Title
What They Don't know Might Help Them: A Demonstration of Subtle Social Inference from Mimicry

Journal
Proceedings of the Annual Meeting of the Cognitive Science Society, 35(35)

ISSN
1069-7977

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Publication Date
2013

Peer reviewed

Nuanced Social Inferences about Trustworthiness from Observation of Mimicry

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Abstract

Mimicry and imitation are crucial mechanisms of social learning and rapport. Further, mimicry informs essential social judgments formed not only by the interacting party but also by third-party observers. How sophisticated are observer's inferences from mimicry? We examined this in the context of observers' use of mimicry to judge trustworthiness. Participants observed a dyadic interaction in which a target mimicked or did not mimic a model. Prior to observation, the model's honesty was earlier defamed, or praised, in front of some, but not other, targets. Observers always knew the model's reputation. Observers also knew which targets were aware of the model's reputation. Results suggest that observers' use of mimicry in trust judgments is very sophisticated It reflects not just the presence of mimicry, but also the model's moral reputation and, critically, knowledge of the target's awareness of the model's reputation. This sophistication leads observers to rate targets as trustworthy when they mimic untrustworthy models, but only when the observers know that the model reputation is unknown to the target.

Keywords: Mimicry; Imitation; Inference, Social Judgment; Trust

Introduction

Mimicry is an essential part of the human social repertoire that is inexorably bound up to basic social processes of empathy, bonding, and in-group formation (Churchland, 2011; Kashima, 2008; Lakin & Chartrand, 2003; Lakin, Jefferis, Cheng, & Chartrand 2003; Preston & De Waal, 2002). We have greater rapport with those who mimic us (Bernieri 1998), and are more prosocial after being mimicked (Lakin, Jefferis, Cheng, & Chartrand, 2003). Interestingly, many of these effects occur without participants' consciousness of mimicry (Chartrand & Bargh, 1999).

To date, the mimicry literature has focused on the interacting dyad (for a review, see Chartrand & van Baaren, 2009). However, the social context of mimicry often includes many interacting parties. Here, human observers can use information about who mimics whom to make social judgments. This was shown in a recent series of experiments by Kavanagh, Suhler, Churchland, and Winkielman (2011). Participants (observers) viewed videos of one-on-one interviews, and evaluated the interviewee's competence. In some videos the interviewee mimicked the interviewer's gestures (leg crossing, chin-rubbing) and in the other videos the interviewee did not mimic. Additionally, the attitude of the interviewer towards the interviewee was manipulated: in some videos, the interviewers were cordial to the interviewee and in others they were condescending to the interviewee.

The results showed that the impact of mimicry on the observers' (participants') judgments of interviewees' competence depended on whom the interviewee mimicked. When the interviewer was rude to the interviewee, mimicking interviewees were rated as significantly *less* competent than non-mimicking interviewees. When the interviewer was cordial to the interviewee, mimicking

interviewees were rated as non-significantly more competent. Finally, when the interviewer was cropped out of the videos, thus preventing participants from noticing synchronous movements, all of the above effects disappeared. Despite these effects, participants showed a lack of conscious awareness of mimicry in debriefings.

Thus mimicry, when done in the wrong context, can negatively affect observers' judgments of our competence. But this research leaves open two important questions, which will addressed presently.

How Complex are Inferences From Mimicry?

The above-discussed judgments by observers can be seen as relatively "sophisticated", as they took the attitude of the model (interviewer) towards the mimic (interviewee) into account. Observers clearly did not simply equate mimicry with competence. This seems to show that information gleaned from mimicry is integrated with broader social information in a subtle manner.

However, an alternative "non-intelligent" interpretation of these findings is that gestural mimicry simply enhances the perceived similarity between the interacting parties. As a result, negative attributes of the model (e.g., rudeness or cordiality) "rubbed off" on the mimic but not on the non-mimic. This can be explained as a relatively simple associationist inference that a target person who behaves like the model probably shares further traits with the model (Andersen, Moskowitz, Blair & Nosek, 2007), or as a reflection of observers' belief that mimicry functions as a means of enhancing perceived similarity (Over & Carpenter, 2012).

On the other hand, much research argues that mimicry itself is a complex, and even intelligent, process. Mimicry generation (despite its unconscious origins) depends on the context and social relationship between the mimicker and the model. People reduce their mimicry or even engage in anti-mimicry when interacting with a partner who is disliked, represents an out-group, or has different goals (Bourgeois & Hess, 2008; Likowski, Muehlberger, Seibt, Pauli, & Weyers, 2008; McIntosh, 2006; Stel et al., 2010). It would thus seem maladaptive for perceivers to interpret mimicry in a context-free manner.

Mimicry, competence, and trust

It is also interesting and important to understand whether perception of traits other than competence can be influenced by perceived mimicry. Competence is one of the two main dimensions of social judgment (Judd et al., 1995). The other dimension is trust, which is critical to group cohesion, relationships, and most social transactions. Indeed, mimicry is posited to be part of the process of developing empathy and interpersonal trust (Bavelas, Black, Lemery, & Mullett, 1987), and been called "social glue" (Lakin & Chartrand, 2003). Thus, the connection between mimicry and trust is of obvious interest.

The link between mimicry and trust is particularly important in situations where an observer watches an interaction involving a person with a persuasive agenda. It has been shown, for example, that children imitate others more when they are attempting to persuade them to do unpleasant things, such as eat unappetizing foodstuffs, rather than enjoyable things (Thelen, Miller, Fehrenbach, Frautschi, & Fishbein, 1980). Mimicry has also been shown to be an effective technique in adult negotiations (Maddux, Mullen, & Galinsky, 2008). In short, it is important, and also novel, to explore how mimicry influences third-party inferences about trust.

Present Study

The goals of the present study were twofold. First we examined whether third-party judgments about mimicry result from a simple assumption of trait similarity between similarly behaving individuals (i.e., the transference or "rub off" effect described above), or whether they instead reflect more nuanced social inferences. In particular, we tested whether observers' inferences about the target's trustworthiness reflected not only the presence/absence of mimicry between the target and the model, and the model's past trust-relevant behavior, but also, critically, the observer's knowledge of the target's epistemic state with regard to the model's past behavior. If mimicry inferences are indeed complex, observers should be sensitive to whether the mimicker "knows" about the model's reputation-related behavior. This is not unlike sensitivity that observers, even relatively young children, show to the epistemic state of an actor in "theory-of-mind" tests (Premack & Premack, 1995).

Secondly, we explicitly attempt to show that mimicry can influence third-party observers' impressions of the trustworthiness of dyad members. We do this by directly influencing participants' impressions of the trustworthiness of one of the dyad members (the interviewer), and then testing whether mimicry (and the mimic's epistemic state) moderates the extent to which this reputation carries over to the other member (the interviewee).

The current paradigm was based on the previous work on third-party observation (Kavanagh et al. 2011), with some important changes. Participants again observed interviews and made social judgments about interviewees. Interviewees either mimicked or did not mimic their interviewer (model). Additionally, in the current study, participants also had to play an economic "trust" game (Berg, Dickhaut, & McCabe, 1995) with interviewees.

Critically, in the current study, the interviewer exhibited the same neutral behavior in all videos – that is, she was not directly cordial or directly rude to the target, as in Kavanagh et al. (2011). Rather, subjects' perceptions of the interviewer were manipulated by an experimental confederate (also posing as a subject) who relayed a story. The interviewer was depicted as trustworthy to half of subjects, and as untrustworthy to the other half.

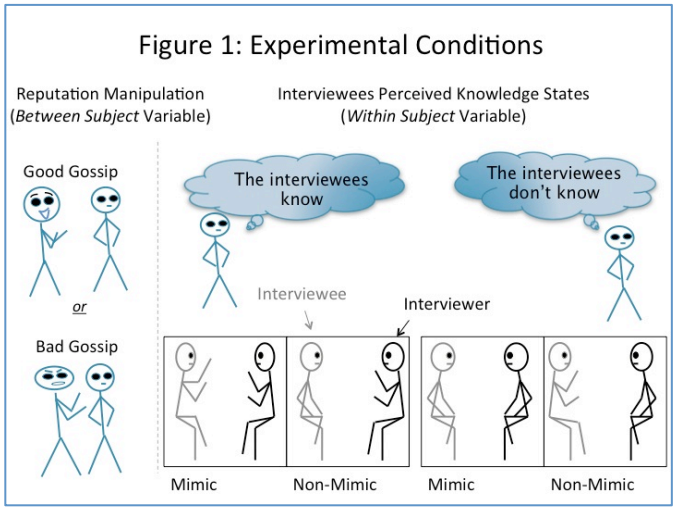
Participants' understanding of whether they and the interviewees had common knowledge of the interviewer was also manipulated. We did this by having some of the interviewees be present as "subjects" in the waiting room, along with the actual participant. There they also heard either the praising or defamatory story about the interviewer. Other interviewees were not among the subjects in the waiting room. Thus, the observers knew that some interviewees, having heard the story, were aware of the interviewer's high/low trustworthiness, but that other interviewees, having not heard the story, were not aware of the interviewer's high/low trustworthiness.

This step was motivated by the moral psychology literature, as well as philosophical and legal perspectives on responsibility more broadly, which suggest that observers take into account an agent's mental states (e.g., intent, deliberation, knowledge) when determining culpability for right/wrong actions (Suhler & Churchland, 2009). Importantly, it seems that such considerations are relatively automatic (Young & Saxe, 2009).

The current paradigm allows for a test of the sophisticated inference hypothesis of mimicry. If mimicry (similar movements) simply leads dyad members to be seen as similar, then observers should judge interviewees mimicking the trustworthy interviewer more favorably than interviewees mimicking the untrustworthy interviewer, regardless of the interviewee's state of knowledge about the interviewer's trustworthiness/untrustworthiness. However, the sophisticated inference account generates a more nuanced set of predictions in the context of trust-related situations.

The most straightforward prediction is that mimicking a trustworthy interviewer should benefit interviewees who are personally knowledgeable about his or her trustworthiness. This prediction should be offered with the caveat that work within the dyad has shown that some level of mimicry is expected in a normal face-to-face interaction (Dalton, Chartrand, & Finkel, 2010) and so it may be that very strong mimicry would be required in order to "make a positive impression" on the viewer.

Figure 1: Experimental Conditions



The second and perhaps more interesting prediction is that mimicking an untrustworthy interviewer may benefit interviewees who are *not* knowledgeable about his or her misdeeds. After all, for the observer, when an innocent mimics an undesirable individual (i.e., shows affiliative behavior toward an undeserving party), the mimic should be seen as a particularly trusting (or naïve) and prosocial individual. All this should result a three-way interaction between mimicry (present/absent), trustworthiness (positive/negative), and knowledge (present/absent).

Method

Participants and Procedure. 123 UCSD undergraduates participated for class credit. Upon arrival in the lab, subjects were greeted by the experimenter, who consulted a list and then told them that they would be in the rater condition and placed in a waiting room marked "rater condition." Another waiting room, clearly visible, was marked "interviewer condition" (this language was chosen to minimize ingroup effects by emphasizing situational assignment to the interviewee role). See Figure 1 for timeline (panel A) and spatial schematic (panel B). Several minutes before the supposed experimental start time, the confederate (henceforth "the gossip") who would be used to manipulate opinions about the trustworthiness of the interviewer was brought to the waiting room posing as another subject. Two other confederate "subjects" (confederate interviewees), who would eventually be transferred to the interviewee condition, entered the room one at a time right around the supposed experimental start time. This made their entrance (i) noticeable by subjects and (ii) minimized their chances of being engaged in conversation by subjects. After the last confederate arrived, the experimenter then fetched another confederate ("the interviewer"), introduced her to the subjects, and while the interviewer stood on, told the subjects (accurately) that they would see four interviews and then would play with the interviewees an economic game in which the trustworthiness of one's partner would be crucial to success. Subjects were also (deceptively) told that interviews would take place live in the interview room and that the video would be broadcast to computer screens in the rating rooms via the local intranet. After all these instructions, the experimenter left to take the interviewer to the interview room.

While the interviewer was gone, "the gossip" loudly told a story meant to either erode or build the participants' trust in the interviewer. In the praise condition the gossip recounted that the interviewer had driven to his home to return a lost wallet intact. In the defamation condition, participants were told that the interviewer was a friends' roommate who avoided paying all bills and shunned any communication.

After sufficient time, the interviewer returned and said that the experiment was ready to start but that two "subjects" currently in the rater condition would need to be transferred to the interviewee condition. The confederate interviewees were chosen for transfer and taken to the

interview room, while subjects and the gossip were escorted to small rooms equipped with a computer.

The computer portion of the experiment (see Figure 1, right panel) consisted of viewing and responding to 4 videos of interviews with 4 interviewees, all of whom were paired with the confederate interviewer. At the start of the computer portion, participants also viewed a detailed explanation of the Trust Game (see below). To back up the experimenter's cover story that the videos were in fact live, a screen of variable duration saying simply "waiting for live feed" in slowly flashing text was added to each video. Each subject now saw two interviewees (knowledgeable interviewees) who had heard the same story that they did, and two that did not (non-knowledgeable interviewees). Within each of these knowledge conditions, videos were arranged so that one member mimicked the interviewer and one did not. Mimicry was implemented as is standard in the literature, with neutral gestures (e.g., chin rubbing and leg-crossing) and no differences between verbal or meaningful nonverbal content.

Participants provided Likert scale (7-point) ratings for each interviewee on trustworthiness. As a behavioral measure, subjects also indicated how much money (from $0 to 10) they would entrust with the target in the investor game (Berg et al., 1995). In this game, the participant is endowed with $10 and can transfer some amount of this endowment to the target. This money is then tripled, and a partner could (if scrupulous) then return some money back to the participant. Participants also rated targets on control dimensions of competence, likability, and friendliness. Finally, as a manipulation check, participants also rated the interviewer herself on the same measures. Post-experimental funneled debriefing was also performed to check for conscious awareness of mimicry, belief that videos were live, and skepticism towards the waiting room manipulation (gossip).

Manipulation-Checks Analysis of debriefing questionnaires revealed that 20 participants were suspicious of the waiting room manipulation. A further 6 participants were excluded because they personally knew one of the confederates, and 1 participant was excluded because they noticed mimicry. The final sample thus consisted of 96 participants (59 females and 37 males) who were, on average, 20.23 years old (*SD*=1.58).

We tested how participants perceived the interviewer as function of reputational manipulation (praise/defamation) and as a function of interacting with a mimicking or non-mimicking interviewee. Across all dependent measures, a 2 x 2 MANOVA revealed only a main effect of reputation, with no ME or interactions with mimicry on any measures. Specifically, in the Trust Game probe, participants were willing to give the interviewer more money in the praise condition [*M=4.8 vs.* 3.17, $F(1,94)=10.30$, $p=.002$]. They also rated the interviewer as more trustworthy [*M* = 5.05 vs. 3.67, $F(1,94)=21.5$, $p<.001$]. In the praise condition, the interviewer was also rated as significantly more likeable (F=15), competent (F=5.1), and marginally more friendly (F=3.8), all *ps* < .05. However, of the 4 ratings, the trust rating was particularly strongly influenced, as reflected in the 2-way interaction of reputation by rating type, [$F(3,94) = 5.9$, $p=.01$]. In short, our manipulation was very successful in changing the perception of the interviewer (model), with the effects particularly pronounced on the trust-related dimensions.

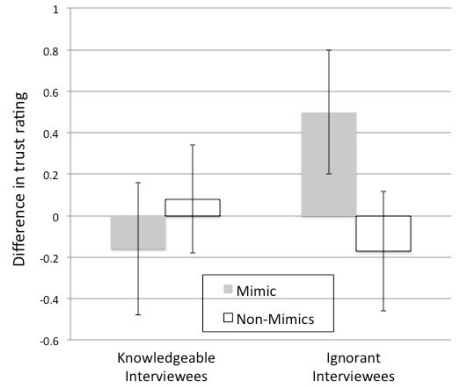
Results

As described above, the "sophisticated inferences from mimicry" hypothesis predicts that evaluations made by third-party observers should vary as a function of the reputation of the model, presence or absence of mimicry by the target (interviewee), and the observer's knowledge about whether the target is aware of the reputation of the model (interviewer). Our central prediction was the observers would take the target's epistemic state into account. This should lead to the inferences that are more than simply a function of the goodness/badness of the model, as predicted by an associationist/rub-off account.

Because our reputational manipulation (praising vs. defamatory story) targeted the model's trustworthiness, we chose trustworthiness ratings, and monetary investment as our critical DVs. We analyzed these variables as a function of reputation (praise/defamation), knowledge (informed/ignorant), and mimicry (presence/absence), using a 3-way, mixed-models MANOVA.

We first focused on the trustworthiness rating (Figure 2) There were no significant main effects or interactions in the knowledgeable condition (all *Fs* < 1). Critically, in the ignorant condition, we found a 2-way interaction of reputation and mimicry [$F(1,93)=5.87$, $p=.02$. Simple effects (two-tailed) showed that ignorant participants who mimicked bad (untrustworthy) models were perceived as mo

Figure 2: Changes in trust ratings as a function of reputation, mimicry, and knowledge. (Difference in ratings in the defamation minus the praise condition).

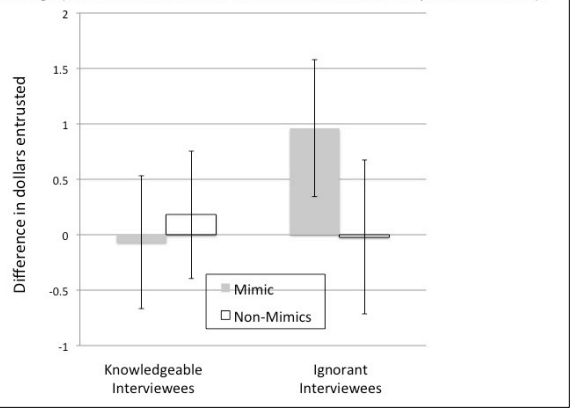


re trustworthy than participants who did not mimic bad models ($p < .06$), and as more trustworthy than ignorant participants who mimicked good (trustworthy) models ($p < .10$). Overall, this pattern resulted in a significant 3-way interaction [$F(1,93)=4.58$, $p=.03$]. We also found a main effect of knowledge, such that targets who witnessed the reputational manipulation were rated as more trustworthy

than targets who did not [$F(1,93)=11$, $p<.01$]. This effect (also seen on other ratings, as discussed below) presumably reflects that participants were personally familiar with targets in the knowledge, but not the ignorant, condition.

On the investment measure of trust, we also found a 2-way interaction of reputation and mimicry [$F(1,94)=5.41$, $p=.02$]. Simple effects (two-tailed) showed that when ignorant participants mimicked bad models, they were perceived as marginally more trustworthy than participants who did not mimic bad models ($p<.12$), and as more trustworthy than ignorant participants who mimicked good models ($p<.01$). There were no significant effects in the "knowledgeable" condition (all $Fs < 1$). Overall, this pattern resulted in a 3-way interaction [$F(1,94)=3.42$, $p=.07$]. No other main effects or interactions were reliable.

Figure 3: Changes in economic trust as a function of reputation, mimicry, and knowledge (Difference in dollars in the defamation minus the praise condition).



Other ratings. Similar analyses were conducted on other ratings that were not directly related to trust. Analyses revealed a main effect of knowledge, such that "knowledgeable" targets were rated as overall friendlier ($p < .01$) and more competent than "ignorant" targets ($p < .05$). As mentioned above, this effect may be due to participants' personal familiarity with targets in the knowledge condition (due to having spent time with them in the waiting room). Critically, none of the other ratings showed the 3-way interaction involving mimicry, reputation and knowledge ($Fs < 1$). This suggests that observers' inferences were restricted to the relevant trust-related dimensions that were relevant to our praising/defaming story manipulation.

Discussion

Our central question was whether third-party observers' inferences from mimicry are simple or sophisticated. Thus, we tested whether such inferences take into account not only the presence or absence of mimicry, but also the reputation of the model and the target's knowledge about the model. We examined these third-party inferences of mimicry in the context of morality-related judgments of trust – an important social dimension.

Overall, our results support the idea that inferences made about third-party dyad members on the basis of observed mimicry are nuanced. Specifically, participants' judgments of trustworthiness reflected (i) whether the target mimicked, (ii) the reputation of the person they mimicked, and also (iii) whether the target was aware of their model's reputation. As such, the results speak against the hypothesis that third party judgments of mimics reflect simple "rub-off", where the mimic is merely assigned traits of the model. More generally, our results suggest that people can integrate their perception of rapport with higher level social information. Critically, this higher level information includes knowledge about the target's epistemic state.

The observed 3-way interaction was largely driven by the fact that ignorant interviewees benefited from mimicking the untrustworthy interviewer. As we suggested earlier, this could reflect observers' perception that mimicry is an affiliative, courteous social behavior, so extending it, unknowingly, to an undeserving party is demonstrating a particularly trusting, perhaps gullible personality disposition. However, we feel this explanation should be tested explicitly in future extensions.

Another question for future research is why knowledgeable targets were not seen as more trustworthy after mimicking a trustworthy model. Targets were also not "blamed" for mimicking a model they knew to be bad. One possibility, consistent with the trust literature is that people do not give moral credit or blame for social courtesy (mimicry) when such courteous behavior is expected (Wojciszke, 2005). As mentioned, past work shows that some level of mimicry is expected in a normal social interaction (Dalton et al., 2003).

Another possibility is that mimicry effects disappeared in the knowledgeable condition because the targets had previously been personally encountered in the "waiting room" portion of the experiment. As mentioned, this brief acquaintance non-specifically enhanced several judgments, including trust, friendliness, and competence. Familiarity may also have caused these targets actions' to be judged in a more "charitable" manner. It may also be related to the fact that people make more situational inferences about acquaintances and more dispositional ones about strangers.

Also noteworthy is that, as expected, there was no decrement in competence ratings when targets mimicked a "defamed" interviewer. We believe this is because, unlike previous work (Kavanagh et al, 2011) interviewers were never directly condescending to the interviewee in this study. This contextualizes previous work, in which interviewees who mimicked to interviewers who condescended directly to them were seen as less competent. This provides further evidence that inferences from mimicry are subtle and situated. Though the full extent and nature of such inferences is not entirely clear, the results are the first to point towards the integration of unconsciously processed embodied signals with epistemic (e.g. Theory of Mind) knowledge.

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