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This is the final peer-reviewed author's accepted manuscript (postprint) of the following publication:

Published Version:

Menegatti, M., Moscatelli, S., Brambilla, M., Sacchi, S. (2020). The honest mirror: Morality as a moderator of spontaneous behavioral mimicry. EUROPEAN JOURNAL OF SOCIAL PSYCHOLOGY, 50(7), 1394-1405 [10.1002/ejsp.2670].

Availability:

This version is available at: <https://hdl.handle.net/11585/807114> since: 2021-07-16

Published:

DOI: <http://doi.org/10.1002/ejsp.2670>

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Morality as a moderator of spontaneous behavioral mimicry. *European Journal of*

Social Psychology, 50(7), 1394–1405. <https://doi.org/10.1002/ejsp.2670>

The final published version is available online at:
<https://doi.org/10.1002/ejsp.2670>

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RUNNING HEAD: Morality as Moderator of Behavioral Mimicry

The Honest Mirror:

Morality as a Moderator of Spontaneous Behavioral Mimicry

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Author Contributions

All authors contributed to the development of the research idea and design, M. Brambilla and S. Sacchi run the experiments, all authors collected the data, S. Moscatelli performed the analyses, all authors contributed to the interpretation of the results, M. Menegatti drafted the manuscript and all authors provided critical revisions. All authors approved the final version of the manuscript for submission.

The Honest Mirror:

Morality as a Moderator of Spontaneous Behavioral Mimicry

Abstract

Two studies examined whether morality-related information has a greater impact than sociability- or competence-related information upon the spontaneous mimicry of an interaction partner. Participants were video recorded during an interaction with a confederate previously presented as moral vs. lacking morality, or sociable vs. lacking sociability (Study 1), or competent vs. lacking competence (Study 2). Two coders rated the extent to which participants imitated the gestures of the confederate, participants' postural openness, and the general smoothness of the interaction. When the confederate lacked moral qualities, mimicry and postural openness were lower, and the interaction was less smooth than when the confederate was highly moral, unsociable or incompetent. Moreover, our findings showed that global impression is the key mediating mechanism driving such an effect. Indeed, knowing that another person behaved immorally resulted in a negative impression, which in turn hindered behavioral mimicry.

Keywords: morality, mimicry, sociability, competence, impression formation

When we meet someone for the first time, the most important information we look for before engaging in interaction is whether this person is honest, sincere, and fair. To put it differently, we want to know whether s/he can be trusted. Indeed, morality-related information has the primacy over other types of cues (i.e., sociability and competence; Leach, Ellemers, & Barreto, 2007) – in forming impressions about others (e.g., Brambilla & Leach, 2014; Brambilla, Rusconi, Sacchi, & Cherubini, 2011; Goodwin, Piazza, & Rozin, 2014) and deciding on how to behave toward them (Brambilla, Sacchi, Menegatti, & Moscatelli, 2016; Iachini, Pagliaro, & Ruggiero, 2015; Pagliaro, Brambilla, Sacchi, D’Angelo, & Ellemers, 2013). Whether morality can trigger spontaneous interpersonal behaviors remains a critical question in this context. As such, it would be key to understand how we behave when we cannot avoid interacting with a person lacking moral qualities. The present studies aimed to fill this gap by examining whether and how morality information affects spontaneous interpersonal interactions. In particular, we argued that knowing about one’s partner’s morality has a leading role over other content information (i.e., sociability and competence) in predicting automatic behavioral mimicry. Moreover, drawing from research showing the key role of morality in forming interpersonal impressions (Brambilla & Leach, 2014), we tested the possibility that the more an individual is perceived as immoral, the more it is likely to elicit negative impressions, which in turn should diminish behavioral mimicry.

Morality in Interpersonal Relationships

Through all stages of impression formation, from face perception (Todorov, Olivola, Dotsch, & Mende-Siedlecki, 2015) to information gathering (e.g., Brambilla, et al., 2011), impression updating (Brambilla, Carraro, Castelli, & Sacchi, 2019), and overall judgment of the other person (e.g., Brambilla, Sacchi, Rusconi, Cherubini, & Yzerbyt, 2012; Goodwin et al., 2014), morality has been proved to be more important than sociability (e.g., friendliness, kindness) and competence (e.g., efficiency, skillfulness). Indeed, when individuals are asked

to judge either a stranger or a known person, their overall impressions are more strongly predicted by the moral qualities of the target than by non-moral characteristics. This is by virtue of the fact that others' morality (or lack thereof) provides relevant information on whether they can be trusted and therefore whether they could be harmful (Brambilla & Leach, 2014; Brambilla, Biella, & Freeman, 2018). By contrast, sociability or competence are less useful to predict others' potential of threat (e.g., Brambilla, Sacchi, Pagliaro, & Ellemers, 2013; Willis & Todorov, 2006). Interestingly for the present research, individuals tend to place greater weight on negative than positive information about morality when forming impressions. The informational strength of negative information on morality is higher than that on other dimensions, so that a single negative morality behavior makes people unwilling to describe a person as moral. Indeed, people expect that only immoral individuals act immorally whereas both moral and immoral individuals may act morally (Reeder & Brewer, 1979), partly because moral behavior is normative and is therefore rewarded. Thus, immoral information is more diagnostic in defining the moral character of our interaction partners (Skowronski & Carlston, 1987). Moreover, since we are motivated to understand whether others might represent an opportunity or a threat (Brambilla & Leach, 2014), we place interest in evidence that falsifies moral related traits when looking for information about others (Brambilla et al., 2011).

If on the one hand research on the relevance of morality in shaping social perception is quite rich, on the other hand, less is known on the behavioral consequences of perceiving others as (im)moral. Some works have shown that the desire to interact with another person and the intention to help are better predicted by his/her morality than his/her sociability or competence (Pagliaro et al., 2013). Moreover, in a virtual reality experiment, participants were more likely to approach a confederate when s/he was described as moral rather than immoral (Iachini et al., 2015). In a similar vein, pro-social and unselfish behaviors are more

likely to occur toward social targets perceived as highly moral (Prati, Moscatelli, Van Lange, Van Doesum, & Rubini, 2018). However, as mentioned, all these studies pertain to behavioral intentions or actual behaviors that are intentionally controlled. Interestingly for our purposes, findings by Brambilla et al. (2016) showed that individuals were less eager to coordinate their movements with a dishonest rather than with an unfriendly person, suggesting that a lack of morality might inadvertently influence behavior. Yet, participants in that study were explicitly instructed to synchronize their movements with those of the partner. Thus, it remains to be examined the impact of information about the morality of an unknown other on spontaneous behaviors that are not intentionally controlled. Moreover, although previous work has clearly shown that morality affects impression formation (e.g., Brambilla et al., 2012; Skowronski & Carlston, 1987), no prior research has tested whether overall impressions resulting from others' morality drives social behaviors. More importantly, so far, no research has investigated whether explicit impression formed on the basis of the (im)morality of an interaction partner is able to predict less controlled and more automatic behavioral reactions. However, this would be key to better understand how morality influences social relations, going beyond explicit judgment.

The present research focused on these issues by examining whether knowing about others' morality (vs. sociability or competence) could affect the automatic mimicry of their gestures and whether interpersonal impressions are responsible in driving such an effect. In doing so, we tested whether the explicit attitude about an individual resulting from the perception of his/her (im)morality predicts behavioral reactions that are under less direct control.

Behavioral Mimicry and its Social Moderators

Behavioral mimicry, defined as the automatic imitation of gestures, postures, mannerisms, and other movements observed in others, is pervasive in human interactions and

occurs beyond conscious awareness. Scholars have explained spontaneous mimicry by the mechanism of the perception-behavior link: When individuals see a behavior, they construct a simulation of the observed action in the brain, which would activate the corresponding action (Chartrand, Maddux, & Lakin, 2005; Dijksterhuis & Bargh, 2001). This link is instantiated at the neural level by mirror mechanisms that make it a prepotent and difficult to control phenomenon (e.g., Dijksterhuis & Bargh, 2001; Rizzolatti & Craighero 2004). In this perspective, the mere perception of another person's action is believed to influence our behavior in a direct and unmediated manner such that we automatically behave as we perceive (i.e., seeing is like doing). In other words, our tendency to imitate others it is not necessarily motivated and does not require a decision, but rather, is a result of the way we are neurologically wired.

However, the fact that mimicry is a direct consequence of perception and occurs without conscious awareness does not preclude that it is functional and adaptive. Indeed, mimicry facilitates social interactions, brings people together, and strengthens social bonds (Hess & Fisher, 2013; Lakin, Jefferis, Cheng, & Chartrand, 2003). Therefore, motivations, goals and the characteristics of the social context could serve as its facilitators or inhibitors. Extensive research has demonstrated that we mimic friends, people we like, similar others, and ingroup members more readily than strangers, unlikeable or dissimilar persons, and outgroup members respectively (e.g., Fino, Menegatti, Avenanti, & Rubini, 2016; Gueguen & Martin 2009; Salazar Kämpf, Liebermann, Kerschreiter, Krause, Nestler, & Schmukle, 2018; Stel, Blascovich, McCall, Mastop, van Baaren, & Vonk, 2010; for reviews, see Chartrand & Lakin, 2013). Furthermore, affiliation goals are associated with enhanced mimicry (Lakin & Chartrand, 2003), whereas social stigma has negative effects on spontaneous imitation (Johnston, 2002).

Overall, supporting our contention about a possible effect of explicit attitudes towards an (im)moral partner, these studies highlighted that evaluations of another person can facilitate or inhibit the automatic tendency to mimic others' behaviors. However, they were merely focused on examining the effects of the *valence* of such attitudes, without considering that social judgments can have different *contents* and, therefore, are not all alike. As argued above, in fact, morality judgments are more relevant than those pertaining to other dimensions when it comes to judging others (Brambilla & Leach, 2014; Moscatelli, Menegatti, Albarello, Pratto, & Rubini, 2019).

In a recent review, Duffy and Chartrand (2017) have also contended that mimicry and morality are strongly interwind because mimicry fosters affective, cognitive, and behavioral prosociality. Indeed, according to their view, the fact that (emotional) mimicry facilitates trust, increases feelings of similarity, attitudes convergence, and empathy, reduces prejudice, and leads to a variety of prosocial actions, means that mimicry blurs the boundaries between self and other, reinforcing moral orientations and behaviors. However, the reverse pattern has not yet been considered. In other terms, if mimicry leads to morality-relevant behaviors, it is plausible to expect that morality would have a strong impact on mimicry.

The present research aimed to answer these open questions by examining whether morality information about an unknown partner affects the imitation of his/her gestures to a greater extent than information concerning the other main dimensions of social judgment. Importantly, given the stronger negativity effects concerning moral judgments (e.g., Brambilla et al., 2011), we tested whether this effect could be particularly pronounced when the interaction partner lacks of moral qualities and whether it could be explained by the explicit, negative impression that people form about immoral others.

Overview

Two studies examined whether morality-related information has a greater impact than sociability- (Study 1) or competence-related information (Study 2) on the spontaneous mimicry of an interaction partner during interpersonal exchanges. In both studies, we also tested whether such information differently affects participants' postural openness and the overall smoothness of the interaction. Study 2 further explored whether the impression people form about the interaction partner could be the mechanism underlying the above effects. To these aims, we video-recorded conversational interactions between participants and a confederate who was previously described as moral (vs. immoral), sociable (vs. cold), or competent (vs. incompetent). Two independent coders then rated the extent to which participants imitated three specific gestures of the confederate.

Previous research showed that positive attitudes towards an individual increase the tendency to imitate his/her gestures (Chartrand & Lakin, 2013). On its part, morality has a primary role in determining the valence of initial impressions and behavioral intentions (Brambilla et al., 2016; Iachini et al., 2015; Leach et al., 2014; Pagliaro et al., 2013). On this basis, we predicted that information about the morality of an interaction partner would have a stronger effect on spontaneous mimicry than sociability- (Study 1) or competence-related (Study 2) information. Similarly, we predicted a greater influence of the partner's morality than sociability or competence on participants' postural openness and overall interaction smoothness. Interestingly, as reviewed above, the tendency to place greater weight on the negative than positive information in social judgment is particularly pronounced for moral behaviors (e.g., Brambilla et al., 2011; 2016; Skowronski & Carlston, 1987). Therefore, we expected the hypothesized effects to be stronger when the partner was described as lacking morality vs. sociability or competence. Finally, based on previous evidence that evaluative impressions of others are primarily built on their moral character (e.g., Brambilla et al., 2011; Goodwin et al., 2014), and that people mimic more those whose characteristics are positively

evaluated (e.g., Stel et al., 2010; Lakin & Chartrand, 2003), in Study 2 we hypothesized that an interaction partner described as lacking in morality would elicit less favorable impression, which in turn should reduce the spontaneous imitation of his/her gestures during the interaction.

Study 1

Method

Participants and design. Sample size was determined before data collection. Specifically, we advertised the study on campus and all the students who responded within 10 weeks were involved in the study. Eighty-four students (66 women; $M_{\text{age}} = 25.20$, $SD = 9.14$) volunteered to participate. One participant was excluded because of unclear video acquisition in the head area. Participants were randomly assigned to the conditions of a 2 (dimension: morality, sociability) \times 2 (valence: positive, negative) design. A sensitivity analysis conducted with G*Power (Faul, Erdfelder, Buchner, & Lang, 2007) showed that our sample was sufficient to detect medium-to-large effects of $f = 0.31$ (equivalent to $\eta_{\text{part}}^2 = .09$) assuming an α of 0.05, and power of 0.80 for a between-participants ANOVA.

Procedure. Participants were asked to participate in a study on dyadic conversational dynamics, where the supposed other partner was a female confederate. Before engaging in interaction, both participant and confederate were asked to introduce themselves by writing on a sheet of paper about a recent personal experience. Then, both the participant and the confederate were given two minutes to read each other's story. In the positive morality condition, the confederate wrote that she went to the cinema and found a wallet with 300 Euros inside. She went to the reception desk and helped to find the owner. In the negative morality condition, the confederate wrote that after finding the wallet she kept the money and left the cinema. In the positive sociability condition, she wrote that she went out for dinner with a friend who had also invited some other people. Despite the fact she had not met them

before, she was friendly to everyone. In the negative sociability condition, the confederate wrote that she was rude and unfriendly with her friend's guests (for full descriptions, see Appendix). To ascertain that the vignettes employed in the study were perceived as intended, we asked 49 students to rate the extent to which the vignettes were related to morality and sociability (1 = *not at all*; 5 = *extremely*). The vignettes about confederate's morality were perceived as more related to morality ($M = 3.84$, $SD = 1.46$) than to sociability ($M = 1.80$, $SD = 0.81$), $p < .001$, whereas the vignettes about confederate's sociability were considered as more related to sociability ($M = 4.42$, $SD = 1.14$) than to morality ($M = 1.71$, $SD = 0.69$), $p < .001$, $F(1, 45) = 121.28$, $p < .001$, $\eta_{\text{part}}^2 = .73$. No other significant effect emerged, $F_s < 2.30$, $p_s > .136$. Moreover, positive vignettes were rated more positively ($M = 4.54$, $SD = 0.76$) than negative ones ($M = 2.17$, $SD = 1.15$), $F(1, 45) = 72.40$, $p < .001$, $\eta_{\text{part}}^2 = .62$, irrespectively of the morality or sociability content. No other effect was significant, $F_s < 1.56$, $p_s > .22$.

After reading each-other's stories, as a manipulation check, participants were asked to evaluate the confederate on her morality and sociability (1 = *not at all*; 7 = *extremely*)¹. Then, the participant and the confederate were invited to discuss about their experience as university students. The conversation lasted about 5 minutes and was video recorded. When the time was up, the experimenter entered the room, interrupted the conversation, and fully debriefed the participant. No participant expressed the suspicion that the other person was a confederate and that the study concerned his/her imitation of the confederate's gestures. The confederate had been previously trained to perform three specific movements in sequence, rubbing the arm, touching the face, and moving the head, with an interval between them during which she was instructed to refrain to do any other gesture. We chose these three movements because they can be easily considered as part of spontaneous mannerisms during conversations, and therefore they can be easily considered as natural gestures – at least in the Italian context (e.g., Diadori, 1990; Kendon, 1992; Iverson, Capirci, Volterra, & Goldin-Meadow, 2008). To

ascertain that the confederate performed the same gestures in all experimental conditions, we asked two independent judges, blind to the conditions, to watch the videos and rate (1 = *not at all*; 4 = *very much*) the extent to which the confederate performed the three planned behaviors throughout the interaction ($\alpha_{\text{coder1}} = .81$, $\alpha_{\text{coder2}} = .81$; ICC = .76). They also rated the extent to which the confederate appeared to behave in a spontaneous and unscripted way (spontaneity; $\alpha_{\text{coder1}} = .78$, $\alpha_{\text{coder2}} = .80$; ICC = .51), and appeared tense, in a good mood (reversed), or hostile (tension; $\alpha_{\text{coder1}} = .55$, $\alpha_{\text{coder2}} = .89$; ICC = .57). A series of 2 (dimension: morality, sociability) \times 2 (valence: positive, negative) ANCOVAs, with participant gender as covariate, showed no significant effects on the averaged ratings of confederate's movements ($\bar{M} = 2.76$, $SD = 0.67$), $F_s < 0.63$, $p_s > .431$, spontaneity ($\bar{M} = 3.03$, $SD = 0.52$), $F_s 2.11$, $p_s > .150$, or tension ($\bar{M} = 1.92$, $SD = 0.52$), $F_s < 0.32$, $p_s > .572$. We can therefore be quite confident that the confederate did not vary her behavior across the experimental conditions.

To measure behavioral mimicry, two further independent judges, blind to the experimental conditions, were instructed to watch the videos (without audio) and to evaluate the extent to which participants imitated the three gestures performed by the confederate, as well as her mannerisms in general (4 items, $\alpha_{\text{coder1}} = .71$; $\alpha_{\text{coder2}} = .87$) on a 4-points Likert scale (1 = *very little*; 2 = *little*; 3 = *much*; 4 = *very much*). The judges were instructed to make a global judgment based on their holistic impression of mimicry, considering both the similarity between gestures and the amount of the imitation (for a similar procedure see, Salazar Kämpf et al., 2018). As previously suggested (Salazar Kämpf et al., 2018), a macro-level behavioral measure is more adequate than a micro-level measure (e.g., counting the number of imitative behaviors) to capture the psychological meaning of the action (Sherman, Nave, & Funder, 2009). The coders also evaluated the extent to which participants made gestures that were unrelated to imitation². Finally, they rated participants' postural openness and closure ($\alpha_{\text{coder1}} = .76$; $\alpha_{\text{coder2}} = .89$), and the smoothness of the overall interaction (1 = *very*

little; 4 = *very much*). They were told that they could watch the videos as many times as they needed to provide their ratings.

Results

Table 1 displays means and standard deviations for overall mimicry, postural openness and smoothness of the interaction. All data are publicly available at: <https://osf.io/pf532/>

Manipulation check. A 2 (dimension) \times 2 (valence) \times 2 (trait: morality, sociability; within participants) ANOVA revealed a main effect of trait, $F(1, 79) = 7.29, p = .008, \eta_{\text{part}}^2 = .084$, and a significant trait \times valence interaction, $F(1, 79) = 7.60, p = .002, \eta_{\text{part}}^2 = .117$, which was qualified by the significant three-way interaction, $F(1, 79) = 46.57, p < .001, \eta_{\text{part}}^2 = .371$. The manipulation of morality was effective, since participants considered the confederate as more moral in the positive ($M = 6.25, SD = 1.48$) than in the negative morality condition ($M = 3.00, SD = 1.54$), $t(39) = 6.86, p < .001, d = 2.14, 95\% \text{ CI } [1.34, 2.86]$. No difference was found between the positive ($M = 5.19, SD = 0.93$) and negative sociability conditions ($M = 5.10, SD = 1.09$), $t(40) = 0.35, p = .762$. Supporting the sociability manipulation, participants considered the confederate as more sociable in the positive ($M = 6.00, SD = 0.77$) than in the negative sociability condition ($M = 4.95, SD = 1.16$), $t(40) = 3.34, p = .001, d = 1.07, 95\% \text{ CI } [0.40, 1.69]$. No difference was found between positive ($M = 5.30, SD = 0.98$) and negative morality conditions ($M = 4.71, SD = 1.06$), $t(39) = 1.84, p = .093$.

Mimicry. The intercoder reliability between the mean evaluations of participants' mimicry, assessed with an intraclass correlation analysis, was strong ($ICC = .72$). Thus, we averaged the responses of the two coders to obtain an overall mimicry index. The overall mimicry index was submitted to a 2 (dimension: morality, sociability) \times 2 (valence: positive, negative) ANCOVA with participant gender as covariate. Results revealed a significant main effect of valence, $F(1, 78) = 9.05, p = .004, \eta_{\text{part}}^2 = .104$, with higher mimicry in the positive ($M = 2.50, SD = 0.61$) than negative condition ($M = 2.09, SD = 0.73$). Dimension did not

significantly affect mimicry, $F(1, 78) = 1.97, p = .165$. In line with the hypothesis, the interaction was significant, $F(1, 78) = 6.78, p = .011, \eta_{\text{part}}^2 = .080$. Participants mimicked the confederate less when she reported negative morality, compared to negative sociability episodes, $t(40) = 2.73, p = .031, d = 1.14, 95\% \text{ CI } [0.47, 1.77]$, whereas no difference emerged between the positive morality and sociability conditions, $t(39) = -0.76, p = .448$. Mimicry was higher in the positive compared to negative morality condition, $t(39) = 4.92, p < .001, d = 1.54, 95\% \text{ CI } [0.80, 2.21]$. There was no difference between the positive and negative sociability conditions, $t(40) = 0.23, p = .820$.

Postural openness. The same ANCOVA performed on the postural openness index averaged between the coders ($\text{ICC} = .61$), showed a main effect of dimension, $F(1, 78) = 5.50, p = .022, \eta_{\text{part}}^2 = .066$, due to higher scores in the sociability ($M = 3.04, SD = 0.69$) than in the morality condition ($M = 2.72, SD = 0.76$). The effect of valence was significant, $F(1, 78) = 5.55, p = .021, \eta_{\text{part}}^2 = .066$, with greater postural openness in the positive ($M = 3.07, SD = 0.61$) than in the negative ($M = 2.70, SD = 0.74$) condition. The valence \times dimension interaction was significant, $F(1, 78) = 5.61, p = .020, \eta_{\text{part}}^2 = .067$. Participants' posture was less open when the confederate described a negative morality, compared to negative sociability episode, $t(40) = 3.24, p = .002, d = 1.00, 95\% \text{ CI } [0.34, 1.62]$. No difference emerged between the positive morality and sociability conditions, $t(39) = -0.21, p = .838$. Postural openness was higher in the positive compared to negative morality condition, $t(39) = 3.39, p = .002, d = 1.05, 95\% \text{ CI } [0.38, 1.68]$, whereas no difference emerged between the positive and negative sociability condition, $t(40) = 0.06, p = .95$.

Smoothness of the interaction. The same ANCOVA performed on the smoothness of the interaction averaged between the two coders ($\text{ICC} = .72$) revealed that the effects of valence, $F(1, 78) = 1.99, p = .163$, and dimensions $F(1, 79) = .445, p = .507$, were not significant. As expected, the dimension \times valence interaction was significant, $F(1, 78) = 5.12,$

$p = .026$, $\eta_{\text{part}}^2 = .062$. The interaction between the participants and the confederate was smoother in the positive than negative morality condition, $t(39) = 2.64$, $p = .012$, $d = 0.83$, 95% CI [0.18, 1.45], whereas no difference emerged between the positive sociability and morality conditions, $t(39) = -1.32$, $p = .196$. Moreover, the interaction tended to be less smooth in the negative morality than sociability condition, although the difference did not reach full significance, $t(40) = 1.95$, $p = .058$, $d = 0.60$, 95% CI [-0.02, 1.21]. No difference was found between the positive and negative sociability conditions, $t(40) = -0.60$, $p = .553$. The ANCOVA provided no other significant effects, $F_s < 1.99$, $p_s > .163$.

Study 2

Study 1 provided converging evidence that information concerning the immorality of an unknown person could inhibit the imitation of her gestures during spontaneous conversational interactions. Moreover, when participants interacted with a person lacking morality, they tended to show a closer posture, thus signaling the implicit need to distance themselves from the other person. Finally, a third part observer perceived the interactions as less smooth in such a condition. Study 2 aimed at replicating and extending these findings. In this Study the effects of morality- related information about others on spontaneous mimicry were compared to those of competence-related information. This should prove that the findings we highlighted in Study 1 were not limited to differences between morality and sociability judgments. Moreover, we tested a possible mediational mechanism that could explain the above effects. To this aim, before the interaction, we asked participants to express their global impression of the interaction partner. Then, we examined whether this explicit and deliberative judgment could account for the effects of morality on the inhibition of automatic mimicry.

Method

Participants and design. We aimed at collecting the same number of participants employed in Study 1. Eighty-eight students (57 women; $M_{age} = 23.07$, $SD = 3.30$) volunteered to participate in the study. They were randomly assigned to the conditions of a 2 (dimension: morality, competence) \times 2 (valence: positive, negative) design. A sensitivity analysis showed that our sample was sufficient to detect medium-to-large effects of $f = 0.30$ (equivalent to $\eta_{part}^2 = .085$) assuming an α of .05, and power of .80 for a between-participants ANOVA.

Procedure. The procedure was the same as in Study 1, except for the competence manipulation. In the positive competence condition, the confederate wrote about an episode describing how she was praised by her supervisor for her performance in a project that brought the company considerable profits. In the negative competence condition, the confederate wrote that she made a technical error at work, the error was acknowledged by her supervisor and resulted in a considerable loss for the company (for full description, see Appendix). Forty-five students rated the extent to which the vignettes were perceived as intended. The vignettes on confederate's morality were considered as more related to morality ($M = 4.20$, $SD = 1.17$) than to competence ($M = 2.09$, $SD = .91$), $p < .001$, whereas the vignettes on confederate's competence were rated as more related to competence ($M = 4.16$, $SD = .94$) than to morality ($M = 2.61$, $SD = 1.04$), $p < .001$, $F(1,43) = 140.82$, $p < .001$, $\eta_{part}^2 = .77$. Positive vignettes were rated more positively ($M = 4.74$, $SD = .45$) than negative vignettes ($M = 1.25$, $SD = .44$), $F(1,43) = 932.88$, $p < .001$, $\eta_{part}^2 = .96$. No other effect was significant, $F_s < 0.96$, $p_s > .33$.

After reading the stories, participants were asked to report their impression of the partner without revealing the score to one other ($-3 = \textit{extremely negative}$, $+3 = \textit{extremely positive}$). Then, as in Study 1, participants evaluated the confederate on morality and competence. The conversational interaction between was structured as in Study 1. During the

debriefing, no participant expressed the suspicion that the other person was actually a confederate and that the study concerned his/her imitation of the confederate's gestures. Two judges rated the extent to which the confederate performed the planned behaviors ($\alpha_{\text{coder1}} = .58$, $\alpha_{\text{coder2}} = .58$; ICC = .61), seemed spontaneous ($\alpha_{C1} = .55$, $\alpha_{C2} = .68$; ICC = .59), and appeared tense ($\alpha_{\text{coder1}} = .78$, $\alpha_{\text{coder2}} = .74$; ICC = .58). A series of 2 (dimension) \times 2 (valence) ANOVAs, with participant gender as covariate, showed no significant effects on confederate behavior ($\bar{M} = 2.48$, $SD = 0.41$), $F_s < 2.41$, $p_s > .125$, spontaneity ($\bar{M} = 3.08$, $SD = 0.42$), $F_s < 2.55$, $p_s > .114$, or tension ($\bar{M} = 1.80$, $SD = 0.42$), $F_s < 0.64$, $p_s > .425$, supporting that the confederate did not vary her behavior among experimental conditions.

Then, behavioral mimicry was rated by two further coders with the same procedure as in Study 1 ($\alpha_{\text{coder1}} = .79$; $\alpha_{\text{coder2}} = .67$). Each coder also rated the extent to which participants performed gestures unrelated to the imitation³, their postural openness ($\alpha_{\text{coder1}} = .65$; $\alpha_{\text{coder2}} = .74$), and the smoothness of the interaction.

Results

Table 2 displays means and standard deviations for impression, mimicry, postural openness, and smoothness of the interaction.

Manipulation check. A 2 (dimension: morality, competence) \times 2 (valence: positive, negative) \times 2 (trait: morality, competence; within participants) ANOVA revealed a trivial main effect of trait, $F(1, 84) = 10.86$, $p = .001$, $\eta_{\text{part}}^2 = .115$. The analysis also showed significant trait \times dimension, $F(1, 84) = 7.69$, $p = .007$, $\eta_{\text{part}}^2 = .084$, and trait \times valence interactions, $F(1, 84) = 16.47$, $p < .001$, $\eta_{\text{part}}^2 = .164$, which were qualified by the three-way interaction, $F(1, 84) = 54.87$, $p < .001$, $\eta_{\text{part}}^2 = .395$. The manipulation of morality was effective: Participants considered the confederate as more moral in the positive ($M = 6.50$, $SD = 1.26$) vs. negative morality condition ($M = 3.09$, $SD = 1.74$), $t(42) = 7.42$, $p < .001$, $d = 2.24$, CI [1.46, 2.95], whereas no difference was found between positive ($M = 5.17$, $SD = 0.94$) and

negative competence conditions ($M = 5.62$, $SD = 0.97$), $t(42) = 7.42$, $p = .130$. Supporting the effectiveness of the competence manipulation, participants attributed more competence to the confederate in the positive ($M = 5.70$, $SD = 0.63$) vs. negative competence condition ($M = 5.24$, $SD = 0.77$), $t(42) = 2.16$, $p = .036$, $d = 0.86$, $CI [0.23, 1.47]$. No difference emerged between the positive ($M = 5.77$, $SD = 0.81$) and negative morality condition ($M = 5.45$, $SD = 0.67$), $t(42) = 1.42$, $p = .164$.

Impression. A 2 (dimension: morality, competence) \times 2 (valence: positive, negative) ANCOVA on the global impression toward the confederate with participant gender as covariate was performed. Results showed a main effect of valence, with impression being more favorable in the positive ($M = 1.96$, $SD = 1.02$) vs. negative condition ($M = 0.49$, $SD = 1.32$), $F(1, 83) = 40.68$, $p < .001$, $\eta_{\text{part}}^2 = .329$. The effect of dimension was not significant, $F(1, 83) = 1.59$, $p = .211$. The significant interaction, $F(1, 83) = 16.68$, $p < .001$, $\eta_{\text{part}}^2 = .167$, revealed that the impression toward the confederate was more favorable in the positive morality than in the positive competence condition, $t(43) = -2.11$, $p = .040$, $d = 0.63$, 95% $CI [-1.22, -0.02]$, and less favorable in the negative morality than in the negative competence condition, $t(41) = 3.61$, $p = .001$, $d = 1.10$, 95% $CI [0.44, 1.72]$. The impression was also more favorable in the positive than in the negative morality condition, $t(42) = 7.40$, $p < .001$, $d = 2.23$, 95% $CI [1.44, 2.94]$. No difference emerged between positive and negative competence conditions, $t(42) = 1.58$, $p = .121$.

Mimicry. The same ANCOVA performed on the overall mimicry index averaged between the coders ($ICC = .71$) showed a main effect of valence, with mimicry being higher in the positive ($M = 2.28$, $SD = 0.48$) than in the negative condition ($M = 2.04$, $SD = 0.58$), $F(1, 83) = 5.20$, $p = .025$, $\eta_{\text{part}}^2 = .059$. The trivial main effect of dimension showed that mimicry was lower in the morality ($M = 2.04$, $SD = 0.53$) than in the competence condition ($M = 2.29$, $SD = 0.53$), $F(1, 83) = 4.40$, $p = .039$, $\eta_{\text{part}}^2 = .050$. The hypotheses were supported

by the significant interaction, $F(1, 83) = 7.48, p = .008, \eta_{\text{part}}^2 = .083$. Participants mimicked the confederate less when she described a negative morality than competence behavior, $t(41) = 3.50, p = .001, d = 1.06, 95\% \text{ CI } [0.40, 1.67]$. No difference emerged between positive morality and competence conditions, $t(43) = -0.32, p = .751$. Moreover, mimicry was higher in the positive vs. negative morality condition, $t(42) = 3.88, p < .001, d = 1.17, 95\% \text{ CI } [0.51, 1.79]$, whereas there was no difference between the positive and negative competence conditions, $t(42) = -0.37, p = .711$.

Postural openness. The ANCOVA on postural openness averaged between the coders ($\text{ICC} = .72$) showed a main effect of valence, $F(1, 83) = 15.37, p < .001, \eta_{\text{part}}^2 = .156$, due to higher scores in the positive ($M = 2.57, SD = 0.60$) vs. negative condition ($M = 2.13, SD = 0.60$). There was a trivial main effect of dimension with higher openness in the competence ($M = 2.45, SD = 0.66$) than morality condition ($M = 2.26, SD = 0.60$), $F(1, 83) = 6.50, p = .013, \eta_{\text{part}}^2 = .073$. As expected, the interaction was significant, $F(1, 83) = 8.88, p = .004, \eta_{\text{part}}^2 = .097$. Participants displayed less postural openness in the negative morality than competence condition, $t(41) = 2.92, p = .006, d = 0.89, 95\% \text{ CI } [0.26, 1.52]$, with no difference between the positive morality and competence conditions, $t(43) = -0.32, p = .751$. Moreover, their posture was less open in the negative than in the positive morality condition, $t(42) = 5.07, p < .001, d = 1.52, 95\% \text{ CI } [0.83, 2.16]$. No difference emerged between the positive and negative competence conditions, $t(42) = 0.70, p = .488$.

Smoothness of the interaction. The ANCOVA performed on the smoothness of the interaction ($\text{ICC} = .67$) revealed a main effect of valence, $F(1, 83) = 7.88, p = .006, \eta_{\text{part}}^2 = .087$, with higher smoothness when the confederate reported a positive ($M = 3.06, SD = 0.64$) than a negative event ($M = 2.60, SD = 0.88$). There was no effect of dimension, $F(1, 83) = 2.08, p = .153$. The interaction was significant, $F(1, 83) = 4.00, p = .046, \eta_{\text{part}}^2 = .046$. The interaction was less smooth when the confederate reported a negative moral than competent

behaviour, $t(41) = 2.30$, $p = .026$, $d = 0.69$, 95% CI [0.07, 1.30]. No difference emerged between positive morality and competence conditions, $t(43) = -0.36$, $p = .722$. The interaction was also smoother when the confederate reported a positive than negative moral behavior, $t(42) = 3.80$, $p < .001$, $d = 1.14$, 95% CI [0.49, 1.76]. The positive and negative competence conditions did not significantly differ, $t(42) = 0.48$, $p = .635$.

Mediation analysis. We conducted a moderated mediation analyses using PROCESS macro (Hayes, 2013; model 7, 5000 bootstrap resampling) with “valence” as independent variable (0 = positive, 1 = negative), “dimension” as moderator (0 = competence, 1 = morality), “impression” as mediator, and “mimicry” as dependent variable. Results showed a significant valence \times dimension interaction on impression, $b = -1.90$, $SE = .46$, $p < .001$, 95% CI [-2.81, -0.99], which in turn was associated to behavioral mimicry, $b = .24$, $SE = .04$, $p < .001$, 95 % CI [.15, .32]. The confidence interval for the index of moderated mediation (Hayes, 2015) confirmed that the mediation of impression on the relation between valence and mimicry was moderated by dimension, estimate = $-.45$, $SE = .15$, 95 % CI [-.79, -.21]. Conditional indirect effects indicated that impression acted as mediator in the morality, $b = -.57$, $SE = .14$, 95 % CI [-.88, -.33], but not in the competence condition, $b = -.12$, $SE = .08$, 95 % CI [-.29, .02]. Thus, when the information about the confederate was negative and referred to morality, the overall impression was less favorable, and this in turn reduced mimicry.

General Discussion

When we interact with others lacking morality, the ubiquitous tendency to automatically imitate their gestures is reduced. The present research consistently demonstrated this effect by comparing morality with the two other main dimensions of social judgment (Leach et al., 2007) – sociability (Study 1) and competence (Study 2) - and by measuring behavioral mimicry during spontaneous interactions. When the interaction partner was described as lacking in moral qualities, mimicry was lower than when she was described

as highly moral, unsociable or incompetent. Moreover, knowing that the other person behaved immorally produced a negative impression, which in turn hindered behavioral mimicry. Thus, negative information per se is not enough to reduce mimicry: It needs to be anchored to someone's moral character. Indeed, our participants mimicked competent and incompetent others, as well as sociable and unsociable others to a similar extent.

Morality and mimicry are for social regulation

Overall, the present findings demonstrated the power of morality over other dimensions of social judgment in affecting behaviors that people do not consciously control. Thus, this research contributes to one of the underdeveloped issues in the existing literature, that is, the concrete implications of judgments resulting from moral information for specific situations and actual behaviors (Ellemers, van der Toorn, Paunov, & van Leeuwen, 2019). Our results on less controlled reactions converged with previous works on deliberate behavioral intentions (e.g., Pagliaro et al., 2013; Prati et al., 2018) in suggesting a general estrangement from those who are characterized by weak moral character. This is also supported by the fact that participants tended to show a closer posture when the confederate was described as lacking morality, a signal they tried to distance themselves from the confederate. In this condition, the interaction was also evaluated as less smooth, thus suggesting, in line with previous research (see, Chartrand & Lakin, 2013), that when mimicry is absent the relation between interaction partners suffers.

It is now established that behavioral mimicry can be considered as the essential expression of the perception-behavior link “we act as we see” and is therefore an automatic response. Nevertheless, it is also functional, in the sense that this automatic association could be regulated by specific factors and information provided by the context (i.e., morality information about the interaction partner; Chartrand et al., 2005; Dijksterhuis & Bargh, 2001; Hess & Fisher, 2013). This is also in line with recent social neuroscience research showing an

early neural processing of socially relevant cues within a few milliseconds of exposure (e.g., Avenanti, Candidi, & Urgesi, 2013). Assuming this perspective, we could interpret our results as a spontaneous inhibition of the imitative behavior caused by the mimickee's lack of morality. In this vein, enhanced or reduced mimicry of moral and immoral persons is likely to reflect the late peripheral correlates of an early and dynamic integration of social cues with evaluative contextual information that rely on simultaneously top-down and bottom-up processes (see, Barret, Lindquist, & Gendron, 2007; Fino et al., 2016; in press).

It is noteworthy that our results clearly showed that only negative morality information and the relative impression have the function of interfering with the default option that perception does lead to action. Conversely, exactly because mimicry is a spontaneous reaction, we did not find differences for negative and positive information concerning information on sociability or competence, which are relatively less important for the regulation of interpersonal behaviors. In the same line of reasoning, our key finding that mimicry is reduced when the interaction partner lacks morality, demonstrates that the stronger negativity effect that characterizes the moral dimension is not restricted to social judgment and impression formation (e.g., Brambilla et al., 2011; Skowronski & Carlston, 1987), but applies also to actual behaviors. Moreover, it suggests that negative social judgments are not enough to regulate automatic behaviors, but they need to be based on the negative side of the moral dimension. Specifically, it is plausible that people would use moral judgments to distance themselves from immoral others through the reduced imitation of their gestures.

In this vein, the present findings further highlighted the evolutionary and adaptive function of behavioral mimicry as a means to keep from affiliate with potentially harmful individuals. Mimicry has been defined as a “natural social glue that binds and bonds humans together” (Chartrand et al. 2005, p. 357), because it enhances rapport, leads to greater liking, facilitates trust and empathy, increases feelings of similarity and self-other merging in daily

life (Chartrand & Lakin, 2013). But these are not the kind of outcomes that we want to achieve with immoral others. To put it differently, the present findings suggest that mimicry – or its reduction – could serve this function and keep us from “binding and bonding” with persons whom we cannot trust to be honest, sincere, fair and loyal.

Of course, we cannot be completely sure that our participants did not deliberately decide to refrain from mimicking the confederate. For instance, it is possible that in the negative morality condition they were more attuned to the confederate’s gestures that signal the embarrassment of having “confessed” a dishonest episode. This in turn could have prevented participants to imitate her behavior. However, in our view, it is unlikely that participants controlled their behavior throughout an entire, complex conversation such as the one considered in this set of studies.

The present findings also extend the literature on behavioral mimicry by showing that morality-related information about others is an additional critical moderator of automatic imitation. Previous research has found that being mimicked encourages trust and prosocial orientation within and beyond the dyad (for a review, see Duffy & Chartrand, 2017). Here, we took a different perspective and demonstrated that mimicry is also moderated by basic information about others’ morality, and that this effect is mediated by overall impression. Thus, impression formation is a key process in explaining why we mimic some people less than others.

Finally, but not less important, we believe that our findings have twofold implications for theorization on the processes underlying behavioral mimicry. On the one hand, we found support for the notion that behavioral mimicry is the chief expression of the perception-behavior link. Indeed, our participants tended to imitate the confederate’s gestures in all conditions ... except when she was described as relatively immoral. This was the only case in which the means were lower than the middle point of the scale, showing that there was very

little mimicry. Thus, we found convergent and further evidence to support the contention that imitative behaviors do not need other mechanism or factors to be activated, but still they could be inhibited in specific circumstances (Dijksterhuis & Bargh, 2001). However, the present research highlighted that these inhibiting factors should be relevant for the regulation of social interactions and relations, as morality essentially is.

Limits and future directions

One of the novelties of the present studies is that in measuring behavioral mimicry we considered coders' perception of both the "quantity" and the "quality" of the imitation. Still, one might argue that this measure lacks in objectivity. As we mentioned before, mimicry is conventionally measured through the number of times in which a behavior is completed or the proportion of time spent imitating. However, it should also be noticed that the majority of these studies measured mimicry while participants were watching a video with the target person performing a certain gesture, whereas only few of them measured mimicry in more complex interactions (e.g., Chartrand & Bargh, 1999; Lakin et al., 2008) during which the partners are unlikely to perform *exactly* the same gestures. Therefore, if we had relied simply on quantitative measures, we would have risked missing participants' imitative gestures that were very similar (but not identical) to those of the confederate (for a discussion on how subjective measures of behavior could provide more valid measures of psychological constructs than objective measures, see Sherman et al., 2009). That said, it should be noted that, in some cases, the interclass correlations were less than perfect. Thus further research might be necessary to verify whether our effects could be detected also by employing more "objective" evaluations of mimicry, including psycho-physiological measures (e.g., EMG, facial recognition of expressions, etc). In the same line of reasoning, future research might investigate whether the judgments of low morality lead to a global reaction that involves the activity of brain structures, such as the amygdala (which is implicated in the detection of

potentially harmful stimuli, Winston, Strange, O'Doherty, & Dolan, 2002), automatic or spontaneous reactions, such as the management of physical distance (Iachini et al., 2015) or the reduction of behavioral mimicry/synchrony (Brambilla et al., 2016), and more deliberate, conscious reactions, such as deciding to help others (Pagliaro et al., 2013; Prati et al., 2018) or impression updating and management (Brambilla et al., 2018; Pagliaro, Ellemers, Barreto, & Di Cesare, 2016).

Another limitation of the present studies was that the confederates were both women, therefore it was not possible to test the combined effects of confederate's and participants' gender. Indeed, previous research has shown that people mimic more ingroup than outgroup members (Fino et al., in press; Stel et al., 2010; Yabar et al., 2016). Moreover, due to their higher level of emotional empathy, women tend to display more pronounced, even of not qualitatively different mimicry than males (Dimberg & Ludqvist, 1990) and to rely more on other's expressions than man do (Stel & van Knippenberg, 2008). Considering this evidence, one might expect higher mimicry among female participants. Future research could employ a more balanced sample and vary the confederate's gender in order to explore this possibility. A further even more compelling effect of confederate's gender that future research could address is related to the stereotypical expectations according to which women are generally seen as "nice but incompetent" and men as "competent but maybe not so nice" (Fiske, 1998, p. 377). As a consequence of such beliefs, the counter-stereotypic descriptions of the female interaction partner (i.e., negative sociability and positive competence conditions) could trigger a sort of "backlash" (see, Rudman & Glick, 2001), that is a less favorable impression and, in turn, less imitation of the confederate.

A final limitation of the present work is that our sample size was able to detect medium-to-large effects, thus it would be important to replicate our findings with larger samples. Nevertheless, the fact that we obtained very consistent results across coders,

measures (mimicry, posture openness, and smoothness of interaction), and studies speaks of the robustness and reliability of our effects.

Conclusion

Overall, the present research highlighted that the judgments formed on the basis of other's morality serve as guideline for the imitative behaviors that are functional to regulate social interactions. As much as people automatically do what they see, they can “block” such automatic reaction when the interaction partner could not be trusted to do what is considered right. We started this paper by wondering what people would do if they could not avoid interaction with someone lacking in morality. Now we can answer that they would spontaneously reduce imitation of their gestures as an implicit signal that they had formed a negative impression of their character.

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Footnotes

¹ We also measured the extent to which participants attributed morality, sociability, and competence to the self and their emotions in both studies. These data were not analysed in the present paper.

² The ANOVA on gestures unrelated to imitation ($ICC = .72$) did not yield any significant effect: dimension, $F(1, 79) = 1.97, p = .165$, valence, $F(1, 79) = .479, p = .491$, dimension \times valence, $F(1, 79) = .343, p = .560$. Moreover, adding this variable as covariate in the analyses on mimicry, smoothness of the interaction, and postural openness did not alter the pattern of results.

³ A 2 (dimension) \times 2 (valence) ANOVA performed on the gestures unrelated to imitation ($ICC = .83$) did not yield any significant effect: dimension, $F(1, 84) = 2.99, p = .087$, valence, $F(1, 84) = 2.84, p = .096$, dimension \times valence, $F(1, 84) = .025, p = .620$. Moreover, adding this variable as covariate in the analyses on mimicry, smoothness of the interaction, and postural openness did not alter the pattern of results.

Table 1. Means (Standard Deviations) of Mimicry, Postural Openness, and Smoothness of the Interaction as a Function of Dimension and Valence of Confederate's Behavior

	Morality		Sociability	
	Positive	Negative	Positive	Negative
Mimicry	2.58 (0.46)	1.80 (0.54)	2.43 (0.73)	2.38 (0.79)
Postural openness	3.09 (0.64)	2.37 (0.71)	3.05 (0.60)	3.04 (0.61)
Smoothness	2.70 (0.68)	2.14 (0.67)	2.45 (0.52)	2.57 (0.76)

Table 2. Means (Standard Deviations) of Impression, Mimicry, Postural Openness, and Smoothness of the Interaction as a Function of Dimension and Valence of Confederate's Behavior

	Morality		Competence	
	Positive	Negative	Positive	Negative
Impression	2.27 (0.88)	-0.14 (1.25)	1.65 (1.07)	1.14 (1.06)
Mimicry	2.31 (0.45)	1.77 (0.47)	2.26 (0.51)	2.32 (0.57)
Postural openness	2.63 (0.54)	1.89 (0.41)	2.52 (0.66)	2.38 (0.67)
Smoothness	3.09 (0.45)	2.32 (0.84)	3.02 (0.79)	2.90 (0.83)