The submissive chameleon: Third-party inferences from observing mimicry

Oliver Genschow
(University of Cologne)

Hans Alves
(University of Cologne)

accepted manuscript at Journal of Experimental Social Psychology before copyediting

Author Note

Correspondence concerning this article should be addressed to Oliver Genschow,
University of Cologne, Social Cognition Center Cologne, Richard-Strauss Str. 2, 50931
Cologne, Germany, E-Mail: oliver.genschow@uni-koeln.de

Abstract

Past research has shown that mimicry has a number of pro-social consequences for interaction partners. However, such research has almost exclusively focused on its effects among interaction dyads. As social interactions are often witnessed by third-party observers, the question arises which inferences perceivers draw from observing mimicry. In the present work, we apply a third-party perspective to mimicry and test whether observers perceive mimicking individuals as submissive. Experiment 1 confirmed our prediction and found that observers perceived a mimicking person as less dominant, and thus more submissive, than a mimicked person. Experiment 2 replicated this finding and ruled out possible demand effects. Experiment 3 showed that when an interaction partner does not mimic the movements initiated by another person, the interaction partner gains dominance in the eye of the observer. Experiment 4 demonstrates that the inferences that perceivers draw from observing mimicry partly rely on a mere action-response pattern. These findings have not only important implications for mimicry as a genuinely social phenomenon, but also for research on impression management and person perception.

Keywords: Mimicry; Imitation; Person perception; Dominance; Submissiveness

Individuals have the tendency to automatically imitate other individuals during social interactions (for a meta-analysis, see Cracco, Bardi, et al., 2018)—a phenomenon called mimicry (for definitions, see Chartrand & Bargh, 1999; Genschow et al., 2017). For example, individuals mimic facial expressions (Dimberg, 1982), characteristics of language (Cappella & Planalp, 1981; Giles & Powesland, 1975; Webb, 1969, 1972), emotions (Hess & Fischer, 2014), postures (LaFrance, 1982), gestures (Bernieri, 1988; Cracco, Genschow, Radkova, & Brass, 2018), simple movements (Genschow & Florack, 2014; Genschow, Florack, & Wänke, 2013; Genschow, Hansen, Wänke, & Trope, 2019; Genschow & Schindler, 2016), as well as complex action patterns (Hansen, Alves, & Trope, 2016).

Research over the last two decades has produced an impressive number of findings indicating the importance of such mimicking behavior for dyadic social interactions (for reviews, see Duffy & Chartrand, 2015; Wang & Hamilton, 2012). For example, when being mimicked, individuals experience increased liking for the mimicker (Chartrand & Bargh, 1999; Kulesza & Kot, 2016; Kulesza et al., 2015; Sparenberg, Topolinski, Springer, & Prinz, 2012), increased feelings of closeness and affiliation (Lakin & Chartrand, 2003), as well as pro-social orientation towards the mimicker (Lakin, Chartrand, & Arkin, 2008; van Baaren, Holland, Kawakami, & van Knippenberg, 2004). Being mimicked also increases people's willingness to share resources with the mimicker (van Baaren, Holland, Steenaert, & van Knippenberg, 2003), and their susceptibility to be persuaded by the mimicker (Kulesza, Szypowska, Jarman, & Dolinski, 2014; Maddux, Mullen, & Galinsky, 2008; Tanner, Ferraro, Chartrand, Bettman, & Van Baaren, 2008).

Surprisingly, research on mimicry has almost exclusively focused on its effects among interaction dyads. That is, research has tested how individuals perceive a person who has just mimicked them and thereby neglected that dyadic interactions are oftentimes witnessed by third-party observers (e.g., during job interviews, interactions among friends,

or televised interviews). This raises the fundamental question how mimicry behavior is perceived by third-party observers and which inferences third-party observers draw about the interacting individuals. Given that individuals automatically draw many different inferences from observing others (e.g., Bruner, 1957; Fodor, 1983; Nisbett & Wilson, 1977) and that these inferences are oftentimes fundamentally different from individuals who are actually part of the social interactions (Jones & Nisbett, 1987), it is surprising that mimicry research has almost fully neglected the perspective of third-party observers.

In fact, there are only a few exceptions in that regard. For example, Powell and Spelke (2016) recently investigated inferences that 4 to 5.5 months old infants' draw from observing imitation among smiley characters. The authors found that infants expect smileys that imitated the sound or movement of another smiley to approach and affiliate with the smiley they imitated. Capozzi, Becchio, Willemse, and Bayliss (2016) investigated how much attention is directed to people who follow the gaze of another person. The researchers found that participants direct less attention to people who follow the gaze than to those who initiated the gaze. Using adult participants, Kavanagh, Suhler, Churchland, and Winkielman (2011) found that people who mimicked a friendly target were perceived as more competent than people who mimicked an unfriendly target.

To the best of our knowledge, Kavanagh and colleagues' studies remain the sole investigation regarding inferences that adult perceivers draw from observing actual mimicry. We believe that the lack of a systematic investigation into observed mimicry leaves our understanding of this genuinely social phenomenon highly incomplete. Thus, we aimed at extending previous research by providing a highly controlled investigation of third-party inferences from observed mimicry.

Hypotheses

A central characteristic of mimicry is that one interaction partner (i.e., the

mimicker) adapts to the behavior of the other person (i.e., the initiator). In a sense the initiator gets to “lead” the mimicker. It therefore seems plausible that the initiator is perceived as dominant while the mimicker is perceived as submissive. This reasoning is in line with past research showing that people who are perceived as dominant express opinions, take the lead, and ask others to do things. Conversely, people are perceived as submissive when they do not state desires, feelings, and opinions or when they go along with others and wait for others to speak and act (Moskowitz, 1994). Hence, we hypothesize that observers perceive mimicking individuals as less dominant, and thus more submissive, than mimicked individuals.

Overview of empirical investigation

We tested our hypotheses in four experiments. In all experiments we presented participants with different videos, in which two individuals interacted with each other. In these videos one person (mimicker) always mimicked three movements of the other person (initiator). In order to account for any possible confounds, we committed to a rigorous counterbalancing of various stimulus properties (for details, see below). In the first experiment, participants watched two videos, in which one person always mimicked the movements of another person. After each video, participants rated perceived dominance and submissiveness of both persons. Experiment 2 aimed at replicating Experiment 1 and ruling out potential demand effects. That is, we let participants guess the purpose of the experiment and then tested whether correctly guessing the purpose influences the results. In Experiment 3, we added a control condition featuring interactions during which one person initiates movements that are then not followed by any movement from the other person. This allowed testing the alternative explanation that the initiator moving first more strongly grasps observers’ attention influencing the evaluations. The final Experiment 4 tested whether mere action-response patterns account for our effect. That is, we tested whether

observers' inferences rely on the mimicker performing the very same movements as the initiator, or whether observers draw similar inferences when the mimicker performs a different kind of movement in response to the initiator's movement. All experiments were preregistered and all material and data are publicly accessible at the Open Science Framework (OSF; https://osf.io/wtzrf/?view_only=7e79c6ab20874e49ad992b22a7f8ebfb). All measures, manipulations, and exclusions in the studies are disclosed and reported in the paper.

Experiment 1

Experiment 1 tested whether individuals who mimic the movements of others are perceived as less dominant, and thus more submissive, than individuals who initiate the movements. The experiment was preregistered at aspredicted.org (<https://aspredicted.org/xg5ai.pdf>).

Method

Participants. We aimed at recruiting a sufficiently large participant sample to detect even a small effect of $d_z = .2$ (Cohen, 1969). With a power of $1 - \beta = .9$ and an alpha probability of $\alpha = .05$, 265 participants are needed to detect such an effect. To compensate for possible dropouts (see preregistration), we recruited 300 participants online via Amazon's Mechanical Turk. One participant was excluded from the analyses due to missing data. We did not exclude any other participant, because none of the participants finished the survey faster than one minute (cf. preregistration). The final sample consisted of 299 participants (138 female) with an age ranging from 21 to 74 ($M = 40.74$, $SD = 11.34$).

Stimulus material. We created different videos, which allowed us to test the hypotheses in a highly controlled manner. All videos are publicly accessible at the Open Science Framework (OSF;

https://osf.io/wtzrf/?view_only=7e79c6ab20874e49ad992b22a7f8ebfb). Creation of the videos involved multiple steps. First, we videotaped two conversations among different female research assistants engaging in a conversation. In each conversation, another pair of research assistants was involved. All research assistants were wearing neutral clothes and were sitting in front of a neutral background. The tone of the videos was silent. In each video, one person was sitting on the left while the other person was sitting on the right, so that both persons were facing each other. In each video one individual (i.e., mimicker) mimicked three arm movements that were initiated by the other individual (i.e., initiator). Depending on the video, mimicked movements were either touching the hair or touching the chin. After videotaping the interactions, we cut the videos using video editing software. Specifically, we cut each video in the middle of the screen into two video halves so that in each video half only one person was visible. We then rearranged the different video halves in various ways that fully eliminated any possible stimulus confounds. Confounding factors could be that third-party inferences are not based on observed mimicry, but (1) on specific characteristic of a person (e.g., clothing style, facial expression, hairstyle, etc.), (2) on whether an individual was sitting on the left or right, or (3) on any behavioral tendencies elicited by the experimenter's instructions given to the videotaped persons.

With the help of video editing software, we rearranged the different video halves as well as their timings in the following ways. First, each original video was mirrored, to switch the positions of each individual. After this mirroring process the person who was formerly sitting on the left, was now sitting on the right and the person who was formerly sitting on the right was now sitting on the left. Second, for both the original and the mirrored videos, we then rearranged the timings of the executed movements by fast-forwarding the video halves of the initiators. When putting the different video halves back together, the person who was formerly the initiator was now the mimicker and the person

who was formerly the mimicker was now the initiator.

This video editing procedure resulted in four different videos for each target movement (i.e., touching the hair and touching the chin). Table 1 illustrates these different video versions for the example of chin touching. Each video lasted 20 seconds.

Table 1. Depiction of all possible video combinations (i.e. four different videos) using the example of mimicking chin touching. The same combination of videos with other individuals was created for touching the hair.

Procedure. Participants first received general information about the procedure of the experiment and then indicated informed consent by clicking on the “next” button. Afterwards, participants observed two videos in which two females were engaging in a conversation. In each video, one individual (i.e., mimicker) mimicked the movements of the other person (initiator). The dyad in the second video always involved different persons than the dyad in the first video. Whether a person was sitting on the left or the right side and whether a person was the initiator or the mimicker was counterbalanced between participants. To measure perceived dominance, we used the items validated by Bente, Leuschner, Al Issa, and Blascovich (2010). That is, after watching each video, participants answered the following six questions on 7-point rating scales: “How dominant/submissive do you find the person on the LEFT (1 = very submissive; 7 = very dominant)?”, “How dominant/submissive do you find the person on the RIGHT (1 = very submissive; 7 = very

dominant)?”, “How strong/weak do you find the person on the LEFT (1 = very weak; 7 = very strong)?”, “How strong/weak do you find the person on the RIGHT (1 = very weak; 7 = very strong)?”, “How confident/unconfident do you find the person on the LEFT (1 = very unconfident; 7 = very confident)?”, “How confident/unconfident do you find the person on the RIGHT (1 = very unconfident; 7 = very confident)?”. To compute composite scores of perceived dominance, we averaged all items separately for persons who initiated the movements and persons who mimicked the movements. High scores indicate high dominance and low submissiveness. Cronbach’s Alpha for mimicking persons was $\alpha = .88$ and $\alpha = .89$ for persons who initiated actions. At the end of the experiment, participants provided basic demographic data.

Results

To test the hypothesis that individuals who mimic another person’s movements are perceived as less dominant than individuals who initiate the movements, we conducted a paired *t*-test. In line with our hypothesis, the analysis showed that participants perceived persons who mimicked the movements as less dominant ($M = 3.60$, $SD = 0.95$) than persons who initiated the movements ($M = 4.52$, $SD = 0.87$), $t(298) = 10.50$, $p < .001$, $d_z = .61$.

Experiment 2

Experiment 1 found first support for our hypothesis that persons who mimic others’ movements are perceived as less dominant, and thus more submissive, than persons who initiate the movements. However, one may argue that the mimicking behavior in the videos was rather blatant. Hence, participants could have guessed the purpose of our experiment and then acted in line with our predictions. To test whether participants can indeed guess the purpose of the experiment and whether this influences the results, we conducted a replication of Experiment 1. At the end of the experiment, we asked participants to guess

the purpose of the experiment. The preregistered study plan of the experiment can be accessed via <https://aspredicted.org/ga2q6.pdf>.

Method

Participants and Design. In line with Experiment 1 we recruited 300 participants (128 female) online via Amazon's Mechanical Turk. Age ranged from 23 to 73 ($M = 39.46$, $SD = 10.67$). We did not exclude any participant, because none of the participants finished the survey faster than one minute (cf. preregistration).

Procedure. The procedure of Experiment 2 was similar to Experiment 1 with one exception. After participants watched the videos and rated perceived dominance (Cronbach's $\alpha_{\text{mimicker}} = .92$; Cronbach's $\alpha_{\text{initiator}} = .91$), they were asked to guess the purpose of the experiment. That is, participants first answered a binary choice (yes vs. no) question asking whether they thought they knew the purpose of the experiment. Participants who indicated "yes" were then guided to a new screen on which they were asked to type the exact purpose of the experiment into a provided text box.

Results

The first preregistered analysis included all participants. The results replicate those obtained in Experiment 1. Participants perceived persons who mimicked the movements as less dominant ($M = 3.41$, $SD = 1.04$) than persons who initiated the movements ($M = 4.66$, $SD = 0.95$), $t(299) = 12.68$, $p < .001$, $d_z = 1.22$.

In a second preregistered analysis, we excluded participants who correctly guessed the purpose of the experiment. Forty-five participants (15 %) believed to know the purpose of the experiment. From these participants, twenty-four participants (8 %) provided a wrong purpose and twenty-one participants (7 %) mentioned imitation, mimicry, mirroring, copying, or related concepts as part of the purpose. Excluding the latter participants did not substantially change our results. That is, the remaining participants still perceived the

mimicking persons as less dominant ($M = 3.39$, $SD = 1.03$) than the persons who initiated the movements ($M = 4.64$, $SD = 0.96$), $t(278) = 12.25$, $p < .001$, $d_z = 1.22$.

Experiment 3

Experiments 1 and 2 support our general hypothesis that perceivers who observe mimicry behavior draw inferences regarding the dominance, and thus submissiveness, of interaction partners. We argue that this effect is due to the responding person mimicking the movements of the initiating person. However, another explanation might be that the effects are driven by the initiating person moving first. That is, the initiator may more strongly grasp observers' attention influencing the evaluations. In Experiment 3, we tested this possibility by adding a condition featuring interactions during which one person initiates movements that are then not followed by any movement from the other person (i.e., no movement condition). If our effects would be due to the initiating person moving first, one should expect that mimicking persons are similarly evaluated than persons who do not respond at all. We preregistered the study plan of the experiment at AsPredicted (<https://aspredicted.org/bd2hm.pdf>).

Method

Participants and design. Similarly to our previous experiments, we recruited 300 participants online via Amazon's Mechanical Turk. In line with the preregistration and our previous experiments, we excluded participants who took less than one minute to complete the survey ($N = 7$). The final sample consisted of 293 participants (115 female). Age ranged from 23 to 73 ($M = 39.29$, $SD = 10.61$). To test our predictions, we applied a 2 (person: initiator vs. responder) $\times$ 2 (response: same movement vs. no movement) within-subject design.

Procedure. The procedure of Experiment 3 was similar to the one of Experiment 1 and 2 with one exception. In addition to using the same mimicry videos as in the previous

experiments, we created new videos involving the same individuals interacting with each other. However, during these interactions one person (i.e., the responder) did not respond to the other person's movements with any kind of movement.

As in our previous experiments, participants watched two videos. In one video, the responder mimicked the movements of the initiator and in the other video she did not respond to the other person's movement. Each of the two videos always featured a different dyad. The order of the videos was randomized. After watching each of the videos, participants rated perceived dominance on the same items that we used in Experiment 1 and 2 (Cronbach's $\alpha_{\text{mimicking person}} = .73$; Cronbach's $\alpha_{\text{non-responding person}} = .91$; Cronbach's $\alpha_{\text{mimicked initiator}} = .93$; Cronbach's $\alpha_{\text{non-mimicked initiator}} = .91$).

Results

A 2 (person: initiator vs. responder) x 2 (response: same movement vs. no movement) ANOVA yielded a significant effect of response $F(1, 292) = 25.66, p < .001, \eta_p^2 = .08$ indicating that both interaction partners were perceived as more dominant in the no movement compared to the same movement condition (see Figure 1). The main effect of person was not significant, $F(1, 292) = 0.15, p = .696$. More important for our predictions, however, was the significant interaction between person and response, $F(1, 292) = 162.68, p < .001, \eta_p^2 = .36$. As Figure 2 shows, the same movement condition replicated the findings from the previous experiments, as the responder (i.e., the mimicking person) was perceived as less dominant ($M = 3.47, SD = 1.13$) than the initiator ($M = 4.59, SD = 1.22$), $F(1, 292) = 106.35, p < .001, \eta_p^2 = .27$. Interestingly, this pattern flipped in the no movement condition. Here, the responder who did not perform any movement, was perceived as more dominant ($M = 4.78, SD = 1.21$) than the initiator ($M = 3.73, SD = 1.20$), $F(1, 292) = 78.64, p < .001, \eta_p^2 = .21$.

Figure 1. Perceived dominance in Experiment 3 as a function of person and response. Error bars represent standard errors of the mean.

Discussion

The results of Experiment 3 replicate the findings obtained in Experiments 1 and 2: Third-party observers perceive individuals who mimic the movements of others as less dominant, and thus more submissive, than persons who initiate movements. Moreover, Experiment 3 shows that merely initiating a movement is itself not perceived as dominant. This suggests that perceivers' inferences regarding dominance as found in the previous experiments rely on the observation that the movement by one person is followed by the movement of the other person.

In addition, Experiment 3 renders another intriguing insight regarding the inferences perceivers draw from observing interaction dyads: When a person who initiates a movement is not mimicked by the other person, the initiating person is perceived as submissive, while the other person who refrains from mimicry is perceived as dominant. This indicates that the responding person is in control of the impressions that third-party observers will draw from the initiator. If the responder decides to mimic another person's

movements, the initiator will appear dominant. In contrast, if the responder decides to not mimic, the initiator will appear submissive.

Experiment 4

While our previous results indicate that mimicry affects third-party observers' inferences regarding perceived dominance and submissiveness, it remains unclear which specific aspect of mimicry behavior triggers these inferences. Strictly speaking, mimicry involves two behavioral regularities: action-response pattern and movement similarity (Sparenberg et al., 2010). Action-response pattern means that the responder performs a movement in temporal contiguity to the initiator performing a movement. Movement similarity indicates that the responder performs the very same movement as the initiator. As in our previous experiments movement similarity was confounded with action-response pattern, it remains open whether perceiver's inferences rely on the observation of a mere action-response pattern or whether they rely on movement similarity. In Experiment 4, we added a new condition that featured videos in which the responder performed a movement in temporal contiguity to the initiator's movement, but this movement was different from the initiator's movement. The preregistered study plan of the experiment can be accessed via <https://aspredicted.org/f5jt4.pdf>.

Method

Participants and Design. In line with our previous experiments we recruited 300 participants online via Amazon's Mechanical Turk. In accordance with the preregistered protocol, we discarded one participant from the analyses who finished the survey below one minute. The final sample consisted of 299 participants (138 female) with an age ranging from 18 to 69 ($M = 35.92$, $SD = 11.09$).

Procedure. The procedure of Experiment 4 was similar to the one of Experiment 3 except that we replaced the no movement condition with a condition, in which the

responding person responded with a different movement to the initiator. That is, nose touching was followed by shoulder touching and chin touching was followed by touching the belly. For these additional videos we applied the same video cutting techniques as in the previous experiments to eliminate any possible stimulus confounds.

In total, participants watched two videos. In one video, the responder mimicked the same movements of the initiator (i.e., movement similarity), while in the other video, the responder performed a different movement (i.e., action-response pattern). The order of the videos was randomized. After watching each of the videos, participants rated perceived dominance on the same items that we used in our previous experiments (Cronbach's $\alpha_{\text{responder same movement}} = .87$; Cronbach's $\alpha_{\text{responder different movement}} = .89$; Cronbach's $\alpha_{\text{initiator same movement}} = .89$; Cronbach's $\alpha_{\text{initiator different movement}} = .90$).

Results

The results of Experiment 4 are depicted in Figure 2. A 2 (person: initiator vs. responder) x 2 (response: same movement vs. different movement) ANOVA yielded a significant main effect for person, $F(1, 298) = 63.42, p < .001, \eta_p^2 = .18$, indicating that the initiator ($M = 4.41, SD = .88$) was perceived as more dominant than the responder ($M = 3.79, SD = .88$). The main effect for response was not significant, $F(1, 298) = .97, p = .327$. The interaction between person and response was significant, $F(1, 298) = 19.97, p < .001, \eta_p^2 = .06$. This indicates that the difference in perceived dominance between the initiator and the responder was larger when the responder performed the same movement ($M = 0.90, SD = 1.66$) as compared to a different movement ($M = 0.33, SD = 1.82$).

Contrast analyses indicated that the difference in perceived dominance between the initiator and the responder was significant when the responder responded with the same movements, $F(1, 298) = 88.40, p < .001, \eta_p^2 = .23$, as well as when the responder responded with different movements to the initiator, $F(1, 298) = 9.58, p = .002, \eta_p^2 = .03$.

Figure 2. Perceived dominance in Experiment 4 as a function of person and response. Error bars represent standard errors of the mean.

Discussion

Experiment 4 replicated our previous findings indicating that observers perceive an individual who mimics movements of another person as less dominant, and thus more submissive, than a person who initiates the movements. Moreover, the results indicate that perceivers' inferences regarding dominance to some extent rely on mere action-response pattern, as responders were perceived as less dominant even when performing a different movement than the initiator. In this respect, it is important to note that the results also indicate an additive effect of movement similarity, as responders were perceived as even less dominant when they performed the same movement as the initiator. In other words, a mere action-response pattern does not solely account for the mimicry effect, because persons who responded with the very same movements were perceived as even less dominant than persons who responded with other movements.

General Discussion

Past research on person perception and impression formation has focused almost exclusively on the perception and evaluation of isolated individuals. Our research

contributes to recent calls for extending social-perceptual research to a third-party perspective, which incorporates the perception of interactions and relations between individuals (for reviews, see Quadflieg & Koldewyn, 2017; Quadflieg & Penton-Voak, 2017). In the present work, we applied such a third-party perspective in the domain of mimicry, and asked whether mimicry behavior influences the impressions that third-party observers draw regarding the dominance and submissiveness of interaction partners. Experiment 1 found that an interaction partner who mimics the movements of another person is perceived as less dominant, but more submissive, weak and unconfident than the interaction partner who initiated the movements. Experiment 2 replicated this finding and ruled out possible demand effects. Experiment 3 revealed that when the initiator's movements are not followed by any movement from the other person, the initiator in turn is perceived as submissive, while the person who refrains from mimicry is perceived as dominant. The final Experiment 4 found that perceivers' dominance inferences partly rely on the observation of a mere action-response pattern, and that the observation of movement similarity substantially adds to such inferences¹.

The present findings on the third-party perspective on mimicry furthers our understanding of mimicking behavior in multiple ways. First, while previous research investigating the consequences of mimicry has found that mimicry has mainly positive social consequences for dyadic interactions (for a review, see Duffy & Chartrand, 2015), our research suggests that in the presence of third-party observers, mimicry may also have detrimental effects. Kavanagh et al. (2011) already found that mimicry can have detrimental effects by showing that people who mimicked a friendly target were perceived as more competent than people who mimicked an unfriendly target. Our research goes one

---

¹ In additional non-preregistered explorative analyses, we tested whether participants' inferences regarding dominance differed significantly from the mid-point of the scale (i.e., "4"). The results indicate that in each experiment, participants ratings were significantly lower than the mid-point of the scale, $t_s > 5.04$, $p_s < .001$, indicating that mimicking persons are perceived as submissive.

step further by demonstrating that mimicry can even have detrimental effects when the interaction partners are not unfriendly. Specifically, our research indicates that while mimicking another person may increase one's likeability in the eyes of the other person, it creates a submissive impression in third-party observers. In certain situations, such as during pre-election debates, candidates may want to avoid being perceived as submissive, weak, or unconfident, and should therefore avoid adapting their movements, or rhetorical style to that of the rivalry candidate. In this respect, the findings of Experiment 3 suggest that refraining from mimicking another person makes the person appear dominant and the other person appear submissive. While during political debates it may be beneficial to appear dominant, in other situations it is desirable to appear submissive and weak. For example, in order to elicit empathy or helping behavior in observers, mimicking behavior may be a useful strategy for impression management.

A key finding of the present work is that the inferences that perceivers draw from observing mimicry at least partly rely on the observation of a mere action-response pattern. That is, the movement of one person is followed by a different movement executed by another person. This is evident from Experiment 4 which found that responders were perceived as less dominant and more submissive, even when they performed different movements than the initiator. This findings has intriguing implications not only for third-party observers' inferences, but it also suggests that the typical pro-social effects that mimicry elicits within dyads, may also at least partly result from an action-response pattern, and not from mimicking the exact same movements. While it is commonly assumed that effects of mimicry depend on movement similarity, mimicry studies do usually not include control conditions in which the mimicking person responds with different movements (for an exception see Sparenberg et al., 2012). Hence, future research

may test to what extent the well-documented effects of mimicry within interaction dyads rely on a mere action-response pattern and to what extent they rely on similar movements.

Besides implications for research on mimicry, our research also has important implications for the research on perceived dominance. Past research has indicated that people who speak firmly, give information, express opinions, take the lead, ask others to do things, and get to the point quickly are perceived as dominant. Conversely, people who speak softly, wait for others to speak or act, go along with others, do not state desires, feelings, and opinions, and avoid being responsible, are perceived as submissive (Moskowitz, 1994). Our research extends this literature by demonstrating that individuals who initiate behaviors are perceived as more dominant than individuals who mimic them. More generally, the present findings may suggest that following rather than initiating behavior decreases perceived dominance. For example, ordering the same food as another person, or buying the same product as another person, may also be perceived as submissive. Future research may aim at testing this implication in more detail.

Open Practices

The experiments in this article earned Open Materials, Preregistration and Open Data badges for transparent practices. Materials and data for the experiments are available at https://osf.io/wtzrf/?view_only=7e79c6ab20874e49ad992b22a7f8ebfb. Preregistrations can be accessed via <https://aspredicted.org/xg5ai.pdf> for Experiment 1, via <https://aspredicted.org/ga2q6.pdf> for Experiment 2, via <https://aspredicted.org/bd2hm.pdf> for Experiment 3, and via <https://aspredicted.org/f5jt4.pdf> for Experiment 4.

References

- Bente, G., Leuschner, H., Al Issa, A., & Blascovich, J. J. (2010). The others: Universals and cultural specificities in the perception of status and dominance from nonverbal behavior. *Consciousness and cognition*, 19, 762-777.
- Bernieri, F. J. (1988). Coordinated movement and rapport in teacher-student interactions. *Journal of Nonverbal Behavior*, 12, 120-138.
- Bruner, J. S. (1957). On perceptual readiness. *Psychological Review*, 64, 123-152.
- Capozzi, F., Becchio, C., Willemse, C., & Bayliss, A. P. (2016). Followers are not followed: Observed group interactions modulate subsequent social attention. *Journal of Experimental Psychology: General*, 145, 531-535.
- Cappella, J. N., & Planalp, S. (1981). Talk and silence sequences in informal conversations III: Interspeaker influence. *Human Communication Research*, 7, 117-132.
- Chartrand, T. L., & Bargh, J. A. (1999). The chameleon effect: The perception-behavior link and social interaction. *Journal of Personality & Social Psychology*, 76, 893-910.
- Cohen, J. (1969). *Statistical power analysis for the behavioural sciences*. New York: Academic Press.
- Cracco, E., Bardi, L., Desmet, C., Genschow, O., Rigoni, D., De Coster, L., . . . Brass, M. (2018). Automatic Imitation: A Meta-Analysis. *Psychological Bulletin*, 5, 453-500. doi: 10.1037/bul0000143
- Cracco, E., Genschow, O., Radkova, I., & Brass, M. (2018). Automatic imitation of pro- and antisocial gestures: Is implicit social behavior censored? *Cognition*, 170, 179-189.
- Dimberg, U. (1982). Facial reactions to facial expressions. *Psychophysiology*, 19, 643-647.

- Duffy, K. A., & Chartrand, T. L. (2015). Mimicry: causes and consequences. *Current Opinion in Behavioral Sciences*, 3, 112-116.
- Fodor, J. A. (1983). *The modularity of mind: An essay on faculty psychology*. Palatino: MIT press.
- Genschow, O., & Florack, A. (2014). Attention on the Source of Influence Reverses the Impact of Cross-Contextual Imitation. *Journal of Experimental Psychology: Human Perception and Performance*, 40, 904-907.
- Genschow, O., Florack, A., & Wänke, M. (2013). The power of movement: Evidence for context-independent movement imitation. *Journal of Experimental Psychology: General*, 142, 763–773. doi: 10.1037/a0029795
- Genschow, O., Hansen, J., Wänke, M., & Trope, Y. (2019). Psychological distance modulates goal-based versus movement-based imitation. *Journal of Experimental Psychology: Human Perception and Performance*, 45, 1031-1048. doi: 10.1037/xhp0000654.
- Genschow, O., & Schindler, S. (2016). The influence of group membership on cross-contextual imitation. *Psychonomic Bulletin & Review*, 23, 1257-1265.
- Genschow, O., van Den Bossche, S., Cracco, E., Bardi, L., Rigoni, D., & Brass, M. (2017). Mimicry and automatic imitation are not correlated. *PloS one*, 12, e0183784.
- Giles, H., & Powesland, P. F. (Eds.). (1975). *Speech style and social evaluation*. London: Academic Press.
- Hansen, J., Alves, H., & Trope, Y. (2016). Psychological distance reduces literal imitation: Evidence from an imitation-learning paradigm. *Journal of Experimental Psychology: Human Perception and Performance*, 320-330.
- Hess, U., & Fischer, A. (2014). Emotional mimicry: Why and when we mimic emotions. *Social and Personality Psychology Compass*, 8, 45-57.

- Jones, E. E., & Nisbett, R. E. (1987). The actor and the observer: Divergent perceptions of the causes of behavior. In E. E. Jones, D. E. Kanouse, H. H. Kelley, R. E. Nisbett, S. Valins & B. Weiner (Eds.), *Attribution: Perceiving the causes of behavior* (pp. 79-94). Morristown, NJ: General Learning Press.
- Kavanagh, L. C., Suhler, C. L., Churchland, P. S., & Winkielman, P. (2011). When it's an error to mirror: The surprising reputational costs of mimicry. *Psychological Science*, 22, 1274-1276.
- Kulesza, W., & Kot, S. (2016). The Chameleon as a Leech: The Costs of Mimicry for the Mimickee.
- Kulesza, W., Szypowska, Z., Jarman, M. S., & Dolinski, D. (2014). Attractive Chameleons Sell: The Mimicry - Attractiveness Link. *Psychology & Marketing*, 31, 549-561.
- Kulesza, W. M., Cislak, A., Vallacher, R. R., Nowak, A., Czekiel, M., & Bedynska, S. (2015). The face of the chameleon: The experience of facial mimicry for the mimicker and the mimickee. *The Journal of social psychology*, 155, 590-604.
- LaFrance, M. (1982). Posture mirroring and rapport. In M. Davis (Ed.), *Interaction rhythms: Periodicity in communicative behavior* (pp. 279-298). New York: Human Sciences Press.
- Lakin, J. L., & Chartrand, T. L. (2003). Using nonconscious behavioral mimicry to create affiliation and rapport. *Psychological Science*, 14, 334-339.
- Lakin, J. L., Chartrand, T. L., & Arkin, R. M. (2008). I am too just like you - Nonconscious mimicry as an automatic behavioral response to social exclusion. *Psychological Science*, 19, 816-822.
- Maddux, W. W., Mullen, E., & Galinsky, A. D. (2008). Chameleons bake bigger pies and take bigger pieces: Strategic behavioral mimicry facilitates negotiation outcomes. *Journal of Experimental Social Psychology*, 44, 461-468.

- Moskowitz, D. S. (1994). Cross-situational generality and the interpersonal circumplex. *Journal of Personality and Social Psychology*, 66, 921.
- Nisbett, R. E., & Wilson, T. D. (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological Review*, 84, 231-259.
- Powell, L. J., & Spelke, E. S. (2016). Human infants' understanding of social imitation: Inferences of affiliation from third party observations. *bioRxiv*, 050385.
- Quadflieg, S., & Koldewyn, K. (2017). The neuroscience of people watching: how the human brain makes sense of other people's encounters. *Annals of the New York Academy of Sciences*, 1396, 166-182.
- Quadflieg, S., & Penton-Voak, I. S. (2017). The emerging science of people-watching: forming impressions from third-party encounters. *Current Directions in Psychological Science*, 26, 383-389.
- Sparenberg, P., Topolinski, S., Springer, A., & Prinz, W. (2012). Minimal mimicry: Mere effector matching induces preference. *Brain and Cognition*, 80, 291-300.
- Tanner, R. J., Ferraro, R., Chartrand, T. L., Bettman, J. R., & Van Baaren, R. (2008). Of chameleons and consumption: The impact of mimicry on choice and preferences. *Journal of Consumer Research*, 34, 754-766.
- van Baaren, R., Holland, R. W., Steenaert, B., & van Knippenberg, A. (2003). Mimicry for money: Behavioral consequences of imitation. *Journal of Experimental Social Psychology*, 39, 393-398.
- van Baaren, R. B., Holland, R. W., Kawakami, K., & van Knippenberg, A. (2004). Mimicry and prosocial behavior. *Psychological Science*, 15, 71-74.
- Wang, Y., & Hamilton, A. F. d. C. (2012). Social top-down response modulation (STORM): a model of the control of mimicry in social interaction. *Frontiers in Human Neuroscience*, 6, 1-10. doi: 10.3389/fnhum.2012.00153

Webb, J. T. (1969). Subject speed rates as a function of interviewer behavior. *Language & Speech*, 12, 54-67.

Webb, J. T. (1972). Interview synchrony: An investigation of two speech rate measures in an automated standardized interview. In B. Pope & A. W. Siegman (Eds.), *Studies in dyadic communication* (pp. 115-133). New York: Pergamon.