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Automatic imitation of pro- and antisocial gestures: Is implicit social behavior censored?☆

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ABSTRACT

According to social reward theories, automatic imitation can be understood as a means to obtain positive social consequences. In line with this view, it has been shown that automatic imitation is modulated by contextual variables that constrain the positive outcomes of imitation. However, this work has largely neglected that many gestures have an inherent pro- or antisocial meaning. As a result of their meaning, antisocial gestures are considered taboo and should not be used in public. In three experiments, we show that automatic imitation of symbolic gestures is modulated by the social intent of these gestures. Experiment 1 (N = 37) revealed reduced automatic imitation of antisocial compared with prosocial gestures. Experiment 2 (N = 118) and Experiment 3 (N = 118) used a social priming procedure to show that this effect was stronger in a prosocial context than in an antisocial context. These findings were supported in a within-study meta-analysis using both frequentist and Bayesian statistics. Together, our results indicate that automatic imitation is regulated by internalized social norms that act as a stop signal when inappropriate actions are triggered.

1. Introduction

The propensity to imitate is well documented in psychological science (Chartrand & van Baaren, 2009; Heyes, 2011). That is, there is now strong evidence that individuals unintentionally imitate the actions (Brass, Bekkering, Wohlschläger, & Prinz, 2000; Chartrand & Bargh, 1999; Genschow, Florack, & Wanke, 2013), postures (Scheflen, 1964), facial expressions (Dimberg, Thunberg, & Elmehed, 2000), and speech patterns (Bock, 1986) of the people they interact with. According to ideomotor theory, these imitative tendencies are the result of shared perception-action representations in the brain (Brass et al., 2000). In particular, it is assumed that the visual image of an action is part of its motor representation and therefore that observed actions trigger an automatic imitative response (Brass et al., 2000). Interestingly, imitation is known to have important social benefits in the sense that it smooths social interaction (Chartrand & Bargh, 1999), increases prosocial behavior (van Baaren, Holland, Kawakami, & van Knippenberg, 2004), and facilitates empathy (De Coster, Verschuere, Goubert, Tsakiris, & Brass, 2013). As a result, it has been suggested that automatic imitation is an inherently social phenomenon (van Baaren, Janssen, Chartrand, & Dijksterhuis, 2009) that is driven by the social profits it generates (Lakin, Jefferis, Cheng, & Chartrand, 2003; Stel, van Dijk, & van Baaren, 2016; Wang & Hamilton, 2012). Specifically, it has been argued that operant conditioning causes individuals to associate imitative responses with social reward, which in turn leads them to use imitation, be it conscious or subconscious, as a means to facilitate social interaction (Lakin et al., 2003; Stel et al., 2016; Wang & Hamilton, 2012).

However, the potential of imitation to produce social profit is constrained by contextual bounds. As a result, social reward theories predict that imitative tendencies should be reduced when the context makes it unlikely that they will lead to positive social outcomes (Stel et al., 2016; Wang & Hamilton, 2012). For example, it is doubtful that imitation will facilitate social interaction when the imitated person is not looking at the imitator (Wang & Hamilton, 2012). From a social reward perspective, the absence of eye contact should thus result in weaker automatic imitation, which has now been confirmed across multiple studies (Forbes, Wang, & Hamilton, 2016; Wang & Hamilton, 2014; Wang, Newport, & Hamilton, 2011). Moreover, if there are no constraints in the environment, social reward theories predict that automatic imitation should depend on the individual's motivation to interact with others. In support, research has reported increased imitative tendencies in situations

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that promote affiliation (Butler, Ward, & Ramsey, 2016; Genschow & Schindler, 2016; Lakin & Chartrand, 2003; Rauchbauer, Majdandžić, Hummer, Windischberger, & Lamm, 2015), stimulate prosocial attitudes (Leighton, Bird, Orsini, & Heyes, 2010; Wang & Hamilton, 2013), or signal threat (Grecucci, Koch, & Rumiati, 2011; Rauchbauer, Majdandžić, Stieger, & Lamm, 2016; Rauchbauer et al., 2015), but decreased imitative tendencies in situations that emphasize self-focus (Hogeveen & Obhi, 2011; Spengler, Brass, Kühn, & Schütz-Bosbach, 2010).

In sum, previous research suggests that automatic imitation is stronger when it has the potential to generate social reward (Lakin et al., 2003; Stel et al., 2016; Wang & Hamilton, 2012). However, does this mean that individuals imitate all behavior indiscriminately as long as they are motivated to affiliate and are in a context that allows affiliation? This is important because gestures in daily life are often used in a symbolic manner as a shorthand for social communication (Morris, 1994). For example, an upwards extension of the thumb can be used to demonstrate approval (i.e., thumbs up) and an upwards extension of the middle finger can be used to communicate insult (i.e., middle finger). Nevertheless, even though communicative gestures are highly prevalent in everyday life, most automatic imitation studies have instead focused on simple actions without a symbolic meaning (Brass, Bekkering, & Prinz, 2001; Brass et al., 2000; Catmur & Heyes, 2011; Heyes, 2011).

As an important exception, a single study looked at automatic imitation of communicative and non-communicative gestures performed by either a human or nonhuman agent (Liepelt, Prinz, & Brass, 2010). The results revealed less imitation of the nonhuman agent compared with the human agent when a communicative action was performed (e.g., peace sign) but not when a non-communicative action was performed (e.g., grasping). However, albeit interesting, this study was silent on whether imitative tendencies depend on the social message expressed by the observed gesture. If automatic imitation is driven by its social consequences, as previous research suggests (Stel et al., 2016; Wang & Hamilton, 2012), then it should be modulated by the degree to which an imitative response would be inappropriate according to the dominant social norm (Cialdini, Reno, & Kallgren, 1990). In particular, the social norm dictates that offensive gestures ought not to be used in public. As a result, if imitation would lead to the execution of a taboo gesture, then it should be inhibited to prevent norm violation.

In line with this hypothesis, research on word production has found an increase in response inhibition when participants are at risk of making a taboo error (Severens, Janssens, Kühn, Brass, & Hartsuiker, 2011; Severens, Kühn, Hartsuiker, & Brass, 2012), suggesting that individuals monitor their behavior in order to inhibit the execution of actions that would otherwise violate the established norms. However, most research on social norms conducted hitherto has looked at language production (Dhooge & Hartsuiker, 2011; Severens et al., 2011, 2012) or intentional social conduct such as littering (Cialdini et al., 1990) and environmental conservation (Goldstein, Cialdini, & Griskevicius, 2008; Scheibehenne, Jamil, & Wagenmakers, 2016). As a result, it remains to be understood whether more spontaneous social behavior such as automatic imitation is regulated by social norms as well. In particular, if this is the case, then the mere observation of a taboo gesture should be sufficient to trigger an implicit stop signal that prevents the unintended execution of that gesture.

To examine the role of social norms in automatic imitation, the current study compared automatic imitation of pro- and antisocial gestures. More specifically, participants performed a prosocial (i.e., thumbs up) or antisocial (i.e., middle finger) gesture in response to a symbolic cue (i.e., M or D) while a hand on the screen performed either a congruent or incongruent gesture. Automatic imitation in this paradigm can be operationalized as a congruency effect with slower responses on incongruent trials than on congruent trials (Brass et al., 2000; Heyes, 2011). If automatic imitation is sensitive to social norms, then the congruency effect should be weaker when an antisocial gesture is observed than when a prosocial gesture is observed. Moreover, as semantic processes are known to be slow (Meyer, Harrison, & Wuerger, 2013; Özyürek, 2014), it can be expected that this difference will become larger when the delay between the presentation of the gesture and the presentation of the cue increases. The reason for this is that longer delays provide participants with more time to process the observed gesture before a response has to be formed.

2. Experiment 1

2.1. Method

2.1.1. Participants

The sampling goal of Experiment 1 was to collect data from 40 participants, similar to our previous work on automatic imitation (Cracco, De Coster, Andres, & Brass, 2015). A sample of 40 participants provided us with 80% power to detect a medium effect size of $d_z = 0.45$ at $\alpha = 0.05$. We had no strong hypothesis regarding the size of the predicted difference between the pro- and antisocial gesture, but considered a medium-sized effect to be a reasonable assumption. In line with our sampling goal, we tested 40 participants. However, one participant had to be excluded because a technical error prevented the data from being saved and another participant because a medical condition prevented the correct execution of the gestures. To attain the sampling goal, we replaced these two participants with two additional participants.

All subjects were first-year psychology students with normal or corrected-to-normal vision who took part in the experiment in return for partial course credit. Subjects were naïve to the purpose of the experiment, signed an informed consent, and were fully debriefed after testing. Participants were excluded from the analysis if their mean reaction time or error rate exceeded the sample mean by more than 3 *SD*. This resulted in the exclusion of one participant with a reaction time (RT) of 812 ms, another participant with an error rate (ER) of 11.25%, and a final participant with an ER of 11.04%. The final sample thus consisted of 37 participants (36 female, $M_{\text{age}} = 19.32$, $SD_{\text{age}} = 3.04$, $\text{range}_{\text{age}} = 18–32$). All experiments were approved by the local Ethics Committee and were performed in accordance with the 1964 Helsinki Declaration.

2.1.2. Stimuli and apparatus

The experiment was programmed in C with Tscope5 (Stevens, Lammertyn, Verbruggen, & Vandierendonck, 2006). The stimuli were pictures of a male right hand presented on a blue background in a first-person perspective (1444 × 810 pixels). To produce an illusion of movement, participants first observed a picture of a clenched fist followed by a picture of a hand performing either the prosocial thumbs up gesture or the antisocial middle finger gesture. An optical response box with four sensors organized from left to right was used to record RTs and ERs. Participants had to put their left/right thumb and their right/left middle finger on the left- and rightmost sensors (Fig. S1). The left/right configuration of the two fingers was counterbalanced across participants. That is, one half of the participants responded with their left thumb and right middle finger and the other half with their right thumb and left middle finger. The response box recorded a response when one of the two fingers was lifted from the sensor.

2.1.3. Task and procedure

Participants were tested individually in a dimly lit room. The duration of the experiment was 35 min and started with the presentation of the instructions on the computer monitor. The instructions explained that a hand would be presented on each trial and that this hand would perform either the thumbs up or middle finger gesture. Participants were instructed to ignore these gestures and to respond as fast and accurately as possible to a letter that would appear on the palm of the hand instead. That is, participants were asked to perform the