For instance, danger-relevant (but not danger-irrelevant) stereotypes about Blacks and other out-groups are activated more strongly when perceivers are in the dark—an environmental cue connoting vulnerability—than when they are in a lighted space, and this effect is especially strong among perceivers who are chronically concerned about danger (Schaller, Park, & Mueller, 2003). Similarly, fear induces a strong tendency for White participants to erroneously "see" anger (but not fear or other emotions) in affectively neutral faces of Black men (Maner et al., 2005).

It may seem paradoxical that threat cues can lead both to increased stereotyping of ethnic out-groups and to the elimination of the out-group homogeneity bias. However, a functional approach presumes that very different psychological mechanisms are responsible for categorical representations of groups, on the one hand, and individuating representations of individual group members, on the other (Smith & DeCoster, 2000). In a study consistent with this logic, Judd and Park (1988) reported that a competitive (but not a cooperative) intergroup context led simultaneously to both categorical judgments of similarity within an out-group ("they're all the same") and greater recognition accuracy for individual members of that out-group. This pattern is consistent with the functional approach outlined here: Effective self-protection may be facilitated by the stereotypical presumption that all out-group members are potentially dangerous, as well as by additional mechanisms that allow differentiation between out-group members, to identify those who actually pose the greatest threat.

The out-group homogeneity bias is an important phenomenon in person perception and has real consequences. It is justifiably highlighted in textbook treatments of eyewitness identification, stereotyping, and social cognition more generally. Although powerful and real, this bias is not ubiquitous. As illustrated here, the same functional analysis that explains the out-group homogeneity bias also predicts realistic circumstances in which it disappears entirely.

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REFERENCES

Anthony, T., Copper, C., & Mullen, B. (1992). Cross-racial facial identification: A social cognitive integration. *Personality and Social Psychology Bulletin*, *18*, 296–301.

Chance, J.E., & Goldstein, A.G. (1996). The other-race effect and eyewitness identification. In S.L. Sporer & R.S. Malpass (Eds.), *Psychological issues in eyewitness identification* (pp. 153–176). Hillsdale, NJ: Erlbaum.

Donaldson, W. (1992). Measuring recognition memory. *Journal of Experimental Psychology: General*, *121*, 275–278.

Fiske, A.P. (1992). The four elementary forms of sociality: Framework for a unified theory of social relations. *Psychological Review*, *99*, 689–723.

Fox, E., Lester, V., Russo, R., Bowles, R.J., Pichler, A., & Dutton, K. (2000). Facial expressions of emotion: Are angry faces detected more efficiently? *Cognition and Emotion*, *14*, 61–92.

Haselton, M.G., Nettle, D., & Andrews, P.W. (2005). The evolution of cognitive bias. In D.M. Buss (Ed.), *The handbook of evolutionary psychology* (pp. 724–746). New York: Wiley.

Johnson, K.J., & Fredrickson, B.L. (2005). "We all look the same to me": Positive emotions eliminate the own-race bias in face recognition. *Psychological Science*, *16*, 875–881.

Judd, C.M., & Park, B. (1988). Out-group homogeneity: Judgments of variability at the individual and group levels. *Journal of Personality and Social Psychology*, *54*, 778–788.

Kenrick, D.T., Sadalla, E.K., & Keefe, R.C. (1998). Evolutionary cognitive psychology: The missing heart of modern cognitive science. In C. Crawford & D.L. Krebs (Eds.), *Handbook of evolutionary psychology: Ideas, issues, and applications* (pp. 485–514). Mahwah, NJ: Erlbaum.

Killeen, P.R. (2005). An alternative to null-hypothesis significance tests. *Psychological Science*, *16*, 345–353.

Kurzban, R., Tooby, J., & Cosmides, L. (2001). Can race be erased? Coalitional computation and social categorization. *Proceedings of the National Academy of Sciences, USA*, *98*, 15387–15392.

Loudin, J.L., Loukas, A., & Robinson, S. (2003). Relational aggression in college students: Examining the roles of social anxiety and empathy. *Aggressive Behavior*, *29*, 430–439.

Maner, J.K., Kenrick, D.T., Becker, D.V., Delton, A.W., Hofer, B., Wilbur, C.J., & Neuberg, S.L. (2003). Sexually selective cognition: Beauty captures the mind of the beholder. *Journal of Personality and Social Psychology*, *85*, 1107–1120.

Maner, J.K., Kenrick, D.T., Becker, D.V., Robertson, T.E., Hofer, B., Neuberg, S.L., Delton, A.W., Butner, J., & Schaller, M. (2005). Functional projection: How fundamental social motives can bias interpersonal perception. *Journal of Personality and Social Psychology*, *88*, 63–78.

Meissner, C.A., & Brigham, J.C. (2001). Thirty years of investigating the own-race bias in memory for faces: A meta-analytic review. *Psychology, Public Policy, and Law*, *7*, 3–35.

Neuberg, S.L., Kenrick, D.T., Maner, J.K., & Schaller, M. (2004). From evolved motives to everyday mentation: Evolution, goals, and cognition. In J. Forgas & K. Williams (Eds.), *Social motivation: Conscious and unconscious processes* (pp. 133–152). New York: Cambridge University Press.

Oda, R. (1997). Biased face recognition in the prisoner's dilemma games. *Evolution and Human Behavior*, *18*, 309–315.

Öhman, A., Flykt, A., & Esteves, F. (2001). Emotion drives attention: Detecting the snake in the grass. *Journal of Experimental Psychology: General*, *130*, 466–478.

Ostrom, T.M., & Sedikides, C. (1992). Out-group homogeneity effects in natural and minimal groups. *Psychological Bulletin*, *112*, 536–552.

Rodin, M.J. (1987). Who is memorable to whom: A study of cognitive disregard. *Social Cognition*, *5*, 144–165.

Schaller, M., Park, J.H., & Faulkner, J. (2003). Prehistoric dangers and contemporary prejudices. *European Review of Social Psychology*, *14*, 105–137.

Schaller, M., Park, J.H., & Mueller, A. (2003). Fear of the dark: Interactive effects of beliefs about danger and ambient darkness on ethnic stereotypes. *Personality and Social Psychology Bulletin*, *29*, 637–649.

Slone, A.E., Brigham, J.C., & Meissner, C.A. (2000). Social and cognitive factors affecting the own-race bias in Caucasians. *Basic and Applied Social Psychology*, *22*, 71–84.

Smith, E.R., & DeCoster, J. (2000). Dual-process models in social and cognitive psychology: Conceptual integration and links to underlying memory systems. *Personality and Social Psychology Review*, *4*, 108–121.

Sporer, S.L. (2001). Recognizing faces of other ethnic groups: An integration of theories. *Psychology, Public Policy, and Law*, *7*, 36–97.

Stanislaw, H., & Todorov, N. (1999). Calculation of signal detection theory measures. *Behavior Research Methods, Instruments, & Computers*, *31*, 137–149.

Stürmer, S., Snyder, M., & Omoto, A.M. (2005). Prosocial emotions and helping: The moderating role of group membership. *Journal of Personality and Social Psychology*, *88*, 532–546.

Todd, P.M., Hertwig, R., & Hoffrage, U. (2005). Evolutionary cognitive psychology. In D.M. Buss (Ed.), *The handbook of evolutionary psychology* (pp. 776–802). New York: Wiley.

von Hippel, W., Sekaquaptewa, D., & Vargas, P. (1995). On the role of encoding processes in stereotype maintenance. *Advances in Experimental Social Psychology*, *27*, 177–254.

Wildschut, T., Pinter, B., Vevea, J.L., Insko, C.A., & Schopler, J. (2003). Beyond the group mind: A quantitative review of the interindividual-intergroup discontinuity effect. *Psychological Bulletin*, *129*, 689–722.

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