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When and Why Being Ostracized Affects Veracity Judgments

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Abstract

Ostracism—being ignored and excluded by others—is a ubiquitous experience with adverse effects on well-being. To prevent further exclusion and regain belonging, ostracized individuals are well advised to identify affiliation partners who are sincerely well-disposed. Humans' ability to detect lies, however, is generally not very high. Yet, veracity judgments can become more accurate with decreasing reliance on common stereotypic beliefs about the nonverbal behavior of liars and truth-tellers. We hypothesize that ostracized (vs. included) individuals base their veracity judgments less on such stereotypical nonverbal cues if message content is affiliation-relevant. In line with this hypothesis, Experiment 1 shows that ostracized (vs. included) individuals are better at discriminating affiliation-relevant lies from truths. Experiments 2-3 further show that ostracized (vs. included) individuals base their veracity judgments less on stereotypical nonverbal cues if messages are of high (but not low) affiliation relevance.

Keywords: ostracism, social exclusion, need to belong, veracity judgment, lie detection

When and Why Being Ostracized Affects Veracity Judgments

Ostracism—that is, being ignored and excluded by others—occurs across social contexts and across the lifespan: from children on the playground and adolescents in school to adults in the workplace and the elderly in their retirement home (see Riva & Eck, 2016, for a review). Being ostracized is a highly aversive experience that threatens humans' fundamental need to belong (Williams, 2009). So far, only few circumstances have been identified that can mitigate the immediate threat ostracism poses to the need to belong (e.g., Eck, Schoel, & Greifeneder, 2017; see Eck, Schoel, & Greifeneder, 2016, for a review). As an unmet need to belong has detrimental effects on well-being (Baumeister & Leary, 1995; Verhagen, Lodder, & Baumeister, 2018), it is crucial for ostracized individuals to reduce the risk of further exclusion and regain belonging by identifying affiliation partners who are sincerely well-disposed. The information conveyed by others, however, is not necessarily true because lying is common in everyday life (e.g., DePaulo, Kashy, Kirkendol, Wyer, & Epstein, 1996; Ekman, 2001). Making things worse, the ability to make accurate veracity judgments is generally not very high (e.g., Bond & DePaulo, 2006; Ekman & O'Sullivan, 1991).

We propose that being ostracized influences veracity judgments if the message is *affiliation-relevant*—that is, the message contains information that helps evaluate others' potential as appropriate affiliation partners (cf. Gardner, Picket, & Brewer, 2000). More precisely, affiliation-relevant messages contain information that reveals what kind of persons others are (e.g., others' characters or interests) or how others behave socially (e.g., others' helpful or selfish acts).[1] In short, we hypothesize that ostracized versus included individuals base their veracity judgments of affiliation-relevant messages less on common stereotypic beliefs about the nonverbal behavior of liars and truth-tellers. Because the stereotypical nonverbal behavior of liars and truth-tellers is usually hardly diagnostic of deception and truth, veracity judgments can become more accurate with decreasing reliance on such stereotypical nonverbal cues relative to verbal cues (Reinhard, 2010; Reinhard & Schwarz,

2012). We detail this reasoning in what follows, drawing on the veracity judgments and ostracism literatures.

Veracity Judgments

Lying is part of everyday life (DePaulo et al., 1996), but usually people are only slightly better than chance in detecting deception (Bond & DePaulo, 2006). Two reasons often put forward when trying to explain the poor accuracy of veracity judgments are wrong stereotypical beliefs about veracity cues and weak diagnostic cues (e.g., Granhag & Hartwig, 2012; Hartwig & Bond, 2011; Vrij, 2008). People around the world believe, for instance, that gaze aversion and body movements are indicative of deception (Global Deception Research Team, 2006), but actually none of these stereotypical nonverbal cues is reliably correlated with deception (DePaulo et al., 2003; Sporer & Schwandt, 2007). By contrast, lay beliefs about verbal veracity cues, such as lies are less consistent and less coherent (Global Deception Research Team, 2006), are in line with meta-analytic findings showing that lies are less plausible, less logically structured, more discrepant, and more ambivalent, as well as include fewer relevant details (DePaulo et al., 2003). Overall, verbal cues have been found to be more predictive of actual truth and deception than stereotypical nonverbal cues (e.g., DePaulo et al., 2003; Vrij, 2008). Thus, although verbal and nonverbal differences between truth-tellers and liars are, on average, rather small (DePaulo et al., 2003; Hartwig & Bond, 2011), decreasing reliance on stereotypical nonverbal cues relative to verbal cues can improve the accuracy of veracity judgments. Meta-analytic findings by Bond and DePaulo (2006) support this assumption: The accuracy of veracity judgments is lowest when only nonverbal information is available (muted-video presentations) and increases with the availability of verbal information in addition to nonverbal information (audiovisual presentations), or when only verbal information is available (audio presentations or transcripts).

Research on veracity judgments further suggests that stereotypical nonverbal veracity cues (e.g., gaze aversion) can be easily processed in a heuristic way (e.g., “liars avoid eye

contact"), whereas verbal veracity cues (e.g., plausibility) require more effortful scrutinizing of the statements' content (e.g., Reinhard, 2010; Reinhard & Sporer, 2008). Specifically, in line with dual-process theories (Chaiken & Trope, 1999), research has shown that factors fostering careful processing of message content (e.g., high need for cognition or knowledge of objective facts of messages) decrease reliance on stereotypical nonverbal veracity cues relative to verbal veracity cues and, thereby, increase the accuracy of veracity judgments (e.g., Reinhard, 2010; Reinhard, Sporer, Scharmach, & Marksteiner, 2011). Next, we elaborate on ostracized individuals' social information processing to show when and why being ostracized should affect veracity judgments.

Ostracism and Social Information Processing

Ostracism has a strongly negative impact on humans' basic need to belong (e.g., Schoel, Eck, & Greifeneder, 2014; Williams, 2009). The successful regulation of basic needs is indispensable for optimal human functioning. Therefore, if basic needs are unsatisfied, adaptive mechanisms become activated that monitor the environment for information relevant to restoring need satisfaction and increase careful processing of that information (e.g., Atkinson & McClelland, 1948; Pickett & Gardner, 2005). The key mechanism in the regulation of belonging—the social monitoring system (Pickett and Gardner, 2005)—becomes activated if the need to belong is unsatisfied. It then increases attention to and careful processing of affiliation-relevant information and, thereby, contributes to an accurate impression formation that enhances the chances to find appropriate affiliation partners. In line with the social monitoring system, prior research has shown that excluded (vs. nonexcluded) individuals have an enhanced memory for others' interpersonal and collective events (but not for others' individual events—that is, affiliation-irrelevant information; Gardner et al., 2000), are more attentive to others' vocal tones (Pickett, Gardner, & Knowles, 2004), and are better at discriminating genuine from fake smiles (Bernstein, Young, Brown, Sacco, & Claypool,

2008). Thus, ostracism can increase careful processing of verbal, vocal, and nonverbal affiliation-relevant information.

On which information ostracized individuals rely in their judgments of others, however, should depend on whether the information is stereotypic or individuating. Specifically, Claypool and Bernstein (2014) showed that excluded individuals' judgments of others were less reliant on group stereotypes than those of included individuals if individuating information (i.e., specific trait or behavioral information) was available. By contrast, excluded and included individuals did not differ in their reliance on heuristics when judging the prototypicality of nonsocial entities (e.g., furniture, trees). These findings suggest that ostracized individuals rely less on stereotypes and heuristics if messages contain affiliation-relevant statements, presumably because ostracism fosters careful processing of affiliation-relevant message content (see Chaiken & Trope, 1999, for a general link between careful processing of message content and decreased reliance on stereotypes and heuristics).

We propose that ostracism's impact on veracity judgments depends on whether a message contains affiliation-relevant statements. If a message mainly contains affiliation-relevant statements, message content should be processed more carefully by ostracized than included individuals. The more message content is processed carefully, the less veracity judgments are based on stereotypical nonverbal veracity cues relative to verbal veracity cues (e.g., Reinhard, 2010; Reinhard et al., 2011). Therefore, ostracism should affect veracity judgments about potential liars' messages if messages contain affiliation-relevant statements.

The Present Research

Research on veracity judgments has shown that careful processing of message content decreases reliance on stereotypical nonverbal veracity cues relative to verbal veracity cues, and that less reliance on stereotypical nonverbal cues improves the accuracy of veracity judgments (e.g., Reinhard & Schwarz, 2012; Reinhard & Sporer, 2008). Ostracism has been found to increase careful processing of affiliation-relevant information and to decrease

reliance on stereotypes if message content is affiliation-relevant (Claypool & Bernstein, 2014; Gardner et al., 2000). Building on these findings, we hypothesize that ostracized (vs. included) individuals' veracity judgments of affiliation-relevant messages are less affected by stereotypical nonverbal veracity cues. Moreover, if being ostracized decreases reliance on stereotypical nonverbal veracity cues relative to verbal veracity cues (i.e., ostracized individuals base their veracity judgments primarily on verbal cues), the veracity judgments of ostracized individuals should be more accurate than those of included individuals.

We tested our hypothesis in three experiments. Experiment 1 examined ostracism's impact on veracity judgments of *actual* lies and truths to capture naturalistic veracity judgments. However, while Experiment 1 provides evidence for more accurate veracity judgments following ostracism, it is largely mute about *why* and *when* ostracism should affect veracity judgments. Experiments 2 and 3 put this focal part of our hypothesis directly to test by investigating ostracism's impact on the use of stereotypical nonverbal cues in veracity judgments. To this end we created simulated messages in which we manipulated verbal and stereotypical nonverbal veracity cues orthogonally. Experiment 3 further examined the moderating role of the message's content affiliation relevance.

Experiment 1: Ostracism and Veracity Judgments of Actual Lies and Truths

Experiment 1 tested if being ostracized improves the discrimination between affiliation-relevant lies and truths. To capture naturalistic behavior, participants judged the veracity of videotaped messages, in which speakers made deceptive or truthful affiliation-relevant statements. Moreover, we assessed participants' self-reported use of verbal and nonverbal behavior in their veracity judgments as a first attempt to shed light on why being ostracized affects veracity judgments.

Method

Participants and design. Previous studies with the same stimulus material we used in Experiment 1 have revealed medium-sized effects of factors fostering careful versus heuristic

processing on veracity judgments (Reinhard, 2010; Reinhard & Schwarz, 2012). Given potential differences in the impact between the manipulation of social experience (inclusion vs. ostracism) and the previously investigated factors, we opted for a conservative approach and calculated the desired sample size based on the assumption of a small to medium-sized social experience effect ($d = 0.35$). A G*Power analysis (Faul, Erdfelder, Lang, & Buchner, 2007) yielded 260 participants to reach a power of .80. To attain a sufficiently large number of participants unacquainted with Cyberball (our manipulation of inclusion vs. ostracism), we decided on an integrative data analysis based on the pooled raw data of two independent samples (Curran & Hussong, 2009).[2] We recruited sample 1A ($N = 149$) at a German university (with participants completing the computer-based experiment in the lab) and Sample 1B ($N = 191$) through mailing lists of different universities in Germany (with participants completing the experiment online).[3] As compensation, in-lab participants received course credit or 2.50 EUR and a chocolate bar; online participants were offered the chance to win one of eight Amazon coupons (each 10 EUR).

Of the 340 participants who completed the experiment, 29 participants were excluded from analyses: 23 participants (21 in-lab) were acquainted with Cyberball, 5 participants had technical difficulties (3 in-lab participants could not hear all of the stimulus persons; for 2 online participants, Cyberball did not load), and 1 online participant interrupted participation during the Cyberball game. The resulting sample size was 311 (57% female; 92% university students; $M_{age} = 23.0$, $SD = 4.7$). In-lab and online participants were separately and randomly assigned to the social experience conditions.

Stimulus material. The stimulus material used in this experiment was adopted from Reinhard (2010) and consisted of 72 videotaped messages of university students telling the truth or lies about their movie or TV series preferences. We assumed these messages to be affiliation-relevant because the students provided reasons for their preferences that revealed information potentially helpful for evaluating how well an affiliation with them might work,

such as personal interests and preferred type of humor. Pretest data supported our hypothesis that reasons for movie and TV series preferences are perceived as affiliation-relevant (see Pretest 1 in the Supplemental Online Material).

To create the *truthful* messages, stimulus persons were asked to describe a movie or TV series they actually liked or disliked. To create the *deceptive* messages, stimulus persons were asked to describe a movie or TV series as if they would like (dislike) it, although they actually disliked (liked) it. All stimulus persons were instructed to appear as truthful as possible and were motivated to do so by offering a bonus of 5 EUR if they convinced the interviewer of telling the truth. In fact, all stimulus persons received the bonus. Stimulus persons could be seen from head to legs. Average message length was about 30 seconds and did not differ between truthful and deceptive messages (M_{truthful} = 29.94 s, SD = 4.34, vs. $M_{\text{deceptive}}$ = 30.17 s, SD = 3.61), $|t| < 1$.

Three sets with 24 messages were created, each containing 12 truthful and 12 deceptive messages. Valence of attitudes and gender of stimulus person were balanced, and each stimulus person occurred only once per set.[4] Messages were presented in one pre-determined random order per set. Sets of messages were used as stimulus replications (see Reinhard, Greifeneder, & Scharmach, 2013).

Procedure. Recruited individuals first consented to participation. Online participants were then probed for activated sound on their device with a test tone. Those who did not choose the correct test tone out of seven response options were not able to continue the experiment. We then assessed standard demographic information such as age and gender.

Social experience manipulation. Social inclusion versus ostracism was manipulated using the virtual ball-tossing game Cyberball (Williams, Cheung, & Choi, 2000). Prior to playing the game, participants were told that Cyberball has been found to test mental visualization skills and that they were going to play the game with two other participants who were logged on at the same time. In fact, participants played the game not with other

participants but with computer-controlled avatars. In the inclusion condition, the 30 tosses were evenly divided between players throughout the game. In the ostracism condition, participants got the ball only once by each player at the beginning of the game and were then ignored. Because being included in the Cyberball game is perceived as the norm (Rudert & Greifeneder, 2016), the inclusion condition is usually considered a control condition.

Veracity judgments. Subsequent to the Cyberball game, participants learned that they would watch videotaped messages of persons describing movies or TV series they liked or disliked. Following general practice in lie detection research, participants were also told that some of the persons they were about to see were telling the truth and some were lying. Participants then watched one set of 24 messages. Immediately after each message, participants judged the message as true or false. To be able to identify online participants with technical problems, we asked them to indicate how clearly they had heard and seen the stimulus persons (1 = *not at all*; 9 = *very well*).

Self-reported use of verbal and nonverbal behavior. Next, we assessed participants' self-reported use of verbal and nonverbal behavior in their veracity judgments with two items each: "When watching the video recordings, to what extent did you pay attention to the persons' verbal [nonverbal] behavior?"; "To what extent did you use the persons' verbal [nonverbal] behavior to make judgments of lie and truth?" ($\alpha_{\text{verbal behavior}} = .74$; $\alpha_{\text{nonverbal behavior}} = .84$; 1 = *not at all*; 9 = *very much*). Further variables were assessed for exploratory reasons and are summarized in Table S1 in the Supplemental Online Material.

Manipulation checks. Participants estimated the percentage of throws they received during the Cyberball game and indicated the extent to which they were included by the other players during the game (1 = *not at all*; 9 = *very much*; items adopted from Zadro, Williams, & Richardson, 2004). In addition, participants were given an option for comments related to the Cyberball game (e.g., to report loading problems) and indicated whether they had played Cyberball prior to the experiment (1 = *yes*; 2 = *no*).

The experiment closed with a debriefing in which participants were informed that they had not played Cyberball with other participants but with a predetermined computer script, and that the course of the game—in particular whether they received few or many balls—had nothing to do with them as a person or their behavior. For further questions, participants could contact the principal investigator.

Results

Manipulation checks. Attesting to the successful manipulation of social experience, participants in the ostracism condition reported fewer received throws (M = 8.58%, SD = 6.94) than those in the inclusion condition (M = 37.62%, SD = 11.62), $t(246.70) = -26.65$, $p < .001$, $d = -3.05$, 95% confidence interval for the difference between means (CI_{diff}) = [-31.19, -26.90]. Moreover, ostracized participants felt less included during the game (M = 2.01, SD = 0.57) than did included participants (M = 6.69, SD = 1.48), $t(195.19) = -36.74$, $p < .001$, $d = -4.20$, CI_{diff} = [-4.94, -4.44].

Veracity judgments. Classification accuracies (in percents) for all, truthful, and deceptive messages across social experience conditions are displayed in Table 1. On average, participants were significantly better than chance (50%) in their lie-truth classifications (M = 57.10%; SD = 11.36), $t(310) = 11.02$, $p < .001$, $d = 0.63$, 95% confidence interval for the mean = [55.83, 58.37].

Table 1.
Means and standard deviations of classification accuracy as a function of social experience.

		Lies		Truths		Overall	
Social experience	*n*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Inclusion	153	51.94%	18.02	59.21%	14.75	55.58%	11.53
Ostracism	158	54.56%	16.43	62.65%	13.29	58.57%	11.03

To test if being ostracized improves the discrimination between affiliation-relevant lies and truths, we used signal detection theory measures (e.g., Stanislaw & Todorov, 1999). More precisely, we used the discrimination parameter *d'*—a measure of the ability to discriminate

occurrences and non-occurrences of a signal, here to discriminate lies from truths—and the response criterion *C*—a measure of general response tendencies, here a tendency of responding truth/lie, also referred to as truth bias. In line with our hypothesis, ostracized participants (M = .43, SD = 0.56) were significantly better than included participants (M = 0.29, SD = .59) at discriminating lies from truths, $t(309) = 2.16$, $p = .032$, $d = 0.24$, CI_{diff} = [0.01, 0.27]. Importantly, ostracized participants (M = .10, SD = 0.27) and included participants (M = .09, SD = 0.32) did not differ significantly in their truth bias, $t(309) = 0.40$, $p = .690$, $d = 0.03$, CI_{diff} = [-0.05, 0.08]. Moreover, the control variables set of messages (1-3) and experimental context (lab vs. online) did not significantly moderate the effect of social experience on the accuracy of veracity judgments, ps > .390, $\eta_p^2 < .01$ (see the Supplemental Online Material of Experiment 1).

Self-reported use of verbal and nonverbal behavior. In line with previous research (e.g., Reinhard et al., 2011), self-reported use of verbal behavior was positively correlated with *d'*, $r(309) = .13$, $p = .019$, whereas self-reported use of nonverbal behavior was negatively correlated with *d'*, $r(309) = -.26$, $p < .001$. These correlations indicate that veracity judgments were more accurate with greater self-reported reliance on verbal behavior and less self-reported reliance on nonverbal behavior. However, social experience had no significant effect on self-reported use of verbal behavior, $t(309) = -0.91$, $p = .363$, $d = -0.11$, CI_{diff} = [-0.43, 0.16], or nonverbal behavior, $t(309) = -0.98$, $p = .326$, $d = -0.11$, CI_{diff} = [-0.51, 0.17]. Both ostracized and included participants indicated scores for using verbal behavior ($M_{ostracism}$ = 7.36, SD = 1.25, vs. $M_{inclusion}$ = 7.22, SD = 1.37) and nonverbal behavior ($M_{ostracism}$ = 7.34, SD = 1.47, vs. $M_{inclusion}$ = 7.17, SD = 1.55) clearly above the scales' midpoint (5), for comparisons to the midpoint, ts > 17.25, ps < .001, ds > 1.39.[5]

Discussion

In line with our hypothesis, the accuracy in discriminating affiliation-relevant lies from truths was higher following ostracism than inclusion. Of interest, social experience did

not affect the truth bias, indicating that the higher accuracy rates of ostracized participants were not due to increased gullibility or suspiciousness. Ostracized participants also did not differ from included participants in their self-reported use of verbal and nonverbal behavior. The magnitude of the correlations between self-reported use of verbal or nonverbal behavior and the accuracy of veracity judgments mirror meta-analytic findings by Hartwig and Bond (2011), suggesting that the behaviors people actually rely on in their veracity judgments differ markedly from those behaviors indicated in self-reports. Given people's limited insight into their own mental processes, self-reports of mental processes often reflect lay theories rather than actual introspective insight (Nisbett & Wilson, 1977). As there is little reason to assume that lay theories of the use of veracity cues differ between ostracized and included participants, it may, in retrospect, be unsurprising that social experience did not affect the *self-reported* use of verbal and nonverbal behavior. Moreover, Hartwig and Bond's (2011) findings suggest that veracity judgments might be driven by mental processes that are partly unconscious. With regard to ostracized individuals' veracity judgments, it is conceivable that the social monitoring system—like mechanisms for regulating other basic needs—operates at least partly unconscious. Both the limitations of participants' self-reports on the use of verbal and nonverbal behavior and the possible influence of partly unconscious processes on veracity judgments invite a change in the experimental procedure to shed light on *why* being ostracized affects veracity judgments. In Experiments 2 and 3, we therefore tested the use of verbal and stereotypical nonverbal veracity cues more directly by manipulating them orthogonally.

Experiment 2: Ostracism and the Use of Veracity Cues

While Experiment 1 showed that ostracism affected veracity judgments of *actual* lies and truths and, thereby, attested to ostracism's impact on naturalistic veracity judgments, it did not allow for investigating *why* and *when* ostracism generally affects veracity judgments. In Experiment 2, we therefore aimed at directly testing our hypothesis that being ostracized decreases reliance on stereotypical nonverbal cues in veracity judgments of affiliation-

relevant messages. To this end we created stimulus material in which verbal and stereotypical nonverbal veracity cues were manipulated orthogonally (see also, e.g., Reinhard & Schwarz, 2012; Stiff et al., 1989). It should be noted that this material does not allow for testing participants' accuracy in discriminating actual lies from truths. Crucially, however, it allows for a particularly powerful test of ostracized versus included participants' relative reliance on verbal and stereotypical nonverbal veracity cues.

If being ostracized decreases reliance on stereotypical nonverbal cues in veracity judgments, the effect of nonverbal cues indicative of truth versus deception on veracity judgments will be smaller following ostracism than inclusion. However, a smaller effect following ostracism may also result from ostracized participants being less aware of nonverbal cues. It is therefore important to show additionally that ostracized and included participants do not differ in their awareness of the stimulus person's nonverbal behavior.

Method

Participants and design. We expected a larger effect in Experiment 2 than in Experiment 1, because Experiment 1 used actual lies and truths as stimulus material, whereas Experiment 2 used simulated messages created for the experiment's purpose (i.e., the material is less noisy). Previous studies with simulated messages have revealed, on average, medium to large-sized two-way interactions between factors fostering careful versus heuristic processing and (non)verbal cues on veracity judgments (Reinhard, 2010; Reinhard & Schwarz, 2012; Reinhard & Sporer, 2008). Again, we opted for a conservative approach and calculated the desired sample size based on the assumption of a medium-sized effect (f = 0.25). A G*Power analysis (Faul et al., 2007) for our 2 (social experience: inclusion vs. ostracism) × 2 (nonverbal cues: truthful vs. deceptive) × 2 (verbal cues: truthful vs. deceptive) between-participants factorial design yielded 128 participants to reach a power of .80. Participants were recruited at a German university and completed the computer-based

experiment in the lab. As compensation, participants received course credit or 1.50 EUR and a chocolate bar.

Of the 150 participants who completed the experiment, 19 participants were excluded from analyses because they indicated being acquainted with Cyberball. The resulting sample size was 131 (60% female; 96% university students; M_{age} = 21.4, SD = 3.4). Participants were randomly assigned to one of the eight conditions.

Stimulus material. We created four parallel versions of a short film (about 4 minutes long) showing a get-acquainted conversation between a woman (Martina) who is in search of a new housemate and another woman (Laura) who is interested in the vacant room. The two women were amateur actresses who volunteered to participate in the film. The camera was set up in such a way that one could see only Laura sitting on a chair but hear the voices of both Laura and Martina. Martina mainly put those questions to Laura to which the answers had been pretested as being helpful for evaluating someone's affiliation potential (see Pretest 2 in the Supplemental Online Material). We manipulated verbal cues (truthful vs. deceptive) of Laura's statements and nonverbal cues (truthful vs. deceptive) of Laura's behavior such that each of the four videos represented a different combination of verbal and nonverbal cues.

Verbal cues manipulation. Consistent with previous research (e.g., Reinhard & Schwarz, 2012; Stiff et al., 1989), simulated statements with truthful verbal cues were worded in such a way that they appeared more plausible than simulated statements with deceptive verbal cues. To this end we varied the statements' consistency, coherence, number of details, and number of repetitions. Regarding the question whether Laura and her current housemates have done a lot together, for instance, Laura replied either "Yes, we did. In the evenings, for example, we cooked together, sat over a glass of wine, or watched movies." (detailed answer) or "We did the usual things you do together with your housemates, such as cooking and so on." (vague answer). Pretest 3 in the Supplemental Online Material shows that the verbal cues manipulation was successful.

Nonverbal cues manipulation. Previous research has found that laypersons associate gaze aversion, posture shifts, and fidgeting with deception (e.g., Hartwig & Granhag, 2015; Vrij, 2008). The actress was therefore instructed to display less eye contact, more posture shifts, and more fidgeting with her bracelet when simulating nonverbal behavior indicative of deception than truth. Ratings of two independent coders attested to the success of the nonverbal cues manipulation (see Pretest 3 in the Supplemental Online Material).

Procedure. The procedure was identical to Experiment 1 except for the following changes. Participants watched only one of the four videos. Immediately after having watched the video, participants judged Laura's veracity with the following three items: 1 = *Laura mainly lied – 9 = Laura mainly told the truth*; *1 = Laura was not honest at all – 9 = Laura was very honest*; *1 = Laura was not credible at all – 9 = Laura was very credible*. We averaged these items into a single veracity judgment (α = .93). Moreover, we assessed participants' awareness of Laura's nonverbal behavior (average of the three items "Laura frequently maintained eye contact with Martina during the conversation" (reverse-scored); "Laura frequently shifted her posture during the conversation"; "Laura fidgeted with an object during the conversation"; α = .80; 1 = *not at all*; 9 = *very much*). Further variables were assessed for exploratory reasons and are summarized in Table S4 in the Supplemental Online Material.

Results

Manipulation checks. Attesting to the successful manipulation of social experience, participants in the ostracism condition reported fewer received throws (M = 8.06%, SD = 5.02) than those in the inclusion condition (M = 38.04%, SD = 13.23), $t(87.19) = -17.39$, $p < .001$, $d = -2.95$, $CI_{diff} = [-33.41, -26.55]$. Moreover, ostracized participants felt less included during the game (M = 2.00, SD = 0.51) than did included participants (M= 6.22, SD = 1.67), $t(80.13) = -19.83$, $p < .001$, $d = -3.36$, $CI_{diff} = [-4.64, -3.80]$.

Veracity judgment. A 2 (social experience: inclusion vs. ostracism) × 2 (nonverbal cues: truthful vs. deceptive) × 2 (verbal cues: truthful vs. deceptive) analysis of variance (ANOVA) on veracity judgment revealed a significant main effect of verbal cues (see Table 2 for the inferential statistics of all main and interaction effects and the simple effects within social experience conditions). Participants rated Laura's statements as more credible when the message included verbal cues associated with truthfulness (M = 4.04, SD = 1.82) rather than deception (M = 2.53, SD = 1.48). Moreover, a significant main effect of nonverbal cues was observed, that was qualified by the predicted Social Experience × Nonverbal Cues interaction. As can be seen in Figure 1, included participants rated Laura's statements as more credible when she displayed nonverbal cues associated with truthfulness (M = 4.27, SD = 1.90) rather than deception (M = 2.60, SD = 1.29). By contrast, ostracized participants' veracity judgments were not significantly affected by nonverbal cues ($M_{\text{truthful nonverbal cues}}$ = 3.39, SD = 2.13, vs. $M_{\text{deceptive nonverbal cues}}$ = 2.84, SD = 1.47). All other main and interaction effects were not significant.

We also compared the simple effects of verbal and nonverbal cues within social experience conditions. These tests revealed that the simple effects of verbal and nonverbal cues differed significantly from each other for ostracized but not included participants (see Table 2), indicating that ostracized participants relied primarily on verbal cues in their veracity judgments, whereas included participants relied on verbal and nonverbal cues to a similar extent.

Table 2.
Inferential statistics of all main and interaction effects on veracity judgment and the simple effects within social experience conditions in Experiment 2.

Variable	*df*	*MS*	*F*	*p*	η_p^2	CI_{diff}
Main and interaction effects						
SE	1	3.44	1.48	.226	.01	[-0.20, 0.86]
Nonverbal	1	45.79	19.64	< .001	.14	[0.66, 1.72]
Verbal	1	79.37	34.05	< .001	.22	[1.03, 2.10]
SE × Nonverbal	1	9.64	4.14	.044	.03	
SE × Verbal	1	0.35	0.15	.698	.001	
Nonverbal × Verbal	1	4.32	1.85	.176	.01	
SE × Nonverbal × Verbal	1	0.59	0.25	.616	.002	
Error	123					
Simple effects within social experience conditions						
Inclusion						
Nonverbal	1	51.03	21.89	< .001	$.15_a$	[1.00, 2.47]
Verbal	1	36.21	15.53	< .001	$.11_a$	[0.73, 2.19]
Ostracism						
Nonverbal	1	6.41	2.75	.100	$.02_a$	[-0.12, 1.41]
Verbal	1	43.20	18.53	< .001	$.13_b$	[0.90, 2.44]

Note. SE = social experience. Nonverbal = nonverbal cues. Verbal = verbal cues. *MS* = mean square. CI_{diff} = 95% confidence interval for the difference between means. To test whether the simple effects of verbal and nonverbal cues differed significantly within social experience conditions, we transformed the effect sizes into *r* and conducted a test that compares correlation coefficients in dependent samples (with specifying the effects of verbal and nonverbal cues as uncorrelated). Different subscripts indicate a significant difference between the simple effects of verbal and nonverbal cues within the respective social experience condition.

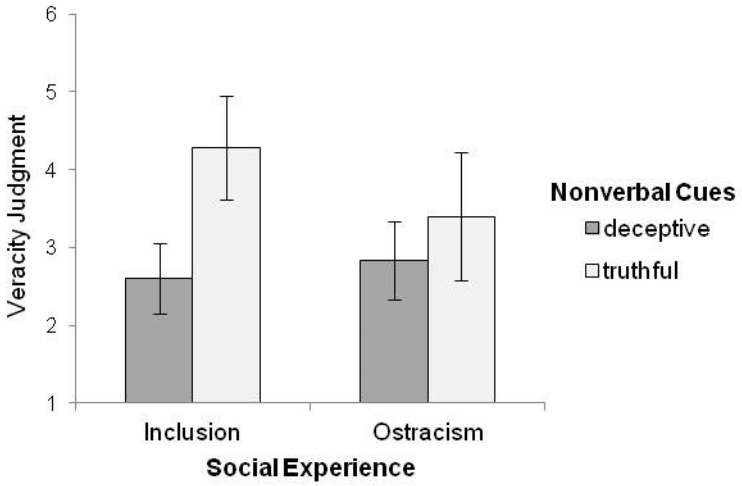

Figure 1. Means of veracity judgment in Experiment 2 as a function of social experience (inclusion vs. ostracism) and nonverbal cues (deceptive vs. truthful). Veracity judgment ranges from 1 to 9 with higher values indicating greater attributed veracity. Error bars indicate 95% confidence intervals.

Perceived nonverbal behavior. The same ANOVA as described above with perceived nonverbal behavior as dependent variable revealed a significant main effect of nonverbal cues, $F(1, 123) = 285.85$, $p < .001$, $\eta_p^2 = .70$, $CI_{diff} = [-4.22, -3.34]$. Participants perceived more nonverbal behavior indicative of deception in the deceptive nonverbal cues condition ($M = 7.82$, $SD = 1.07$) than in the truthful nonverbal cues condition ($M = 4.03$, $SD = 1.43$). All other main and interaction effects were not significant, $ps > .246$, $\eta_p^2 < .02$ (see Table S5 in the Supplemental Online Material for the inferential statistics of all main and interaction effects).

Discussion

Ostracism did not alter the *awareness* of others' nonverbal behavior. Supporting our hypothesis, ostracism (vs. inclusion) decreased reliance on stereotypical nonverbal cues in veracity judgments of affiliation-relevant messages. Specifically, whereas included individuals' veracity judgments were based on both verbal and stereotypical nonverbal cues, ostracized individuals' veracity judgments were significantly affected by verbal cues only.

In Experiments 1 and 2, we used affiliation-relevant messages. Although our theoretical assumptions pertain to affiliation-relevant messages, it remains unclear whether the observed impact of ostracism on veracity judgments is actually specific to affiliation-relevant messages. Experiment 3 addresses this question by varying the affiliation relevance of message content.

Experiment 3: The Role of Message Content's Affiliation Relevance

The goal of Experiment 3 was twofold: First, we aimed at replicating the findings of Experiment 2 with different simulated messages. Second, we sought to substantiate our hypothesis by testing the moderating role of whether message content is affiliation-relevant. Because ostracism increases careful processing of affiliation-relevant message content, we expected the effect of nonverbal cues on veracity judgments to differ between ostracized and

included participants only if messages were of high but not low affiliation relevance (i.e., we predicted a Social Experience × Nonverbal Cues × Message Content interaction).

Method

Participants and design. In Experiment 2, we observed a small to medium-sized Social Experience × Nonverbal Cues interaction. Again, to be on the conservative side, we calculated the desired sample size based on the assumption of a small-sized effect ($f = 0.14$). A G*Power analysis (Faul et al., 2007) for our 2 (social experience: inclusion vs. ostracism) × 2 (nonverbal cues: truthful vs. deceptive) × 2 (verbal cues: truthful vs. deceptive) × 2 (message content: low vs. high affiliation relevance) between-participants factorial design yielded 403 participants to reach a power of .80. Participants were recruited through mailing lists of different universities in Germany and completed the computer-based experiment online. As compensation, participants were offered the chance to win one of ten Amazon coupons (each 10 EUR).

Of the 428 participants who completed the experiment, 14 participants were excluded from analyses: 5 participants indicated that they were acquainted with Cyberball, 5 participants indicated technical problems (i.e., they could not hear or see the stimulus person or the video recording did not load), 3 participants indicated that they were disturbed while watching the video recording, and 1 participant indicated knowing the stimulus person. The resulting sample size was 414 (68% female; 91% university students; $M_{age} = 23.4$, $SD = 3.9$). Participants were first randomly assigned to one of the two message content conditions. In a second step, within each message content condition, participants were randomly assigned to the social experience, verbal cues, and nonverbal cues conditions.

Stimulus material. We created eight parallel versions of a short film (about 2 minutes long) showing a woman who talks about her former job as a student research assistant in the psychology department. The woman was an amateur actress who volunteered to participate in the film. For all video recordings, the camera was positioned about three meters away from

the woman such that her entire body was seen. We manipulated message content (low vs. high affiliation relevance) and verbal cues (truthful vs. deceptive) of the woman's job description and nonverbal cues (truthful vs. deceptive) of the woman's behavior such that each of the eight videos represented a different combination of message content, verbal cues, and nonverbal cues.

Message content manipulation. Based on pretest data (see Pretest 4 in the Supplemental Online Material), job descriptions of low affiliation relevance included a pure description of the tasks that were performed (e.g., "I helped prepare studies, that is, to write the cover story and instructions for the participants and to search for appropriate tasks and questionnaires."). By contrast, job descriptions of high affiliation relevance included (a) additional information about whether the tasks were liked and why they were liked (e.g., "I particularly liked to help prepare studies, and especially to come up with appropriate cover stories and tasks because I love to be creative.") and (b) information about teamwork and relationships with colleagues (e.g., "We have always helped each other when we have got stuck with a task.").

Verbal cues manipulation. Similar to Experiment 2, job descriptions with truthful verbal cues were worded in such a way that they appeared more plausible, consistent, coherent, and detailed, as well as less repetitive than job descriptions with deceptive verbal cues. Pretest 5 in the Supplemental Online Material shows that the verbal cues manipulation was successful.

Nonverbal cues manipulation. As in Experiment 2, the actress was instructed to display less eye contact, more posture shifts, and more fidgeting with her bracelet when simulating nonverbal behavior indicative of deception than truth. Ratings of two independent coders attested to the nonverbal cues manipulation (see Pretest 5 in the Supplemental Online Material). We further maximized the orthogonality of the verbal cues and nonverbal cues manipulations by additional means described in the Supplemental Online Material.

Procedure. The procedure and the measures of Experiment 3 were the same as in Experiment 2 with the following modifications. First, along with the standard demographic information, participants indicated whether they had already worked as a (student) research assistant (1 = *yes*; 2 = *no*), and if so, in which area. Participants who indicated having worked as a (student) research assistant in psychology could not participate in the experiment because knowledge of objectively verifiable facts of messages (here: typical tasks of student research assistants in psychology) can influence the processing of verbal and nonverbal veracity cues (Reinhard et al., 2011; Stiff et al., 1989).

Second, instructions for the veracity judgment task were as follows. Participants were told that we had interviewed students enrolled in a psychology master's program about their former job as a student research assistant in the psychology department. Participants then learned that some of the students told the truth and some of them lied about the fact that they had worked in the psychology department before. Next, depending on the message content condition, participants were told that they would watch the answer of one female student either to the question "You indicated that you had already worked as a student research assistant. What did you like about this job and why?" (introducing job descriptions of high affiliation relevance) or to the question "You indicated that you had already worked as a student research assistant. Can you please tell something about it?" (introducing job descriptions of low affiliation relevance). Before watching one version of the job description, participants were informed that all students had prepared their answer prior to the video recording so that the extent to which answers appeared to be rehearsed was not indicative of truth or deception. Participants were therefore asked to ignore this aspect in their impression formation.

Third, in addition to the veracity judgment adopted from Experiment 2 ($\alpha = .88$), participants were asked to indicate on a binary measure whether the student told the truth (i.e., she has already worked as a student research assistant) or a lie (i.e., she has not worked as a

student research assistant yet). Finally, participants were asked whether they knew the stimulus person (1 = *yes*; 2 = *no*).

Results

Manipulation checks. Attesting to the successful manipulation of social experience, participants in the ostracism condition reported fewer received throws (M = 8.24%, SD = 7.19) than those in the inclusion condition (M = 34.02%, SD = 10.13), $t(375.50) = -29.90$, $p < .001$, $d = -2.93$, $CI_{diff} = [-27.48, -24.08]$. Moreover, ostracized participants felt less included during the game (M = 2.05, SD = 0.54) than did included participants (M = 6.58, SD = 1.62), $t(254.57) = -38.39$, $p < .001$, $d = -3.74$, $CI_{diff} = [-4.77, -4.30]$.

Veracity judgment. A 2 (social experience: inclusion vs. ostracism) × 2 (nonverbal cues: truthful vs. deceptive) × 2 (verbal cues: truthful vs. deceptive) × 2 (message content: low vs. high affiliation relevance) ANOVA on veracity judgment revealed a significant main effect of verbal cues (see Table 3 for the inferential statistics of all main and interaction effects and the simple effects within social experience conditions). Participants rated the student's answer as more credible when the job description included verbal cues associated with truthfulness (M = 4.14, SD = 1.93) rather than deception (M = 3.19, SD = 1.53). Moreover, significant main effects of social experience and nonverbal cues were observed that were qualified by the predicted Social Experience × Nonverbal Cues × Message Content interaction.

As can be seen in Figure 2, for message content of low affiliation relevance, both included and ostracized participants rated the student's answer as more credible when she displayed nonverbal cues associated with truthfulness ($M_{inclusion}$ = 4.05, SD = 1.97; $M_{ostracism}$ = 4.50, SD = 2.02) rather than deception ($M_{inclusion}$ = 3.05, SD = 1.26; $M_{ostracism}$ = 3.20, SD = 1.44). By contrast, for message content of high affiliation relevance, only included participants rated the student's answer as more credible when she displayed nonverbal cues associated with truthfulness (M = 4.16, SD = 1.95) rather than deception (M = 2.69, SD =

1.31). As expected, ostracized participants' veracity judgments were not significantly affected by nonverbal cues when the message content was highly affiliation-relevant ($M_{\text{truthful nonverbal cues}} = 3.96$, $SD = 1.92$, vs. $M_{\text{deceptive nonverbal cues}} = 3.80$, $SD = 1.74$). All other main and interaction effects were not significant.

We also compared the simple effects of verbal and nonverbal cues within social experience conditions. These tests revealed that the simple effects of verbal and nonverbal cues differed significantly from each other only for ostracized participants in the high affiliation relevance condition (see Table 3), indicating that these participants relied primarily on verbal cues in their veracity judgments, whereas all other participants relied on verbal and nonverbal cues to a similar extent.

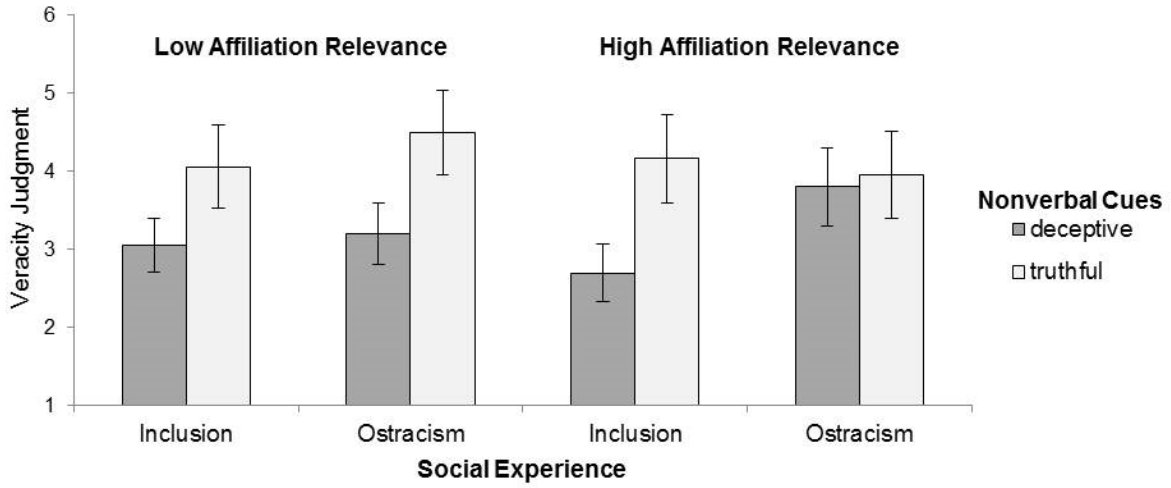

Figure 2. Means of veracity judgment in Experiment 3 as a function of message content (low vs. high affiliation relevance), social experience (inclusion vs. ostracism), and nonverbal cues (deceptive vs. truthful). Veracity judgment ranges from 1 to 9 with higher values indicating greater attributed veracity. Error bars indicate 95% confidence intervals.

Table 3.
Inferential statistics of all main and interaction effects on veracity judgment and the simple effects within social experience conditions in Experiment 3.

Variable	*df*	*MS*	*F*	*p*	η_p^2	CI_{diff}
Main and interaction effects						
SE	1	12.43	4.50	.035	.01	[-0.67, -0.03]
Nonverbal	1	103.87	37.60	< .001	.09	[0.68, 1.33]
Verbal	1	98.27	35.57	< .001	.08	[0.66, 1.30]
Content	1	0.08	0.03	.867	< .001	[-0.29, 0.35]
SE × Nonverbal	1	8.57	3.10	.079	.01	
SE × Verbal	1	1.19	0.43	.512	.001	
SE × Content	1	0.79	0.29	.592	.001	
Nonverbal × Verbal	1	5.30	1.92	.167	.005	
Nonverbal × Content	1	2.42	0.88	.350	.002	
Verbal × Content	1	3.34	1.21	.272	.003	
SE × Nonverbal × Verbal	1	0.40	0.14	.704	< .001	
SE × Nonverbal × Content	1	16.47	5.96	.015	.015	
SE × Verbal × Content	1	0.04	0.01	.908	< .001	
Nonverbal × Verbal × Content	1	4.08	1.48	.225	.004	
SE × Nonverbal × Verbal × Content	1	0.12	0.04	.883	< .001	
Error	398					
Simple effects within social experience conditions						
Message content of *low* affiliation relevance						
Inclusion						
Nonverbal	1	30.38	11.00	.001	$.03_a$	[0.43, 1.67]
Verbal	1	21.76	7.88	.005	$.02_a$	[0.27, 1.51]
Ostracism						
Nonverbal	1	43.16	15.62	< .001	$.04_a$	[0.64, 1.90]
Verbal	1	13.44	4.87	.028	$.01_a$	[0.08, 1.34]
Message content of *high* affiliation relevance						
Inclusion						
Nonverbal	1	57.98	20.99	< .001	$.05_a$	[0.88, 2.20]
Verbal	1	40.29	14.59	< .001	$.04_a$	[0.62, 1.95]
Ostracism						
Nonverbal	1	0.64	0.23	.630	$< .001_a$	[-0.50, 0.83]
Verbal	1	25.80	9.34	.002	$.02_b$	[0.37, 1.70]

Note. SE = social experience. Nonverbal = nonverbal cues. Verbal = verbal cues. Content = message content. *MS* = mean square. CI_{diff} = 95% confidence interval for the difference between means. To test whether the simple effects of verbal and nonverbal cues differed significantly within social experience conditions, we transformed the effect sizes into *r* and conducted a test that compares correlation coefficients in dependent samples (with specifying the effects of verbal and nonverbal cues as uncorrelated). Different subscripts indicate a significant difference between the simple effects of verbal and nonverbal cues within the respective social experience condition.

Binary lie-truth judgment. A logistic regression analysis on the binary lie-truth judgment (0 = lie, 1 = truth) including social experience (-1 = inclusion, 1 = ostracism), nonverbal cues (-1 = deceptive, 1 = truthful), verbal cues (-1 = deceptive, 1 = truthful), message content (-1 = low affiliation relevance, 1 = high affiliation relevance), and their interactions mirrored the main findings on veracity judgment. Again, a significant main effect of verbal cues emerged (see Table 4 for the inferential statistics of all main and interaction effects and the simple effects within social experience conditions). Participants stated more often that the student told the truth when the job description included verbal cues associated with truthfulness (39.2%) rather than deception (16.8%). Moreover the significant main effect of nonverbal cues was qualified by the predicted Social Experience × Nonverbal Cues × Message Content interaction.

As can be seen in Figure 3, for message content of low affiliation relevance, ostracized participants and in tendency also included participants stated more often that the student told the truth when she displayed nonverbal cues associated with truthfulness (41.8% and 32.7%) rather than deception (18.9% and 17.9%). By contrast, for message content of high affiliation relevance, only included participants stated more often that the student told the truth when she displayed nonverbal cues associated with truthfulness (34.7%) rather than deception (10.2%). As expected, ostracized participants' binary lie-truth judgments were not significantly affected by nonverbal cues when the message content was highly affiliation-relevant (35.4% truth judgments in the truthful nonverbal cues condition and 34.7% truth judgments in the deceptive nonverbal cues condition). All other main and interaction effects were not significant. Moreover, a comparison of the simple effects of verbal and nonverbal cues within social experience conditions revealed again that the simple effects differed significantly from each other only for ostracized participants in the high affiliation relevance condition (see Table 4).

Table 4.
Inferential statistics of all main and interaction effects on the binary lie-truth judgment and the simple effects within social experience conditions in Experiment 3.

Variable	*df*	*b*	*Wald*	*p*	*OR*	CI_{OR}
Main and interaction effects						
SE	1	.24	3.32	.069	1.28	[0.98, 1.66]
Nonverbal	1	.48	12.60	< .001	1.61	[1.24, 2.09]
Verbal	1	.63	22.41	< .001	1.89	[1.45, 2.45]
Content	1	-.001	< 0.01	.992	1.00	[0.77, 1.30]
SE × Nonverbal	1	-.17	1.64	.201	0.84	[0.65, 1.10]
SE × Verbal	1	.005	< 0.01	.970	1.00	[0.77, 1.31]
SE × Content	1	.18	1.73	.188	1.19	[0.92, 1.55]
Nonverbal × Verbal	1	.05	0.12	.731	1.05	[0.81, 1.36]
Nonverbal × Content	1	-.06	0.18	.669	0.94	[0.73, 1.23]
Verbal × Content	1	.06	0.19	.661	1.06	[0.82, 1.38]
SE × Nonverbal × Verbal	1	-.003	< 0.01	.983	1.00	[0.77, 1.30]
SE × Nonverbal × Content	1	-.27	4.14	.042	0.76	[0.59, 0.99]
SE × Verbal × Content	1	-.04	0.09	.769	0.96	[0.74, 1.25]
Nonverbal × Verbal × Content	1	.09	0.41	.521	1.09	[0.84, 1.42]
SE × Nonverbal × Verbal × Content	1	.10	0.57	.452	1.11	[0.85, 1.44]
Simple effects within social experience conditions						
Message content of *low* affiliation relevance						
Inclusion						
Nonverbal	1	-.43	3.21	.073	0.65_a	[0.41, 1.04]
Verbal	1	-.66	8.14	.004	0.52_a	[0.33, 0.81]
Ostracism						
Nonverbal	1	-.63	6.13	.013	0.53_a	[0.32, 0.88]
Verbal	1	-.62	5.85	.016	0.54_a	[0.33, 0.89]
Message content of *high* affiliation relevance						
Inclusion						
Nonverbal	1	-.86	6.74	.009	0.42_a	[0.22, 0.81]
Verbal	1	-.73	4.80	.028	0.48_a	[0.25, 0.93]
Ostracism						
Nonverbal	1	.03	0.01	.912	1.03_a	[0.65, 1.61]
Verbal	1	-.53	4.86	.027	0.59_b	[0.37, 0.94]

Note. SE = social experience. Nonverbal = nonverbal cues. Verbal = verbal cues. Content = message content. *OR* = odds ratio. CI_{OR} = 95% confidence interval for odds ratio. To test whether the simple effects of verbal and nonverbal cues differed significantly within social experience conditions, we transformed the *odds ratios* into *r* and conducted a test that compares correlation coefficients in dependent samples (with specifying the effects of verbal and nonverbal cues as uncorrelated). Different subscripts indicate a significant difference between the simple effects of verbal and nonverbal cues within the respective social experience condition.

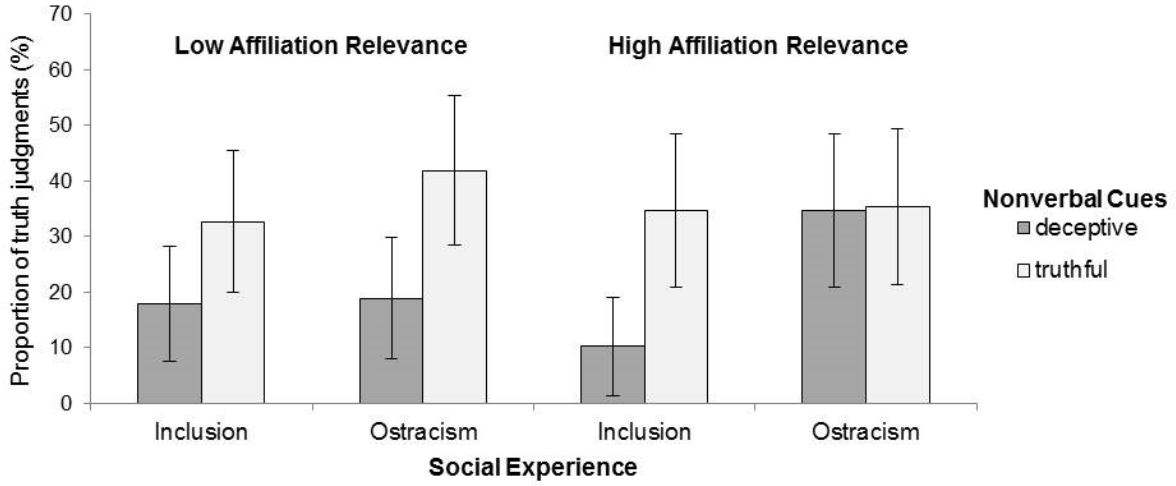

Figure 3. Proportion of truth judgments in Experiment 3 as a function of message content (low vs. high affiliation relevance), social experience (inclusion vs. ostracism), and nonverbal cues (deceptive vs. truthful). Error bars indicate 95% confidence intervals.

Perceived nonverbal behavior. The same ANOVA as described above with perceived nonverbal behavior ($\alpha = .78$) as dependent variable revealed a main effect of nonverbal cues, $F(1, 398) = 1033.49$, $p < .001$, $\eta_p^2 = .72$, $CI_{diff} = [-3.90, -3.45]$. Participants perceived more nonverbal behavior indicative of deception in the deceptive nonverbal cues condition ($M = 7.88$, $SD = 0.98$) than in the truthful nonverbal cues condition ($M = 4.20$, $SD = 1.33$). Importantly, the effect of nonverbal cues was not qualified by any interaction including social experience, $ps > .382$, $\eta_p^2 < .01$ (see Table S8 in the Supplemental Online Material for the inferential statistics of all main and interaction effects).

Discussion

As in Experiment 2, ostracism did not alter the *awareness* of others' nonverbal behavior. Instead, ostracism (vs. inclusion) decreased reliance on stereotypical nonverbal cues in both continuous veracity judgments and binary lie-truth judgments if message content was of high but not low affiliation relevance. Experiment 3 thus replicated the findings of Experiment 2 with a new set of simulated messages and with a binary lie-truth measure in addition to the continuous veracity judgment. Moreover, we showed that ostracism's impact on veracity judgments is specific to affiliation-relevant messages.

General Discussion

Ostracism threatens humans' basic need to belong. As a threatened need to belong has detrimental effects on well-being, identifying well-disposed affiliation partners to regain belonging is an adaptive response to ostracism. Achieving the goal of re-affiliation, however, is complicated by potentially false information about affiliation candidates and people's generally poor ability to discriminate lies from truths. We have proposed that being ostracized positively affects veracity judgments when it is most important for ostracized individuals to be accurate, that is, when the message in question is affiliation-relevant. Specifically, being ostracized increases careful processing of affiliation-relevant message content (e.g., Gardner et al., 2000) and careful processing of message content decreases reliance on stereotypical nonverbal cues in veracity judgments (Reinhard & Sporer, 2008). We have therefore hypothesized that ostracized (vs. included) individuals base their veracity judgments less on stereotypical nonverbal cues if message content is affiliation-relevant.

Because stereotypical nonverbal veracity cues are usually hardly diagnostic of truth and deception, less reliance on those cues can often improve the accuracy of veracity judgments (Reinhard & Schwarz, 2012). In support of these considerations, Experiment 1 showed that ostracized individuals were better than included individuals at discriminating between affiliation-relevant lies and truths. Deep-diving into the psychological mechanisms, Experiments 2 and 3 showed that ostracized individuals relied primarily on verbal cues in their veracity judgments of affiliation-relevant messages, whereas included individuals relied on both verbal and stereotypical nonverbal cues. Finally, Experiment 3 showed that ostracism's impact on veracity judgments was specific to affiliation-relevant messages.

Consistent findings across two experimental contexts (lab vs. online), two methodological approaches (actual vs. simulated truths/lies), two response formats (continuous veracity judgments vs. binary lie-truth judgments), and three different stimulus materials, as well as three sets of messages in Experiment 1, strongly attest to the reliability

and generalizability of the obtained findings. At the same time, three potential caveats deserve brief discussion. First, in none of the experiments did participants expect to interact with the stimulus person(s). Information about the stimulus person(s) was therefore not affiliation-relevant beyond the study context. Nonetheless, ostracized participants seemed to process that information more carefully than included participants. This finding is in line with past research showing that excluded participants carefully process verbal, vocal, and nonverbal information generally useful for affiliation, even if they do not expect to interact with any of the stimulus persons (e.g., Bernstein et al., 2008; Gardner et al., 2000; Pickett et al., 2004). We therefore speculate that the social monitoring system—as the adaptive mechanism in the regulation of belonging—prompts careful processing of information that proved to be useful for affiliation across situations, even when affiliation is not possible in a given situation.

Second, our findings were obtained using Cyberball and are thus, strictly speaking, empirically restricted to this manipulation. However, Cyberball is the most widely used ostracism manipulation (Hartgerink, van Beest, Wicherts, & Williams, 2015) and its effects are largely congruent with those of other ostracism manipulations (see Wirth, 2016, for a review). We therefore expect our findings to be extended to other ostracism manipulations provided that they are not too cognitively taxing for participants, because low cognitive capacity fosters reliance on stereotypical nonverbal cues (Reinhard & Sporer, 2008). Moreover, we expect various social exclusion experiences of everyday life, such as averted eye gaze and dehumanizing language (see Wesselmann et al., 2016, for an overview), to affect veracity judgments because they all threaten social belonging and, thereby, activate the social monitoring system.

Third, participants expect to be included in Cyberball and the ostracism condition violates this expectation (Somerville, Heatherton, & Kelley, 2006). Because expectation violation increases careful processing of message content (e.g., Smith & Petty, 1996), one may wonder whether expectation violation might also explain ostracism's impact on veracity

judgments. In contrast to the social monitoring system, however, expectation violation cannot explain why ostracism influences only veracity judgments of messages high but not low in affiliation relevance.

Implications and Future Directions

The current work advances our knowledge on ostracized individuals' social information processing by showing that ostracism decreases the use of stereotypical nonverbal cues in veracity judgments if message content is of high but not low affiliation relevance. Extending the work by Claypool and Bernstein (2014), this finding suggests that ostracized individuals' judgments of others are particularly less reliant on stereotypic beliefs when most of the available information is useful for affiliation. Moreover, the present research allowed for testing ostracized individuals' reliance on stereotypic nonverbal veracity cues separately from their reliance on verbal veracity cues. It thereby revealed that ostracized individuals' careful processing of affiliation-relevant message content attenuated the effect of stereotypical nonverbal veracity cues on veracity judgments, but did not augment the effect of verbal veracity cues. One may speculate that not all of our manipulated verbal cues required high processing effort to affect veracity judgments, and therefore gains in processing effort could not translate into a stronger effect of verbal cues. Future research might test this speculation by varying the complexity of verbal cues.

We further showed that ostracism improved the accuracy in discriminating affiliation-relevant lies from truths. Importantly, ostracism can improve the accuracy of veracity judgments only if verbal cues are more diagnostic of truth and deception than stereotypical nonverbal cues. Given that this is often the case (e.g., DePaulo et al., 2003; Vrij, 2008), this finding has important implications for ostracized individuals' daily social interactions. For example, ostracized individuals may be sensitive to detect whether inclusion by others is based on true affiliative intentions or just prescribed by teachers or supervisors. An interesting question for future research is whether ostracized individuals are better at identifying

affiliation-relevant *social lies*, that is, harmless lies told to appear polite or to protect the feelings of others (Vrij, 2008). Because social lies help maintain positive relationships, a greater accuracy in detecting them might complicate social interactions. Moreover, with regard to lies and truths of low affiliation relevance, one may expect that ostracism will not significantly affect the accuracy of veracity judgments because ostracism did not affect reliance on stereotypical nonverbal cues if message content was of low affiliation relevance. This speculation awaits empirical testing

The current work also contributes to the understanding of veracity judgments. Consistent with previous research (e.g., Bond & DePaulo, 2006; Hartwig & Bond, 2011), our findings suggest that (a) less reliance on stereotypical nonverbal cues can improve the accuracy of veracity judgments and (b) veracity cues indicated in self-repots differ markedly from those cues people actually rely on in their veracity judgments. Our findings further extend research on factors that influence the reliance on stereotypical nonverbal veracity cues relative to verbal veracity cues and, thus, the accuracy of veracity judgments. In general, if basic needs are unsatisfied, adaptive mechanisms become activated that increase careful processing of information relevant to restoring need satisfaction (Atkinson & McClelland, 1948; Gardner & Pickett, 2005). On the other hand, increasing careful processing of message content decreases reliance on stereotypical nonverbal cues in veracity judgments (Reinhard, 2010; Reinhard & Sporer, 2008). Our findings therefore allow for the interesting speculation that mechanisms for regulating basic needs (e.g., the social monitoring system for regulating the need to belong) may decrease reliance on stereotypical nonverbal cues in veracity judgments if being accurate is relevant to meet unsatisfied needs (e.g., the accurate discrimination between affiliation-relevant lies and truths helps identify appropriate affiliation partners and, thereby, meet an unsatisfied need to belong). Future research might extend our findings by examining if threats to basic needs other than the need to belong affect veracity judgments of messages that contain information relevant to restoring need satisfaction.

Specifically, ostracism also threatens the needs for self-esteem, control, and meaningful existence, which may sometimes yield contrasting hypotheses regarding ostracism's consequences (Walasek, Juanchich, & Sirota, 2019). If these needs increase careful processing of information relevant to restoring need satisfaction, however, this may enlarge ostracism's impact on veracity judgments beyond affiliation-relevant messages.

Conclusion

People do not always tell the truth. At the same time, the ability to discern lies from truths is generally not very high. Research has shown, however, that veracity judgments usually become more accurate with decreasing reliance on stereotypical nonverbal cues. Our finding that ostracism decreases reliance on stereotypical nonverbal cues in veracity judgments of affiliation-relevant messages therefore suggests that ostracism affects social information processing in a way that gives ostracized individuals a cutting edge in discerning affiliation-relevant lies from truths. Potentially, this may help them finding their way back in.

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Footnotes

[1]This definition does not allow for 0/1 categorization of all possible content, as it leaves room for subjective and situation-specific perspectives. Therefore, beyond the theoretical foundation, what is (and what is not) affiliation-relevant needs to be empirically determined.

[2]A small-scale meta-analysis based on the effect sizes obtained in each sample yields similar results (see Table S2 in the Supplemental Online Material).

[3]The data of Sample 1A was collected prior to the data of Sample 1B. Importantly, the recruitment of Sample 1B was necessary and independent of Sample 1A's results because the attained size of Sample 1A did not meet the requirements specified by the power analysis.

[4]Two programming errors occurred for Sample 1A: the 24 messages of Set 2 included 6 messages of Set 1; the 24 messages of Set 3 included 6 messages of Sets 1-2. Therefore, Set 2 included 54% deceptive messages and Sets 2-3 included more attitudes with a positive than a negative valence (i.e., 14 liked and 10 disliked movies/TVseries). Though unfortunate, none of these errors affects conclusions drawn from the reported evidence.

[5]We also assessed participants' self-reported use of verbal behavior relative to nonverbal behavior (see Table S1 in the Supplemental Online Material). This comparative measure replicated the reported results.