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The Effects of Nonverbal Mirroring on Perceived Persuasiveness, Agreement With an Imitator, and Reciprocity in a Group Discussion

Two experiments focused on nonverbal mirroring in a group discussion. In Experiment 1, each participant interacted with two confederates. Confederates disagreed with each other and with the participant during discussion. One confederate mirrored the nonverbal behavior of the participant; the other did not. Participants rated the imitating confederate as more confident and persuasive. However, they were not more likely to change their viewpoint to match that of this confederate. Independent coders, unaware of the hypotheses, did not rate the two confederates as significantly different. In Experiment 2, each participant again interacted with two confederates. One confederate agreed with the participant during the discussion, and the other disagreed. One confederate rubbed his or her face during the discussion. The other shook his or her foot. The hypothesis that participants would be more likely to mirror the nonverbal behavior of the confederate who agreed with them during discussion received no support.

Keywords: *mimicry; chameleon effect; behavioral matching; nonverbal imitation; nonverbal mirroring*

Although the subject of nonverbal behavior has generated considerable research in communication and psychology, nonverbal behavior in groups has remained understudied, despite the widespread allegation that most of the emotional meaning of a relational message is communicated nonverbally, such that people tend to rely on nonverbal aspects of messages more than

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verbal ones in making interpretations (Beebe & Masterson, 2000). The two studies reported in this document focused on how nonverbal mirroring in a group may affect the perceptions of an imitator's persuasiveness, acceptance of an imitator's opinion, and the likelihood of a person mirroring another's behavior in response to agreement.

Prior research has revealed that people tend to mirror the nonverbal behavior patterns of their interaction partners (for a review, see Bavelas, Black, Chovil, Lemery, & Mullett, 1988). For example, research on facial mimicry has revealed that both infants (Meltzoff & Moore, 1977, 1983) and adults (Dimberg, 1982; Zajonc, Adelman, Murphy, & Niedenthal, 1987) imitate the facial expressions of people with whom they interact. Other research has suggested that people match the posture and body configurations of their interaction partners (LaFrance, 1979, 1982; LaFrance & Broadbent, 1976), and research on rhythmic synchrony has indicated that interaction partners often synchronize their speech and body movements (Dittmann & Llewellyn, 1968, 1969).

Despite its ubiquity, most nonverbal mirroring is unintentional and nonconscious (Chartrand & Bargh, 1999; Chen, Chartrand, Lee Chai, & Bargh, 1998; Hull, 1933; LaFrance, 1982; Lipps, 1907; Schefflen, 1964; Wallbott, 1995). Bavelas, Black, Lemery, and Mullett (1986) observed that nonverbal mirroring occurs too rapidly for much prior cognitive processing. Consistent with this view, Chartrand and Bargh (1999) hypothesized that perception of another's nonverbal behavior primes an automatic perception-behavior link that is nonconscious and automatic. In other words, perceiving another's nonverbal behavior has a passive effect on one's own behavior, which increases the tendency to engage in the perceived behavior. Chartrand and Bargh (1999) referred to the nonconscious tendency to mirror the behavior of one's partner as the "chameleon effect."

Liking and Rapport

Many researchers have theorized that the function of nonverbal mirroring is to help create a smoother interpersonal interaction between partners (for a review, see Chartrand & Bargh, 1999). Bavelas et al. (1986, 1988) proposed that nonverbal mirroring is primarily a device that conveys similarity and togetherness. It suggests that "I am like you, I feel as you do" (Bavelas et al., 1986, p. 328) and that the two people are a "unit." There is research evidence of a relationship between mirroring and rapport (Charney, 1966; LaFrance, 1979; LaFrance & Broadbent, 1976; Tickle-Degnen & Rosenthal, 1987). For example, Charney (1966) observed that nonverbal mirroring increased over time in a group, as did feelings of rapport. LaFrance (1979) and LaFrance and

Broadbent (1976) reported a relationship between students' ratings of class involvement and their mirroring of the instructor's nonverbal behavior. LaFrance (1982) suggested that absence of nonverbal mirroring "may not only signal discord but may actually instigate it" (p. 280).

In addition, people seem to respond to displays of behavioral rapport and nonverbal mirroring with stronger perceptions of similarity and liking for their interaction partners (Dabbs, 1969; Wallbott, 1995). In support of this view, Chartrand and Bargh (1999) produced evidence of a causal link between nonconscious mirroring and liking, empathy, and rapport. Chartrand and Bargh's was the first study to show a possible causal link between nonverbal mirroring and intensified perceptions of liking and smoothness of the interaction, even though participants were unaware of mirroring and interacted with strangers who established no eye contact and with whom the participants had no interaction goal. Chartrand and Bargh posited that the unconscious perception-behavior link that causes people automatically to mirror the nonverbal behavior of a partner is adaptive and has social utility because it makes interactions function more smoothly.

Similarity appears to enhance one's persuasiveness (Abrams, Wetherell, Cochrane, Hogg, & Turner, 1990; Burn, 1991; Cialdini, 2001; Evans, 1963; Schultz, 1999). For example, school antismoking campaigns may be more successful when peers rather than teachers serve as leaders (Murray, Leupker, Johnson, & Mittlemark, 1984). We are also more susceptible to the persuasive influence of those we like (Cialdini, 2001; Frenzen & Davis, 1990; Woodside & Davenport, 1974). Nonverbal mirroring has been linked to increased perceptions of similarity to the imitator and increased liking of the imitator (Chartrand & Bargh, 1999; Dabbs, 1969; Wallbott, 1995). Therefore, nonverbal mirroring may enhance a person's persuasiveness in a group discussion because of the increased similarity to and liking of the imitator. However, no previous research has tested this hypothesis. Although, some researchers have hypothesized that nonverbal mirroring should help facilitate a group in reaching consensus.

Shared Viewpoints and Nonverbal Mirroring in a Group Setting

Research concerning how nonverbal mirroring may affect shared viewpoints in a group is scarce. Schefflen (1964) suggested that those who mirror each other's posture in a group usually share the same viewpoint and that nonverbal imitation may be a means to facilitate a group's achieving a shared viewpoint. LaFrance (1982) also has argued that nonverbal mirroring may

facilitate a group's achieving consensus and that nonverbal mirroring may also be a result of shared viewpoints. LaFrance and Broadbent (1976) suggested that nonverbal mirroring may facilitate communication in an interaction and may be correlated with listeners' attention. Navarre and Emihovich (1978) suggested that people are especially likely to mirror the nonverbal behavior of those they like or with whom they agree about particular matters during a discussion. They proposed that coalitions in groups might be identified by the members' similarity with respect to nonverbal behavior. The research on nonverbal mirroring facilitating consensus within a group may have implications for persuasion, as persuasion usually occurs during the process of group members reaching the same viewpoint. Therefore, one could hypothesize that mirroring could facilitate persuasion.

Much of this line of thinking is speculation derived from correlational research. Further, the causal direction of nonverbal mirroring is unclear. Does nonverbal mirroring cause groups to reach consensus more easily, do groups that are in consensus engage in more nonverbal mirroring, or both? Also, does the research on groups reaching consensus apply to persuasion in the group? That is, does nonverbal mirroring facilitate persuasion? There is sparse empirical, experimental evidence of the effects of nonverbal mirroring on consensus within a group to answer these questions. Despite that, the following three hypotheses of the effects of nonverbal mirroring in a group derive from the previous discussion:

Hypothesis 1: People in a group will judge interactional partners who mirror their nonverbal behavior as more persuasive than partners who do not mirror their nonverbal behavior.

Hypothesis 2: People in a group will be more likely to adopt the opinions of interactional partners who mirror their nonverbal behavior than partners who do not mirror their nonverbal behavior.

Hypothesis 3: People in a group will be more likely to mirror the nonverbal behavior of interactional partners who agree with them than partners who disagree with them.

The two following experiments represent a small step toward exploring these hypotheses.

Experiment 1

Experiment 1 tests Hypotheses 1 and 2 concerning whether nonverbal mirroring affects persuasion and perceptions of other group members. The participant individually made a choice among three options and then interacted with two confederates to discuss the three options. Both confederates

disagreed with the participant and with each other during the group discussion. One confederate mirrored the nonverbal behavior of the participant; the other confederate did not. After the discussion, the participant rated the confederates on persuasiveness and sociability and ranked his or her preference of the three options.

Method

Participants. The participants were 54 undergraduate and graduate students at a private, Midwestern university recruited via fliers and paid \$10 for their involvement. There were an equal number of male and female participants.

Procedure. The participants were to arrive outside the main experimental room at a designated time. Two confederates, posing as participants, also arrived at the same time. The naïve participant entered the main experimental room, whereas the two confederates went to two rooms down the hall. The table in the main experimental room was rectangular, with one lone chair on one long end and two chairs on the other long end. When the participant was seated, the experimenter set the informed consent forms in front of the lone chair and then casually stood in back of the other two chairs to prevent the participant from sitting in them. This ensured that the confederates could both be on the same side of the table during the group discussion. All participants voluntarily sat in the lone chair, and no one moved to another chair.

After room assignment, the participants learned that they would be participating in an experiment involving persuasion in small groups, at which point they turned in their informed consent forms. The participants were to play the role of a manager of a pharmaceutical company and decide which of three cholesterol lowering drugs they would prefer to market to help save their company from possible bankruptcy. They were first to read background information concerning cholesterol and heart disease and then other information about three different cholesterol-lowering drugs. The participants were to support their drug choice during a group discussion. After reading through the information, they made a decision and indicated their degree of confidence in it.

The information concerning the three drugs had been pilot tested and established that they were equally preferable. However, the frequency with which participants selected the drugs in the experiment showed a preference for drug 2. They selected drug 2 the most ($n = 24$) and drugs 1 and 3 equally ($n = 15$). A chi-square test revealed, however, that the difference was not statistically significant, $\chi^2(2, 54) = 3.00, p = .22$.

After the participants made the drug choice, the experimenter gave them more information about the one they selected. The extra information purportedly gave them a better basis for discussing their choice in a group. They were also to consider what specific information they might want to introduce during a group discussion. The experimenter allowed the participants 5 minutes to read the new information, left the room, and then returned with the two confederates.

After the confederates took seats, the experimenter gave the following instructions: Now I want you to discuss your drug choice with the other participants. If you picked a different drug than someone else, please explain your choice to the other two participants, telling them why you picked that drug. Also, if another participant picked a different drug than your choice, please listen to their information. You do not have to stick to your original preference if you learn new information about the drugs that changes your mind.

Everyone kept his or her information forms during the discussion. Having group members keep their information sheets allowed the confederates to have a loose script in front of them to follow during each group discussion. The confederates were to try to discuss each piece of information on their sheets in order. All group members had a clearly visible, large colored square sitting in front of them during discussion. They were aware that they would be responding to questions about specific group members after the discussion and would identify these members in the questionnaire by color. The participant always had a green designation, and the confederates were always blue and red. The drug choice of the two confederates was such that everyone disagreed. For instance, if the participant selected drug 1, one confederate favored drug 2, and the other drug 3.

During the discussion, one confederate mirrored the nonverbal behavior of the participant. The other did not. There were two male and four female confederates. Whether or not a particular confederate mirrored the participant was counterbalanced, such that a particular confederate mirrored in approximately half the sessions in which he or she participated and did not mirror in the other half. The drug choice of the confederate was also counterbalanced with the mirroring such that when a particular confederate mirrored, he or she favored a different drug from that in the last session in which he or she mirrored. Also, whether or not the imitating confederate was red or blue during the discussion alternated for each experiment. The imitating confederate supported drug 1 ($n = 19$), drug 2 ($n = 17$), and drug 3 ($n = 18$) approximately the same number of times. Male confederates mirrored 22 times, and female confederates mirrored 32 times. This did not represent a significantly different level of frequency, $\chi^2(1, 54) = 1.85, p = .17$.

Each group had up to 15 minutes to discuss the drugs. After 10 to 12 minutes, the experimenter asked if the members had finished. All but two groups indicated that they had. The remaining groups finished within another 5 minutes. After each group discussion, the experimenter asked everyone to return to his or her original room ostensibly to complete a questionnaire. After the confederates left, the experimenter gave a questionnaire to the participant. The colored squares remained on the table to make it easier for the participant to distinguish the confederates from one another. The questionnaire required the participant to rate each confederate on several traits, as well as to rank the three drugs in order of preference.

The participants did not undergo debriefing immediately after the experiment as a means of preventing them from telling other potential participants. They were to write their address on an envelope if they wished to receive more information about the experiment. After completion of the study, the participants received an explanation of the experiment, along with an invitation to contact the researcher for the results.

Training confederates. The confederates had participated in two half-hour training sessions. Because the confederates were to sit at a table, training focused on mirroring the participant from the waist up. Mirroring was to be of all nonverbal behavior of the participant, including posture, hand gestures, facial expressions, adaptors (scratching, pen tapping, and face rubbing), and head movements (nodding and tilting head). To prevent the imitator from staring at the participant, confederates were to establish eye contact with whoever was speaking, with only quick glances at the participant (if the other confederate was talking) to monitor nonverbal behavior. When speaking, the imitator was to alternate eye contact between the participant and other confederate. The non-imitator was to emit nonverbal behavior that the participant was not displaying to prevent him or her from appearing less animated than the imitator or too stiff. Confederates had one practice session with the author and a second with one another to practice mirroring behavior. They then ran through the experiment with a naïve participant, with neither confederate mirroring the participant. They were to practice displaying nonverbal behavior in which the participant was not engaging and to practice maintaining an equivalent amount of eye contact with the other confederate and the participant. After this practice session, the confederates critiqued one another.

Coding. Although confederates were not aware of the hypotheses, they were aware of the nonverbal mirroring and could reasonably infer how it might affect participants' behavior. Therefore, they were to try to keep their

behavior fairly consistent whether or not they were mirroring. However, it was possible that confederates might act differently, either intentionally or unintentionally. To assess this, for 16 of the experimental sessions only the confederates were videotaped, with the participant out of the camera's view as a means of keeping the coders blind to the experimental manipulation. Two coders, unaware of the experimental hypotheses, assessed the behavior of the two confederates for amount of eye contact, smiling, friendliness, degree to which the confederate appeared to like the participant, persuasiveness, and talkativeness. They rated the confederates on a 6-point scale from *low* to *high*. Participants were aware from the informed consent form that the discussions would be videotaped.

Results

Manipulation checks. For the 16 videotapes, the two coders' ratings significantly correlated for all measures: amount of eye contact ($r = .45, p < .01$); amount of smiling ($r = .72, p < .0001$); friendliness ($r = .45, p < .01$); degree to which the confederate appeared to like participant ($r = .48, p < .005$); persuasiveness ($r = .52, p < .005$); and talkativeness ($r = .47, p < .01$). MANOVA served as the test of differences in each coder's ratings of the imitating and non-imitating confederates with respect to the attributes mentioned. Neither MANOVA was significant, $\Lambda = .90, F(6,25) = .46, \eta^2 = .10, p = .84$ and $\Lambda = .68, F(6,25) = 1.92, \eta^2 = .32, p = .12$; therefore, there was no examination of particular univariate effects. See Table 1 for coder means for each question. Because two coders, both unaware of the imitation, did not rate the two confederates as significantly different, one can be more confident that the confederates were not acting differently, other than with respect to nonverbal mirroring.

Because the confederates were students, it was possible that some participants knew them. Therefore, the participants were to indicate the extent of their acquaintance with the confederates on a scale ranging from 1 (*never saw his / her face before*) to 3 (*we have talked before briefly*) to 6 (*we're friends*). A paired sample *t* test revealed no difference in familiarity with the imitator ($M = 1.21, SD = .69$) or the non-imitator ($M = 1.08, SD = .33$), $t(53) = 1.31$, Cohen's $d = .20, p = .20$. There was only one instance in which a participant had a score above three for his or her knowledge of the confederates. Data from this experimental session were excluded from further analysis. To ensure that participants were naïve, they were to indicate what they thought the purpose of the study was. No participant thought the study concerned nonverbal behavior, and no participant expressed suspicion about the use of confederates in the experiment.

Table 1
Coders' Ratings of the Imitating and Non-Imitating Confederates

Measure	Coder 1				Coder 2			
	Imitator		Non-Imitator		Imitator		Non-Imitator	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Eye contact	2.81	0.83	2.81	0.98	3.63	0.96	3.19	0.83
Smiling	2.81	1.22	2.81	0.83	2.00	1.09	1.87	0.89
Friendliness	3.56	0.96	3.31	0.79	4.38	1.26	4.19	1.22
Liking	3.31	1.08	3.12	0.96	4.13	1.54	3.63	1.20
Persuasiveness	4.63	1.26	4.00	1.27	3.63	0.96	3.19	0.83
Talkativeness	4.50	1.16	4.00	1.59	3.47	0.92	3.87	0.89

The participants' gender was a between-subjects variable in repeated measures ANOVAs for each of the variables in subsequent analyses. The repeated measure was the participants' ratings of the imitator and non-imitator. However, because there was no significant main effect for gender or significant interaction of it with any of the other independent variables, the report makes no further mention of it. Whether or not the experimental session was videotaped was also a between-subjects variable in repeated measures ANOVAs for each of the variables in subsequent analyses. For two dependent variables, there was a significant interaction between whether or not the experimental session was videotaped and the repeated measures factor. These were talkativeness, $F(1,51) = 4.28, \eta^2 = .08, p < .05$, and persuasiveness, $F(1,51) = 6.57, \eta^2 = .11, p < .05$. Therefore, videotaping served as a covariate for analyses relating to these variables.

Participants' ratings. Participants rated the two confederates on several dimensions. Because each participant rated both the imitator and non-imitator, all data were analyzed by means of paired sample *t* tests, except for the variables using videotaping as a covariate. A repeated measures ANOVA, with videotaping as a covariate, was the statistical test for these two variables. Each participant rated the confederates on the following bipolar scales: *not likeable* (1) to *likeable* (7), *unintelligent* (1) to *intelligent* (7), *quiet* (1) to *talkative* (7), *unpersuasive* (1) to *persuasive* (7), *not confident* (1) to *confident* (7), and *unfriendly* (1) to *friendly* (7). In support of Hypothesis 1, participants rated the imitator as significantly more persuasive and confident than the non-imitating confederate. Contrary to past research, the imitator was not rated as significantly more likeable or friendly. See Table 2 for means and statistical test data.

Table 2
Participants' Ratings of Imitating and Non-Imitating Confederates

Measure	Imitator		Non-Imitator		Significance Test		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>d</i>	<i>p</i>
Likeable	5.47	1.07	5.36	1.30	0.48	.62	.64
Intelligent	5.62	0.90	5.34	1.14	1.61	.09	.11
Friendly	5.51	1.30	5.49	1.31	0.08	.87	.94
Confident	5.70	1.22	4.85	1.46	3.03	.01	.004*
	<i>M</i> ^a	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>F</i> (1,51)	η^2	<i>p</i>
Persuasive	5.06	1.39	4.11	1.49	20.28	.28	.000*
Talkative	5.36	1.36	4.79	1.52	6.96	.12	.011

a. Because these last two analyses used a covariate, ANOVAs instead of *t* tests are reported.

* Because six significance tests are conducted on the bipolar scales, a more conservative *p* value is adopted, and only *p* values less than .008 (.05/6) are reported as significant.

Participants indicated how much they agreed with each confederate and answered from 1 (*not at all*) to 7 (*very much*). Contrary to Hypothesis 2, participants did not agree with the imitator ($M = 4.21, SD = 1.33$) significantly more than with the non-imitator ($M = 3.91, SD = 1.52$), $t(52) = 1.01$, Cohen's $d = .21, p = .32$. Participants indicated how knowledgeable each confederate was about the issue and answered from 1 (*not at all knowledgeable*) to 7 (*very knowledgeable*). There was no difference between the imitator ($M = 4.85, SD = 1.31$) and the non-imitator ($M = 4.57, SD = 1.14$) in ratings of how knowledgeable they appeared, $t(52) = 1.26$, Cohen's $d = .23, p = .21$.

Finally, the participants' postdiscussion rankings of the drugs revealed whether they ranked the drug choice of the imitator higher than that of the non-imitator. Participants ranked the three drugs from best (1) to worst (3). Due to the ordinal data, a Wilcoxon signed ranks test served to detect differences. Contrary to Hypothesis 2, they did not rank the imitator's drug ($M = 1.81, SD = .70$) higher than the non-imitator's drug ($M = 1.67, SD = .75$), $T = -.73, p = .47$. Therefore, although the participants rated the imitator as more persuasive, this did not translate into their supporting the imitator's drug significantly more.

Discussion

Experiment 1 yielded mixed support for Hypotheses 1 and 2. In support of Hypothesis 1, the participants rated the imitating confederate as more persuasive, but they were not persuaded to adopt this confederate's viewpoint more than that of the non-imitating confederate, which fails to support

Hypothesis 2. Nonverbal mirroring did not appear to facilitate consensus. Nor did the participants indicate that they agreed with the imitating confederate more. Moreover, and contrary to Chartrand and Bargh's finding (1999), the participants did not rate the imitator as more likeable or friendly than the non-imitator.

One difference in this study and that of Chartrand and Bargh (1999) was that the imitator and non-imitator interacted with the participant simultaneously. Chartrand and Bargh had participants interact with only one confederate and did not have the same participant compare imitating and non-imitating confederates. It may have been harder for the participant to be aware of the nonverbal behavior of the imitator, when also having to pay attention to the non-imitator. The effects of nonverbal mirroring, therefore, may have been diluted by the increased noise of an additional interaction partner. Future research should test whether nonverbal mirroring of one person becomes less important as the number of participants in the discussion increase.

One limitation of Experiment 1 was that the participant and confederates interacted while seated at a table. This prevented a full view of the participants' nonverbal behavior. The table also provided a place for the participant to rest his or her hands and may have inadvertently reduced the amount of nonverbal behavior in the arms. Clearer results may have surfaced if participants had sat in a circle facing each other without a table, which would allow for more nonverbal mirroring of the participant.

In conclusion, nonverbal mirroring increased the perception of persuasiveness, but it did not affect persuasion. However, Experiment 1 did not address Hypothesis 3. Therefore, Experiment 2 tests if people are more likely to mirror those who share the same viewpoint than those who do not. In Experiment 2, the participant individually made a choice among two options and then interacted with two confederates to discuss the options. One confederate agreed with the participant, and the other disagreed. Confederates each emitted a different consistent nonverbal mannerism during the discussion. Discussions were videotaped to determine if the participant imitated the confederate who agreed with him or her more than the confederate who disagreed.

Experiment 2

Method

Participants. Originally, the participants were 47 undergraduates at a private, Midwestern university completing the experiment for course credit.

However, as a result of difficulties mentioned below, data from only 38 participants entered analysis. There were equal number of males and females.

Procedure. For each session, the participant and two confederates were to arrive outside the main experimental room in a similar fashion to that in Experiment 1. The participant entered the main experimental room, and the two confederates went to two rooms down the hall. There was one table in the main experimental room pushed against the wall with one chair at it. There were two other chairs in the room a few feet from the table. The three chairs formed a triangle. The participant sat at the table and signed informed consent forms. The experimenter informed the person that he or she would be participating in an experiment concerning persuasion in small groups and that videotaping would be part of the experiment.

The participants performed the same task as those in Experiment 1, except that there were two cholesterol-lowering drugs to consider instead of three. They were aware that they were to support their drug choice during a group discussion. After reading the information, the participants made a decision and indicated their degree of confidence in the choice. The information for the two drugs had been pilot tested to assure that participants would see them as equally desirable. In confirmation, the participants selected the two drugs equally ($n = 19$).

After each participant expressed a preference, the experimenter collected the form and then indicated that she had to check to make sure the camera had a tape in it. At this time, the experimenter turned on the videocamera. This served to obtain a baseline of the participant's behavior of leg shaking and face rubbing, without the confederates' being present. The participant next turned his or her chair around for the group discussion and waited for the confederates to arrive.

Unfortunately, a usable baseline of behavior was obtained for only 17 of the participants. Some participants turned their chair back around to work at the table while they waited for the confederates. Other participants walked about the room, left to use the bathroom, or moved their chair out of the camera's view. Also, for some participants, the experimenter neglected to turn on the camera.

After approximately 2 minutes, the experimenter returned with the two confederates. The confederates sat in the other two chairs. There was no table or other obstruction between the confederates and participant; consequently, everyone had a full body view of one another. The participants and confederates each sat about three to four feet from one another, as they listened to the following instructions:

Now I want you to discuss your drug choice with the other participants. If you picked a different drug than someone else, please explain your choice to the other two participants, telling them why you picked that drug. Also, if another participant picked a different drug than your choice, please listen to their information. You do not have to stick to your original preference if you learn new information about the drugs that changes your mind. You will not make a group decision, but you will be asked to make an individual decision after the group discussion.

All group members kept their information sheets with them during the discussion. Each group had up to 15 minutes to discuss the information. After approximately 10 minutes, the experimenter checked to determine whether the group had finished. All groups indicated that they were. The average discussion lasted 11.16 minutes ($SD = 2.22$). After each discussion, the experimenter asked everyone to return to his or her original room to complete a questionnaire. After completing the questionnaire, the participants underwent debriefing in a similar manner to that described for Experiment 1.

In each discussion, one confederate was to agree with the participant's drug choice, and the other to disagree. Confederates were also to display a stable nonverbal behavior. One confederate rubbed his or her face consistently throughout the group discussion, and the other confederate shook his or her leg. Whether or not a leg shaker or face rubber agreed with the participant during discussion was counterbalanced; that is, for half the sessions, the leg shaker agreed with the participant and for the other half, the face rubber agreed. There were three male and three female confederates in the study. Whether a particular confederate agreed with the participant or not was counterbalanced, and whether a particular confederate was a leg shaker or face rubber was counterbalanced. In short, a particular confederate agreed with the participant in approximately half the sessions in which he or she participated and disagreed in the rest; in addition, a confederate was the leg shaker in approximately half the sessions in which he or she participated and was the face rubber in the rest. Male confederates agreed with the participant during 21 of the discussions, and females during 17. For 18 of the sessions, the participant and the confederate who agreed with the participant were of different gender, and for 20 of the sessions, they were the same gender.

Excluded data. Participants indicated on a questionnaire whether or not they were suspicious of the confederates or noticed their nonverbal behavior; specifically, they responded to the question, "What do you think the purpose of this research is?" No participant stated that he or she thought the study was about nonverbal behavior. Participants further responded to the

questions, "What did you notice most about the other two participants?"; "Did any of the other two participants engage in any noticeable mannerisms throughout the experiment?"; and "Was there anything about the other two participants' behavior that made you feel awkward or uncomfortable?" Replies led to exclusion of two participants because they expressed suspicion that the experiment was staged or that one of the confederates was, in fact, a confederate. However, these participants did not accurately guess the experimental hypothesis. Data for four participants were excluded because they noticed the staged nonverbal behavior of one of the confederates. These participants mentioned that the confederates were "jiggling their legs," "bobbing foot up and down," "using the hands a lot," or "fidgeting with the leg and gesturing a lot." No other participants expressed any suspicion or said they noticed the confederates' staged nonverbal behavior. In addition to the six participants excluded on the basis of their responses to the questions noted, data for three more participants were excluded because either their feet were cut off in the camera's view or a confederate leaned in and blocked the participant's body from the camera's view, which made accurate coding difficult. This left 38 sets of usable data.

Coding. The camera was set up so that it appeared that the entire group was being videotaped. However, the camera zoomed in on only the participant. Three individuals coded the tapes. A master coder viewed every tape. A second person coded 25 of the tapes, and a third coder the remaining 13 tapes. The master coder's ratings were compared to these two secondary coders to determine reliability. For each tape, the coder counted the number of times a participant rubbed his or her face and shook his or her leg. For face rubbing, the participant had actually to touch the face area to count as an instance; playing with the hair, touching the neck, or covering one's face to sneeze did not count as instances of the behavior. Also, a participant had to lift his or her hand from the face and retouch it for it to count twice. For the leg shaking, the leg movement had to originate from either the knee or ankle. Lifting the leg or crossing and uncrossing the leg did not count. The master coder's and the second coder's ratings significantly correlated for the baseline ($n = 13$) and main experiment ($n = 25$): face baseline ($r = .93, p < .0001$), face ($r = .85, p < .0001$), leg baseline ($r = .99, p < .0001$), leg ($r = .87, p < .0001$). The master coder's and the third coder's ratings significantly correlated for the main experiment ($n = 13$), but due to the small sample size, not for the baseline ($n = 3$): face baseline ($r = .87, p = .33$), face ($r = .62, p < .05$), leg baseline ($r = .50, p = .67$), leg ($r = .99, p < .0001$).

Results

The total number of leg shakes and face rubs was divided by the minutes of discussion to determine average number per minute. Participants' gender was included as a between-subjects variable in ANOVAs for each of the variables in subsequent analyses. However, there was no significant main effect for gender. ANOVA served to reveal whether or not the participant shook his or her leg more when the confederate who agreed shook his or her leg. Although participants had more leg shakes per minute when the confederate in agreement shook his or her leg ($M = 7.32, SD = 10.39$), as opposed to rubbed his or her face ($M = 3.35, SD = 4.80$), the difference was not significant, $F(1,36) = 2.28, \eta^2 = .06, p = .14, \text{observed power} = .31$. ANOVA also served as a test of whether participants had more face rubs per minute when the confederate in agreement rubbed his or her face ($M = .91, SD = .58$), as opposed to shook his or her leg ($M = .78, SD = .70$). The result was not significant, $F(1,36) = .41, \eta^2 = .01, p = .53, \text{observed power} = .10$. Number of leg shakes per minute subtracted from number of face rubs per minute permitted determination of whether the difference was significantly greater in the condition in which the agreeing confederate shook his or her leg ($M = -6.54, SD = 10.61$) than the condition in which the agreeing confederate rubbed his or her face ($M = -2.44, SD = 5.08$). The result was not significant, $F(1,36) = 2.31, \eta^2 = .06, p = .14, \text{observed power} = .32$. Therefore, Hypothesis 3 was not supported. Participants were not significantly more likely to mirror the confederate who agreed with them.

For the 17 sessions for which baseline data existed, the participants' behavior (leg shakes or face rubs per minute) before meeting the confederates served as a covariate in another analysis. The results involving the agreeing confederate's shaking his or her leg did not change, $F(1,14) = 2.43, \eta^2 = .15, p = .14$, nor did those for the agreeing confederate's rubbing his or her face, $F(1,14) = 1.19, \eta^2 = .08, p = .29$.

General Discussion

Chartrand and Bargh (1999) stated, "Extending the paradigms (chameleon effect and nonverbal mirroring) into more complex and dynamic group settings seems to us to be an important next step" (p. 906). The two experiments described above extended research on nonverbal mirroring to a more complex group environment. Experiment 1 revealed that although the participants rated the imitator as more persuasive, they were not persuaded to change their opinion more by the imitator than by the non-imitator. Experiment 2 provided no support for the hypothesis that people are more likely to mirror

the nonverbal behavior of those with whom they are in agreement than those with whom they disagree. In short, the studies provided support for Hypothesis 1, but no support for Hypotheses 2 and 3.

There are a number of possible reasons for the lack of support for the hypotheses. The first is substantive and has to do with the role that relational communication plays in task settings within Protestant-dominated cultures. Nonverbal mirroring is a communicative device (Bavelas et al., 1988) that conveys similarity and serves to create rapport. However, this type of communication is indirect and more relational in nature than verbal forms of communication. Sanchez-Burks, Lee, Choi, Nisbett, Zhao, and Koo (2002) reported that relational concerns and attention paid to more relational, indirect communication may differ as a function of the cultural background of the audience and the context of the communication. Most cultures pay attention to relational concerns and indirect, relational communication equally in both work and social settings. However, in the United States, people pay less attention to indirect, relational communication in the workplace. Sanchez-Burks et al. (2002) propose that the United States' Protestant relational ideology underlies American relational patterns of limiting interpersonal concerns and paying less attention to indirect, relational communication in the workplace. Early Calvinist Protestants emphasized the importance of limiting interpersonal concerns in the workplace and separating the domains of work and leisure (Fischer, 1989; McGrath, 1993). Too much socialization at work, many believed, was evil. This lack of emphasis on relational concerns in work settings affects the importance and attention that an American, especially a Protestant American, pays to indirect communication like nonverbal behavior while in a work setting. Sanchez-Burks (2002) determined that non-Protestant Americans were just as likely to engage in nonverbal mirroring in social or work settings. However, Protestant males were less likely to engage in nonverbal mirroring in work settings than in social settings.

The two experiments reported involved a work context in which the participants were to act as though they were the manager of a company. Although they did not identify their religious affiliation or country of origin, given the demographics of the participant sample, it is likely that many participants were Protestant Americans. This may have inhibited the effects of nonverbal mirroring for these participants. Because the experiment invoked a work environment, Protestant participants may have been less likely to pay attention to indirect, relational communication; therefore, they would have been less likely to pay attention to the confederates' nonverbal behavior and less likely to engage in nonverbal mirroring themselves. Although this hypothesis is speculative, other researchers may want to test hypotheses concerning nonverbal mirroring and persuasion with more social tasks. For example,

participants could discuss a social campus issue, such as drinking at fraternity parties or spring break destinations. Similar to Sanchez-Burks's study, one could take steps to make the laboratory atmosphere more social, by such means as providing snacks and more socially oriented furnishing like sofas or bean bags. Alternatively, if a work type task is used, participants' religious affiliation and country of origin could be used as covariates.

Another reason for the lack of support for the hypotheses may be methodological. First, the task may not have been personally involving enough for the participants, and second, at least for Experiment 2, the power may have been too low to detect differences. The task entailed discussing fictitious, cholesterol-lowering drugs; the topic might not highly interest college students. Crano (1983) indicated that when participants have high vested interest in an issue, consensus is more important to them, and they are more likely to assume there is a high degree of consensus. Therefore, having another person share his or her viewpoint, as in Experiment 2, may have been less important to the participants than would be the case for a task in which they were to have a higher vested interest. The possibly lower concern for consensus may have diminished nonverbal mirroring as a response to the agreeing confederate in Experiment 2. Other researchers may want to use an issue of more importance to participants. For example, an experimenter could have participants state their views on an issue they are likely to view as relevant and important, such as whether colleges should continue to use the SAT, whether their college should require a foreign language, or whether their state should support a medical marijuana initiative. For such an issue, participants might feel a stronger bond to another person who shares their opinion and be more likely to mirror this person's nonverbal behavior. Students are likely to approach such topics with already formed opinions and may find discussions of them more involving. This could, in turn, affect their nonverbal behavior differently from that which they display when discussing a fictitious topic.

Another problem with Experiment 2 was the low power. Means were in the hypothesized direction, which suggests that there may be an effect of nonverbal mirroring, but establishing its existence may require further inquiry with larger sample sizes. The decreased sample size resulting from excluded cases in Experiment 2 may have contributed to the low power. This weakens any conclusions that can be drawn from the data. Due to the low power, one cannot determine whether nonverbal mirroring has no effect and that the results from Experiment 2 point to the limitations of nonverbal mirroring, or whether there is an effect of nonverbal mirroring, but the sample size in Experiment 2 was simply too small to detect it.

Chartrand and Bargh (1999) were the first to test for and find evidence of a possible causal link of nonverbal mirroring to liking and smooth interaction. Experiment 1 of this article attempted to establish a causal link between nonverbal mirroring and persuasion, and Experiment 2 attempted to establish a causal link between shared viewpoints and increased nonverbal mirroring. These two experiments were the first to examine nonverbal mirroring in a group in a controlled experimental setting, in which tentative, causal inferences could be drawn from the data. Previous research examining nonverbal mirroring in groups, usually therapy groups, has been observational and correlational. In conclusion, more research on nonverbal mirroring in groups should be conducted under controlled experimental conditions so causal conclusions concerning the effects of nonverbal mirroring can be more easily reached.

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