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Nonverbal Self-Accuracy in Interpersonal Interaction

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Four studies measure participants' accuracy in remembering, without forewarning, their own nonverbal behavior after an interpersonal interaction. Self-accuracy for smiling, nodding, gazing, hand gesturing, and self-touching is scored by comparing the participants' recollections with coding based on videotape. Self-accuracy is above chance and of modest magnitude on average. Self-accuracy is greatest for smiling; intermediate for nodding, gazing, and gesturing; and lowest for self-touching. It is higher when participants focus attention away from the self (learning as much as possible about the partner, rearranging the furniture in the room, evaluating the partner, smiling and gazing at the partner) than when participants are more self-focused (getting acquainted, trying to make a good impression on the partner, being evaluated by the partner, engaging in more self-touching). The contributions of cognitive demand and affective state are discussed.

Keywords: *self-accuracy; nonverbal communication; interpersonal interaction; power; self-focus*

Do people know how much they engage in smiling, gazing, and other nonverbal behaviors during social interaction? Monitoring one's own nonverbal behavior may be a difficult task because a person is simultaneously a sender and a receiver, and therefore has to plan and execute his or her nonverbal and verbal behavior, process the other person's nonverbal and verbal behavior, and engage in metacognitive activity such as asking oneself how the interaction is going (DePaulo, Kenny, Hoover, Webb, & Oliver, 1987; Patterson, 1995). On the other hand, the accurate monitoring of one's nonverbal

behavior may be a common and important task because nonverbal communication matters greatly in social interaction and people have many reasons to want to know how they are behaving. Both the desire for successful self-presentation (DePaulo, 1992; Schlenker, 1980) and the need to alter one's behavior according to perceived situational requirements (Snyder, 1974) suggest that people have a stake in this kind of accuracy. In the present research, we measured nonverbal self-accuracy, defining it as the ability to remember one's smiling, gazing, nodding, hand gestures, and self-touching during an interaction that has just occurred.

There is much research on memory and memory biases regarding the self (Morris, Laney, Bernstein, & Loftus, 2006). For instance, findings show memory biases for self-relevant information (e.g., Tafarodi, Tam, & Milne, 2001) and biases in favor of information supporting the idea that one is healthy (Kiviniemi & Rothman, 2006). Early research showed that behavior recall is biased to be consistent with attitudes (Ross, McFarland, Conway, & Zanna, 1983). However, many of these studies involved underlying motivations that

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promote the self in a positive manner (e.g., motivated self-enhancement; Sedikides & Strube, 1997). Very little research addresses self-awareness of nonverbal behavior. It is an open question whether one can accurately remember one's own nonverbal behavior, regardless of whether one is motivated in such recall.

Previous Research Relevant to Nonverbal Self-Accuracy

Nonverbal self-accuracy figures in several theoretical traditions in social psychology. It has a place in theorizing about the self-fulfilling prophecy because the expectancy-holder's lack of awareness of his or her own cues is seen as an important contributor to the phenomenon (Rosenthal & Jacobson, 1968; Rosenthal & Rubin, 1978; Snyder, Tanke, & Berscheid, 1977). Vorauer and Miller (1997) found evidence that participants in an expectancy situation were unaware of their biasing behavior. If individuals in such situations were to become aware of their biasing behavior, the impact of their own or others' expectancies might be reduced (Biesanz, Neuberg, Smith, Asher, & Judice, 2001). However, it is rare for researchers in this tradition to actually measure behavioral self-awareness.

Interpersonal mimicry is another phenomenon where self-accuracy is assumed to be lacking (e.g., the "chameleon effect"; Chartrand & Bargh, 1999). Researchers posit that mimicry is automatic and such automaticity occurs outside awareness (Bargh & Williams, 2006). One study suggested that participants were not aware when they were imitating another's movements or expressions in a mimicry paradigm (Chartrand & Bargh, 1999). This unawareness suggests that participants may not be able to accurately recall their own behavior within that interaction. However, being aware of one's behavior and being aware that one's behavior is mimicking another person's are not the same thing.

Unawareness also is usually assumed when people engage in nonverbal behaviors indicative of emotional contagion. However, Chovil's (1991) finding that facial expressions indicative of emotional contagion were more likely when interactants could see each other than when they could not suggests that the facial behaviors had message properties and therefore might be under willful control and associated with some degree of self-accuracy.

We are aware of three studies that measured accuracy of self-reported nonverbal behavior after specific behavioral episodes. Accuracy for remembering one's facial expressiveness was studied by Barr and Kleck (1995). Participants' self-ratings of facial expressiveness made immediately after watching affectively arousing video segments were correlated with observers' ratings of their facial expressiveness (based on videotapes). In

two studies, correlations of $r = .55$ and $r = .59$ between self and observer ratings, respectively, were obtained. The authors suggested that this high level of nonverbal self-accuracy was related to people's ability to monitor and control their faces with relative ease compared to other nonverbal channels such as body movements or vocal behaviors, though those other behaviors were not included in their studies.

Gosling, John, Craik, and Robins (1998) investigated whether participants who were videotaped during a group discussion could accurately report how often they had engaged in a number of behaviors, as determined by correlations between the self-reported frequencies and the actual frequencies (coded from the videotape). Of the 12 most reliably coded behaviors, 2 were clearly nonverbal (laughed out loud and interrupted someone else). Self-accuracy was high for laughing ($r = .52$) but close to zero for interrupting others ($r = .07$).

Finally, Hess, Sénécal, and Thibeault (2004) asked participants to role-play six emotions and afterward asked them to make self-ratings for each emotion of how intensely they had engaged in nine expressive behaviors (e.g., stare/look hard at, tremble/freeze). For each of the six emotions for each participant, the self-ratings were correlated with observers' ratings of the silent video using the same scales. The correlations between self-ratings and observer ratings were highly variable, ranging from a low of $r = .02$ for fear to a high of $r = .71$ for shame ($M r = .38$).¹

Factors Influencing Nonverbal Self-Accuracy

Success in remembering one's nonverbal behavior could depend on many factors including the frequency, saliency, and intentionality (vs. automaticity) of behaviors. The process of observing and interpreting others' nonverbal cues is often said to be automatic and out of conscious awareness (e.g., Ambady & Gray, 2002; Bargh & Chartrand, 1999; Bargh & Williams, 2006). If people process their own nonverbal cues with similar automaticity or unconsciousness, nonverbal self-accuracy can be expected to be low overall.

Malle and Pearce (2001), though not concerned with accuracy per se, measured participants' tendencies to attend to different kinds of information in the self versus another person. Specifically, attention to the self (as measured by postexperimental listing of what happened during an interaction) was directed much more to unobservable events such as emotions than to observable events such as nonverbal behaviors, whereas attention to the other person showed the opposite pattern—more attention to observable than unobservable events. This is consistent with DePaulo's (1992) observation that nonverbal cues are "more accessible to the people who

are observing them than to the people who are producing them” (p. 234). Lack of self-accuracy could therefore stem both from preoccupation with other information in the self (e.g., own subjective experience) and from relative lack of visual availability of one’s own behavior. Thus, both research and common sense suggest that accuracy might be low for recall of one’s own behaviors. However, this is an empirical question, as there are probably times when people are very aware of how they act nonverbally, and there are probably many personal, cognitive, situational, and motivational factors that can influence the extent of such self-accuracy.

It is also possible that self-accuracy varies across different behaviors. Nonverbal “leakage” refers to the inadvertent revealing of one’s feelings through behavioral cues. Different nonverbal behaviors have been said to differ in how prone to leakage they are because of how well they can be monitored and controlled by an encoder (Bond & DePaulo, 2006; Ekman & Friesen, 1969, 1974; Rosenthal & DePaulo, 1979; Vrij, 1994; Zuckerman, Larrance, Spiegel, & Klorman, 1981). Facial expressions are considered to be less prone to leakage than body and voice. Accordingly, self-accuracy should be greater for the face than for self-touching. It is not clear what the leakage hypothesis would predict for gazing, nodding, and hand gestures.

Kolar, Funder, and Colvin (1996) suggested a different possible interpretation for why self-accuracy might be higher for some behaviors than others. In their study, participants’ self-rated personality descriptions were more accurate (i.e., better correlated with behavior coded from videotape) for positive, socially desirable characteristics than for more negative characteristics. People may suppress awareness of behaviors that they would rather not engage in. Thus, in our studies it is possible that participants would consciously focus on, and remember, their smiling, gazing, and nodding because those behaviors are pleasant and desirable, whereas they would tune out their self-touching because that behavior is least desirable (suggestive of anxiety or bad habits).

Situational factors could also influence nonverbal self-accuracy. In the present research we investigated focus of attention. Though intuition might suggest that paying more attention to oneself should produce higher self-accuracy, it is also possible that the reverse will be true because of the additional cognitive demands and potential stress associated with raised self-consciousness. When cognitive demands are high, dividing one’s attention or overloading one’s cognitive capacities is likely to impair performance. Conversation itself is cognitively demanding, and arousal or anxiety negatively affect information processing in general (Easterbrook, 1959) and nonverbal cue processing in particular (Hanggi, 2004; Patterson, 1995; Schroeder, 1995).

The present studies, in which participants were aware of being videotaped while engaging in interpersonal interaction tasks in a psychology laboratory, established a situation of some stress and cognitive demand. In this situation, we believe that higher self-focus is likely to impair nonverbal self-accuracy. This prediction is consistent with research on the effect of cognitive load on memory for how one answered questions in an interview (Tice, Butler, Muraven, & Stillwell, 1995). Deception research also implicates higher self-focus as an impairing factor in successful lying, as would-be deceivers become less successful in deceiving when their motivation to succeed in deceiving is high (and they are presumably paying extra attention to their own behavior; DePaulo, 1992). Also relevant is Patterson and Stockbridge’s (1998) study showing a negative impact of cognitive load on nonverbal cue processing. In that study, participants who were told to pay conscious attention to others’ nonverbal cues that would otherwise go unnoticed at the conscious level were less accurate judges of those cues when also under cognitive load. Thus, there is good reason to anticipate that higher levels of self-focus would impair nonverbal self-accuracy.

The Present Research

In the present studies we measured self-accuracy for smiling, gazing, nodding, gesturing with the hands, and self-touching, based on participants’ recollections of these behaviors that were gathered without forewarning after an interpersonal interaction. Two ways of scoring self-accuracy were calculated (Hall, Bernieri, & Carney, 2005). As in Barr and Kleck (1995) and Gosling et al. (1998), we calculated the *group correlation* for each behavior, which is the correlation for a given behavior between self-assessments and coder assessments across participants (i.e., one correlation for the whole group, no individual self-accuracy scores). This method permits assessment of overall accuracy separately for each behavior. In addition, as in Hess et al. (2004), we calculated an *individual profile correlation* for each participant, reflecting the correlation between his or her self-rated behavior and the coded behavior, across the behaviors. This score captures the participant’s accuracy of remembering the relative amounts of the different behaviors he or she displayed. Calculating an individual accuracy score allows for testing additional research questions.

The five nonverbal behaviors we examined are ubiquitous in social interaction and represent a variety of meanings and functions (Knapp & Hall, 2005). Smiling is a highly social behavior (Kraut & Johnston, 1979) that can reflect affiliation, ingratiation, positive affect, among others (Abel, 2002; Keltner, 1995; Lefebvre, 1975; Ruch, 1995). Nodding is typically associated

with agreement as well as the regulation of interactions (Knapp & Hall, 2005). Gazing at a partner indicates approach-avoidance tendencies as well as emotion (Adams & Kleck, 2003; Ellsworth & Langer, 1976). Hand gestures facilitate smooth discussion and may reflect personality characteristics such as extraversion (Lippa, 1998; Woodall & Burgoon, 1981). Finally, self-touches are associated with anxiety in a social situation (Ekman & Friesen, 1974; Knapp & Hall, 2005).

We predicted that overall levels of nonverbal self-accuracy would be only modest in magnitude, reflecting not only automaticity and lack of visual availability of cues but also competing cognitive activities. However, we expected that self-accuracy would be above chance because we believe that people could not negotiate social life as well as they do if they were completely oblivious to how they behave toward others.

In keeping with the leakage and social desirability hypotheses put forth earlier, we predicted differences among behaviors. Both frameworks would be consistent with finding self-accuracy to be highest for smiling and lowest for self-touching. Our analysis was mainly exploratory for the other behaviors, but we specifically tested the leakage hierarchy mentioned earlier (smiling, gazing, nodding, gesturing, and self-touching, in that order) as well as the possibility that smiling, gazing, and nodding were all socially desirable and therefore more accurate than self-touching. Thus far, there is no research that compares self-accuracy for different nonverbal behaviors, other than Gosling et al.'s (1998) finding that self-accuracy for laughing was higher than self-accuracy for interrupting others. Furthermore, much of the research on the relative controllability of nonverbal channels has been conducted within a lie-detection paradigm. Therefore, investigation of this question during more typical social interactions is needed.

All of the present studies examined self-focus in relation to nonverbal self-accuracy. In Study 1, focus of attention (on self, other, or room) was experimentally manipulated through direct instructions. In Studies 2 and 3, focus of attention (self, other) was manipulated through assigning one participant to be evaluated by the other as part of a manipulation of status roles. And in Study 4, we examined what other nonverbal behaviors were associated with higher and lower self-accuracy to gain indirect insight into self-focus. In none of the studies were participants forewarned that they would be asked to remember their nonverbal behavior.

Research Design Presentation and Demographics

Some of the research questions are addressed in all four studies and are presented as a meta-analytic summary (Rosenthal, 1991). Because the meta-analysis is

based on all four studies, we describe all of their methodologies before proceeding to any of the results. All participants were recruited from introductory psychology classes at Northeastern University and received partial course credit for taking part. Students from this pool typically are 18.7 years old, 80% Caucasian, 8% Hispanic, 6% African American, 6% Asian, and 2% other ethnicities.

STUDY 1

Method

Participants

The sample consisted of 157 students (53 males, 104 females). An additional 157 participants served as interaction partners, but their nonverbal self-accuracy was not measured.

Focus of Attention Manipulation

The experimental conditions were intended to manipulate participants' focus of attention by varying their goals in the interaction. In the get acquainted condition, dyads were instructed to talk about life on campus. In the focus on self condition, they were instructed to get acquainted and at the same time to make a favorable impression on the other. In the focus on partner condition, they were instructed to get acquainted and at the same time to get to know the other as well as possible. And, in the focus on room condition, they were instructed to discuss how to rearrange the laboratory room to be an office for two people. See Schmid Mast and Hall (2006) for manipulation checks.

Procedure

Participants were randomly assigned to be the participant or the partner and were randomly assigned to one of the focus of attention conditions described previously. They spent 5 min interacting while being videotaped by a camera in plain sight, after which they were separated and given self-ratings of how much they remembered having smiled, gazed, nodded, used hand gestures, and touched themselves during the interaction (1 = *hardly ever* to 9 = *a great deal* for each behavior), along with some unrelated questionnaires. Participants also rated their affective experience on several scales; for present purposes, we analyzed the self-rating of nervousness, which was measured on a 9-point scale.

Coding of Nonverbal Behavior

Coders scored all 5 min of interaction. Gazing was measured in seconds and the other behaviors were

measured as frequencies. Mean Pearson r reliability among three coders ranged from .82 to .97 across the five behaviors.

Scoring of Nonverbal Self-Accuracy

Group accuracy correlations. A group accuracy correlation was calculated for each behavior. To illustrate, the group accuracy correlation for smiling consisted of the correlation between self-assessed smiling and coded smiling, across participants. These correlations were tested against zero to ascertain whether accuracy exceeded chance.

Individual profile correlations. Because the five behaviors were not all coded on the same metric (i.e., frequency vs. timing), each coded behavior was first z scored across participants so that for each behavior the participant had a score that indicated how much of the behavior he or she engaged in relative to others in the study. Then, the participant's self-ratings of the five behaviors were correlated with his or her z scores for the same behaviors, creating an individual profile correlation that was treated as an individual accuracy score (transformed to Fisher z for all calculations and then returned to the Pearson r metric for presentation). A higher score indicated that a person's self-ratings matched more closely the relative amounts of the behaviors he or she had displayed. The test of whether the group's performance exceeded chance was a single-sample t test of the mean profile correlation against zero.²

STUDY 2

Method

Participants

Participants were 180 students (58 males, 122 females).

Role Manipulation

The roles were intended to create differences (or not) in perceived status or power within the dyad. The roles were owner or prospective assistant in a mock art gallery (unequal) or co-owners of the gallery (equal). A gift certificate to a local music store was offered to the assistants based on the favorability of the owners' evaluation of them. See Hall, Horgan, and Carter (2002) for manipulation checks.

Procedure

Participants' roles in the dyads were randomly assigned and they interacted in plain view of a video

camera. While in role, they engaged in two tasks: (a) a 5- to 7-min job interview (in the equal status condition the co-owners interviewed each other to practice interviewing an applicant), and (b) a 6-min discussion of various artworks that could be selected for exhibit in the gallery. In the unequal-status dyads, owners were to evaluate the assistant's performance at the end of their interaction. Participants were afterward separated and given the same self-ratings of nonverbal behavior as in the previous study, along with some unrelated questionnaires.

Coding of Nonverbal Behavior

Raters ($N = 720$) recruited from the same participant pool participated in small groups, rating 4 or 5 members of different dyads in 1-hr sessions. The video monitor was covered so that only 1 participant appeared on the screen. Each participant was judged by four raters altogether. Minutes 1, 2, 4, and 5 from each of the two interaction tasks were scored for a total of 8 min per participant or 67% of the total interaction. Using a 1 (*hardly at all*) to 9 (*nearly all the time*) scale for each behavior, raters made a rating for a given behavior every 30 s and these were then averaged for each participant. Interrater reliability, assessed in terms of Cronbach's alpha among the four raters who judged each participant, ranged from .70 to .82.

Scoring of Nonverbal Self-Accuracy

Nonverbal self-accuracy (group correlations and individual profile correlations) was scored as in Study 1.

STUDY 3

Method

Participants

Participants in Study 3 were 180 students (54 males, 126 females).

Procedure

Study 3 had the same design as Study 2 except that hand gestures were not coded from the videotape; therefore, nonverbal self-accuracy was based on four rather than five behaviors. See Hall et al. (2002) for manipulation checks.

Coding of Nonverbal Behavior

Minutes 1, 2, 4, and 5 of each task were again coded, but in this study a trained coder was used and only smiling, nodding, self-touching (all in frequencies), and gazing (in seconds) were coded. Pearson r reliability against

a second coder ranged from .78 to .93 across the four behaviors.

Scoring of Nonverbal Self-Accuracy

Scoring was done as in the previous studies.

STUDY 4

Method

Participants

The sample for Study 4 consisted of 91 students (22 males, 69 females).

Procedure

Dyads spent 15 min working together to design an educational video on the benefits of recycling, while being videotaped by a camera in plain sight, as explained further in Hall, Murphy, and Carney (2006). In each dyad, 1 participant was randomly assigned to work under a reward contingency related to evaluation of his or her performance. For the present study, we calculated nonverbal self-accuracy only for the partner of this person because the partner was not working for a reward and was not aware that the first person was eligible for a reward. Following the videotaped interaction, dyad members were separated to complete the same self-ratings of their nonverbal behavior as in the previous studies, as well as some unrelated questionnaires.

Coding of Nonverbal Behavior

Based on 3 randomly selected minutes from the 15-min planning discussion, participants were scored for the same five nonverbal behaviors as in Studies 1 and 2 by trained coders (all were scored as frequencies except for gazing, which was timed). Other analyses of these tapes showed that 3 min extracted from the full 15-min interaction adequately represented behavior across the full interaction (Murphy, 2005). Reliability (Pearson r) against a second coder ranged from .83 to .96 across the five behaviors.

RESULTS

Overall Nonverbal Self-Accuracy and Differences Between Behaviors

The group accuracy correlations (Table 1) show that self-accuracy was significantly greater than zero for all five behaviors, with the average level of accuracy over all five behaviors being $r = .25$. However, there were differences among behaviors, with smiling showing the

highest self-accuracy and self-touching the lowest. To test the differences, a random-effects approach was taken wherein the correlations in Table 1 were entered into a repeated measures ANOVA after conversion to Fisher's z , in which the behaviors were the levels of the repeated measures factor and the participant groups were the cases. In the first ANOVA, all groups were included but hand gestures were not because Study 3 did not measure this behavior. The main-effect means are those shown in the "unweighted mean" row of Table 1, and as the superscripts indicate, there was significantly higher self-accuracy for smiling than for gazing, nodding, or self-touching; the last three behaviors were not significantly different from one another. In the second ANOVA, all five behaviors were included but Study 3 was excluded because it did not measure hand gestures. Even with the reduced number of groups included, smiling differed from gazing ($p < .10$), nodding ($p < .05$), self-touching ($p < .10$), and hand gestures ($p < .05$). Thus, even with the low statistical power inherent to the random-effects approach, there were differences in how accurately participants could remember different behaviors.

Table 2 shows that the individual profile correlations similarly demonstrated that all of the groups showed some degree of nonverbal self-accuracy, with the means significantly above zero except for equal- and low-power participants in Study 3. The average across all groups was $r = .28$ (the similarity between this mean and the mean of the group correlations is to be expected; Kenny & Winquist, 2001). Note, however, that the group self-accuracy correlations and the individual profile correlations express accuracy in different ways. The former refers to one behavior at a time across all participants, whereas the latter refers to the relative amounts of the behaviors within individual participants.

Sex differences calculated on the individual profile correlations were negligible; with only one exception, all t tests for sex were less than 1.0 and mixed in direction. The only exception was for the high-power participants in Study 3, among whom the women had somewhat higher nonverbal self-accuracy ($p = .07$). Overall, it is fair to conclude that men and women did not differ in nonverbal self-accuracy, consistent with Hess et al. (2004).³

Focus of Attention

To analyze the impact of the self-focus manipulation in Study 1, we performed a 4×2 ANOVA in which the independent variables were focus of attention condition (get acquainted, focus on self, focus on partner, focus on room) and participant sex, and the dependent variable was the individual profile correlation. There was a main effect of focus of attention, $F(3, 142) = 2.65$,

TABLE 1: Nonverbal Self-Accuracy (Group Correlations)

Group	Smiling	Gazing	Nodding	Hand Gestures	Self-Touching
Study 1	.44***	.51***	.21**	.24**	.12
Study 2					
High power	.52***	.26*	.41***	.28*	.32**
Equal power	.44**	-.16	.44*	.10	.22
Low power	.27*	.14	-.01	.30*	.37*
Study 3					
High power	.30*	.37**	.25 [†]	–	.06
Equal power	.33 [†]	.26	.16	–	.05
Low power	.42***	.38**	.12	–	.04
Study 4	.43***	.13	.17	.31**	.25*
Unweighted mean	.40 ^{a,b,c,d}	.24 ^a	.21 ^b	.24 ^c	.18 ^d
Weighted mean	.40	.31	.21	.26	.18
Combined Z	8.95***	5.96***	4.73***	4.89***	4.03***

NOTE: The dash indicates that the behavior was not measured.

a. $F(1, 7) = 3.93, p < .10$ for comparison of these two mean correlations (ANOVA 1; see text).

b. $F(1, 7) = 20.20, p < .01$ for comparison of these two mean correlations (ANOVA 1; see text).

c. $F(1, 4) = 6.17, p < .10$ for comparison of these two mean correlations (ANOVA 2; see text).

d. $F(1, 7) = 19.63, p < .01$ for comparison of these two mean correlations (ANOVA 1; see text).

[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

TABLE 2: Nonverbal Self-Accuracy (Mean Individual Profile Correlations)

Group	Mean <i>r</i>	SD	N	One-Sample <i>t</i> Test
Study 1	.36	.68	157	$t(149) = 6.83***$
Study 2				
High power	.43	.64	59	$t(58) = 5.51***$
Equal power	.29	.66	59	$t(58) = 3.58***$
Low power	.24	.74	60	$t(59) = 2.57**$
Study 3				
High power	.40	.99	57	$t(56) = 3.18**$
Equal power	.16	.91	58	$t(57) = 1.38, ns$
Low power	.11	.90	56	$t(55) = .94, ns$
Study 4	.27	.81	90	$t(90) = 3.66***$

NOTE. In all studies, individual profile correlations (*r*) were transformed to Fisher's *z* before averaging, and the average was returned to the Pearson *r* metric for presentation.

** $p < .01$. *** $p < .001$.

$p = .05$. Self-accuracy was much lower in the get acquainted ($M = .20$) and focus on self ($M = .28$) conditions, where participants were attending to themselves and likely to be self-conscious, compared to the focus on partner ($M = .52$) and the focus on room ($M = .51$) conditions, where self-consciousness would have been much diminished. An ANOVA of the postinteraction self-ratings of nervousness showed the same pattern with a marginally significant main effect for focus of attention condition, $F(3, 151) = 2.58, p < .06$. Participants reported feeling more nervous in the get acquainted ($M = 4.07$) and focus on self ($M = 4.20$) conditions than in the focus on partner ($M = 3.90$) and focus on room ($M = 2.86$) conditions.⁴

In Studies 2 and 3, self-focus was manipulated through assigned status roles. As Table 2 shows, in both studies participants assigned to be evaluated (assistant role) had lower nonverbal self-accuracy than those assigned to do the evaluating (owner role). In both studies, the comparisons of owner with assistant by matched *t* tests were of identical magnitude and were marginally significant: Study 2, $t(58) = 1.81, p < .08$, effect size $r = .23$; Study 3, $t(55) = 1.75, p < .09$, effect size $r = .23$. A combined probability calculated across these two studies was significant, $Z = 2.47, p < .05$ (Stouffer method; Rosenthal, 1991). As shown in the table, the equal-status groups had self-accuracy midway between the high- and low-groups.⁵

TABLE 3: Correlations Between Nonverbal Self-Accuracy (Individual Profile Correlations) and Own Nonverbal Behavior

Group	Smiling	Gazing	Self-Touching
Study 1	.18*	.17*	-.09
Study 2			
High power	.16	.37**	-.34**
Equal power	.05	.18	-.12
Low power	-.04	.10	-.26*
Study 3			
High power	.09	.17	-.25 [†]
Equal power	.47***	-.02	.08
Low power	.25 [†]	.24 [†]	-.26 [†]
Study 4	.27**	-.04	-.19 [†]
Unweighted mean	.19	.15	-.18
Weighted mean	.19	.14	-.16
Combined Z	4.31***	3.40***	-4.15***

[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Finally, the correlations between nonverbal self-accuracy (individual profile correlation) and one's own nonverbal behaviors were examined as additional evidence for the focus of attention hypothesis (Table 3). The correlations of self-accuracy with how much the participant nodded and used hand gestures were negligible and are not shown in the table. However, the pattern for smiling, gazing, and self-touching supported the notion that self-accuracy is higher when one is not focused on the self. As Table 3 shows, the correlations were positive for smiling and gazing and negative for self-touching, with all of the combined p values significant. Smiling and gazing are indicators of an orientation toward the other person and away from the self, whereas self-touching is an indicator of self-focus (e.g., personal discomfort, anxiety; Knapp & Hall, 2005).⁶

GENERAL DISCUSSION

Though social psychologists have expressed interest in how aware people are of their behavior, little research has been done on this question with respect to nonverbal behavior. In four studies (containing eight groups of participants), we measured accuracy of remembering one's nonverbal behavior immediately after engaging in an interaction. Without advance warning, participants rated how much of each behavior they had displayed, and nonverbal self-accuracy was scored by comparing these ratings with how much they actually displayed the same behaviors, as determined by videotape coding. Two methods for calculating nonverbal self-accuracy were used, one describing self-accuracy for the whole group of participants and one describing self-accuracy for individual participants.

Nonverbal self-accuracy was significantly above chance though modest in magnitude, and there were differences between behaviors. Self-accuracy for smiling was significantly higher than self-accuracy for the other behaviors, with self-touching having the lowest self-accuracy. The difference between smiling and self-touching matches with previous authors' proposals regarding the relative difficulty of self-monitoring different nonverbal channels. The face is said to be the easiest channel to self-monitor, but evidence on this question has been indirect. For example, lie detection is less successful when viewers can see the speaker than when they cannot (Bond & DePaulo, 2006), suggesting that deceivers can monitor and control their facial expressions better than other nonverbal channels. The obtained ordering of self-accuracy across the different behaviors fits better with their relative controllability or ease of monitoring than with their relative social desirability as proposed by Kolar et al. (1996) because self-accuracy for smiling was significantly greater than self-accuracy for nodding or gazing, even though all are socially desirable, whereas self-accuracy for self-touching was not significantly different from self-accuracy for gazing, nodding, or hand gestures even though self-touching is less socially desirable than any of those. However, any explanation of why self-accuracy varied across behaviors can only be speculative at the present time.

All four studies support the notion that self-focus impairs ability to remember one's nonverbal cues relative to the level obtained if attention is directed elsewhere. In Study 1, this difference was observed between conditions that promoted self-consciousness and self-presentation (get acquainted, make a good impression) versus conditions that promoted less self-focus (get to know your partner as well as possible, rearrange the furniture in the room). In Studies 2 and 3, nonverbal self-accuracy was lower for participants assigned to be evaluated than for participants doing the evaluating, conditions that also differ in degree of self-focus, with the self-accuracy of participants assigned to have a nonevaluative relationship falling in between. Finally, across all four studies, participants' nonverbal self-accuracy was lower when they engaged in more compared to less self-touching and was higher when they engaged in more compared to less smiling and gazing at the partner. These results, too, suggest a role for self-focus because self-touching is a very self-focused behavior whereas smiling and gazing suggest a focus on the other person.

Future Research

Testing the limits of the self-focus hypothesis will be an important undertaking. In the present research, self-focus impaired nonverbal self-accuracy within the

context of a somewhat stressful situation (i.e., being videotaped in a psychology experiment). If self-focus were to occur in a situation of much lower arousal or cognitive demand, perhaps there would be an absolute gain in self-accuracy or at least less of an impairment. Such a situation might be accomplished by having participants converse with a familiar other in a familiar location or recording their behavior unobtrusively.

Another avenue for future research is to explore why some individuals are more accurate than others. People might attain greater accuracy by maintaining a habit of consciously monitoring their behavior, which implies engaging in a higher proportion of deliberate, as opposed to unintentional, behaviors. It would be interesting to find out whether these people subtract attention from other ongoing events in their environment. On the other hand, some people may have greater processing capacity than others, which allows them to spread their attention while maintaining high accuracy for their own as well as other people's behavior. Individuals who are accustomed to focusing attention on the self, such as actors or individuals high on the self-monitoring trait (Snyder, 1974), may find that self-focus is not very cognitively arousing and therefore does not impair their self-accuracy. Other research questions include whether forewarning or motivation to remember one's nonverbal behaviors affect self-accuracy and whether high nonverbal self-accuracy is associated with better emotional self-regulation.

Another interesting avenue would be the employment of the social relations model using a round-robin design (Levesque & Kenny, 1993). In the model, participants interact with multiple partners and the variance associated with different aspects of the interaction can be calculated. With such a design, the relative size of the self-accuracy effect could be calculated within individuals as well as across interactions.

Limitations

There are obvious limitations to our measurement approach. Because participants described their behavior after the interaction, their scores cannot reflect their possible use of self-accuracy during the conversation to make moment-to-moment decisions about how to act. A person might notice his or her behavior at one point and take action to change or maintain it, and then forget it the next moment as new behaviors are emitted that require monitoring. Therefore, not remembering one's total amount of a given behavior does not mean that one did not take accurate notice of it during the interaction.

Note, too, that our measures of self-accuracy did not estimate participants' absolute ability to know how much of each behavior they displayed. We did not, as an

example, measure whether participants' recollections of the number of smiles they displayed matched the number counted by the coders (cf. Barr & Kleck, 1995). This could not be done because participants used rating scales rather than absolute estimates. Therefore, we do not know whether people over- or underestimated their cue usage. Such information would be interesting for testing hypotheses about possible biases in people's self-understanding. Another possible limitation is the possibility that participants were not actually remembering their behavior directly but instead fell back on a heuristic of some sort when asked to describe their behavior. One such heuristic could be their knowledge of their own personality. Extraverts might, for example, assume that they smiled a lot and self-touched very little based on stereotype knowledge, on past observation of other extraverts' behavior, or on past observation of their own behavior. To the extent that extraverts do smile a lot and self-touch very little, self-accuracy would appear to be high even though they are not actually remembering how they behaved. Fortunately, this potential artifact does not present a problem for our comparisons between experimental conditions because people with different personalities would have been randomly distributed across conditions.

Conclusions

Social and personality psychologists have long doubted the validity of self-reports. This doubt seemed fully justified by Nisbett and Wilson's (1977) review documenting inaccuracy in people's reports of why they behave as they do. People's lack of insight into their behavior (either its nature or its determinants) leads to "authorship confusion" (Wegner, 2003), which appears to underlie a wide variety of phenomena including apparently brilliant horses, Chevreul's pendulum, moving tables, Ouija boards, dowsing rods, and, most recently, facilitated communication (Spitz, 1997; Vogt & Hyman, 2000; Wegner, 2002). Currently there is a widespread revival of the idea that people have limited self-insight, as evidenced by the growing use of implicit measures of behavior and attitudes (e.g., Bargh & Chartrand, 1999; Greenwald & Banaji, 1995; Greenwald, McGhee, & Schwartz, 1998; Macrae, Bodenhausen, Milne, & Jetten, 1994; Phelps, O'Connor, & Cunningham, 2000). Perhaps it is this pessimism about the accuracy of self-reports that explains why so little research actually investigates people's awareness of how they behave.

On the other hand, within some theoretical traditions there seems to be an abundance of optimism about such accuracy. Both self-perception theory (Bem, 1967) and action identification theory (Vallacher & Wegner, 1985, 1987) posit that the way we remember or make sense of

our own behavior affects the inferences we draw about ourselves. In these theories, it is tacitly assumed that one's own behavior can be remembered accurately; thus, these theories do not question whether in fact people are able to correctly remember their actions.

NOTES

1. Some other studies have been concerned with self-accuracy but are not similar enough to our studies to permit a direct comparison. Kolar, Funder, and Colvin (1996) gathered 41 self-reported trait descriptions, 2 of which were purely nonverbal (facial/gestural expressiveness, and behaves and acts quickly). These self-descriptions positively predicted observers' coding of the same behaviors based on videotaped interaction. However, Kolar et al. asked participants about their general behavior, not about how they had acted during their videotaped interaction. Other studies have addressed accuracy in discerning what kind of impression one is making on others, but this skill may entail accuracy of reading other people more than it entails accuracy of self-perception (see review in DePaulo, Kenny, Hoover, Webb, & Oliver, 1987; also, Kenny & DePaulo, 1993).

2. When a profile correlation is calculated across rated items within an individual participant, the null or "guessing" level may not be zero but rather some positive value reflecting the general accuracy of stereotypes about whatever trait or quality is being rated (Hall, Bernieri, & Carney 2005). To examine this possibility, in Studies 1 and 4 we recalculated the individual profile correlation by correlating a participant's self-ratings with a randomly picked participant who was not the actual partner. In both studies, the new average profile correlation was $r = .05$ and the t tests against this value were still significant. Stereotype accuracy (Colvin & Bundick, 2001; Funder, 2001) is thus not an issue for individual profile correlations reflecting nonverbal self-accuracy.

3. Because the present studies had an average female-male ratio of 70:30, it is fair to ask whether our comparisons of men's and women's self-accuracy were significantly undermined by the loss of statistical power associated with unequal sample sizes. According to Rosenthal and Rosnow (1984), a 70:30 split produces a t that is 8% smaller than if it had been calculated with a 50:50 split. Considering how small our obtained t s were, and considering that we examined the effects over four studies, we believe the unequal sample sizes did not obscure the presence of sex differences.

4. There was also a Condition \times Sex interaction, $F(3, 142) = 3.36$, $p = .02$, showing that the experimental conditions affected men and women differently. Because we had no predictions for this effect and the differences were difficult to interpret, no further discussion of this effect is provided. Also, we conducted the ANOVA without having sex in the model and found that the self-focus effect remained: condition effect, $F(3, 146) = 2.84$, $p < .05$; contrast between the two less and the two more self-focused conditions, $F(1, 146) = 5.11$, $p < .05$.

5. Unlike in Studies 1 and 4 where we analyzed only 1 participant from each dyad, in Studies 2 and 3 we included both participants, as follows. The high- and low-power participants were analyzed separately and treated as different groups in all analyses, thus ensuring that within each group all observations were independent. However, the high- and low-power groups were not independent of each other because they had been partners. For the group correlations, the equal-power partners were, for the same reason, randomly assigned to separate groups for analysis; the correlations were calculated separately for these two groups and then averaged. For the individual profile correlations, the equal-power participants were combined into one pooled group. Any errors of nonindependence entailed by these methodological decisions were minor because nonverbal self-accuracy was only minimally correlated between dyad members (correlations = $-.14$ to $.14$, all ns).

6. In all four studies we also calculated the individual profile correlation for accuracy of remembering the partner's behavior (other accuracy) in analogous fashion to the calculation of self-accuracy. The mean for other accuracy was $r = .20$, which was significantly lower than the mean of $r = .28$ found for self-accuracy (combined $Z = 2.27$, $p < .05$). Thus, remembering the partner's nonverbal behavior is also a difficult

task, even more difficult than remembering one's own nonverbal behavior. The mean correlation between the two kinds of accuracy was $.11$, which was significantly greater than zero (combined $Z = 2.81$, $p < .01$). This positive correlation between self-accuracy and other accuracy means that, on average, participants did not trade off memory for their own behavior against memory for the partner's behavior.

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