Mimicry Signals Affiliation, but Why?

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Abstract

The ability of mimicry to signal affiliation to, and elicit affiliation from, the mimicked person has generated great interest, but no definitive account of these phenomena has emerged. While affiliation is often cited as the driving force behind mimicry, I argue that mimicry results from an imitative learning process that helps to produce the best bodily (including emotional) responses to social stimuli and situations by reproducing and learning bodily and emotional reactions of models. The influential "feelings as information" perspective states that we form evaluations of events and objects based on coincident somatic experiences (feelings). Mimicry and contagion effects, which imply "shared feelings" can therefore influence attitudes and evaluations. Thus, mimicry of the wrong person may be costly. This perspective explains why mimicry towards outgroup members is maladaptive, and why responding positively to mimicry is adaptive for models. Connections with related phenomenon, and seemingly strategic mimicry behavior are also discussed.

Keywords: Mimicry; Imitation; Inference, Feelings-as-Information

Introduction

Despite intense research into imitation, intersubjectivity, and their neural bases, a satisfying explanation of the phenomenon of human mimicry has proved to be elusive. Mimicry signals feelings of affiliation towards the mimicked person (the model), and also causes the model to feel closer to the mimic (Lakin, & Chartrand, 2003). Additionally, we typically are not aware when our postures, gestures, expressions and mannerisms are actually copies of others' non-verbal behaviors, but we still reduce our mirroring tendencies when dealing with outgroup members. Similar patterns of results are shared with emotional contagion (DeWaal, 2008) and automatic imitation (Heyes, 2011), suggesting that all of these are related phenomena. A final puzzling aspect of mimicry behavior is that it is sometimes employed in a manner consistent with strategic goals, but still without explicit awareness of mimicry "as such" (Thelen, 1980; Lakin & Chartrand. 1999).

Here I argue that, though the social signal value of mimicry is indisputable, mimicry is an outcome of a process that would be adaptive even without this signal value. Mimicry is outwardly visible evidence that the mimic's nervous system is structurally coupled with that of the model in a way that tends to produce congruent somatosensory states. As many have alluded to (DeWaal, 2008; Heyes, 2010; De Vignemont, 2014), intersubjective states demand that one neural system "represent" two bodies. That is, if we are automatically mirroring, our somatosensory activity is caused by events within our own cognitive system, as well as by happenings within our models. Further, many results from the "feelings-as-information" literature show that humans have difficulty attributing our feelings to their true cause (Schwarz, 2011). Thus, sensations arriving via others will not be easily differentiated from those originating natively.

This difficulty in attributing our feelings to ourselves, versus others, is problematic because bodily sensations inform our attitudes, values and actions. Thus, feelings acquired "contagiously", but not accounted for as such by higher-level cognition, can be expected to have non-trivial effects. Specifically, these will tend to produce convergence of our attitudes, opinions, and beliefs with those of our model. Thus, it may be best to avoid intersubjective experience (and its observable corollary, mimicry) when our prior beliefs about others indicate that this process will lead to disadvantageous attributions, decisions, and motor habits. This also means that persons who we do mimic (our models) may justifiably "infer" that we do not mind convergence of feelings, attitudes and values.

Further, there is overwhelming evidence that people sort themselves into groups that share feelings and preferences (McPherson, Smith-Lovin, & Cook, 2001; Preston & De Waal, 2002). Ingroup members "feelings" are highly informative of what our own feelings should be in a situation or would be, if we had more experience. Thus, if mimicry is greater when the model is regarded as a good source of information about proper non-verbal (including emotional) reactions, and will tend to produce convergence in the behaviors and attitudes, then mimicry also signals ingroup membership. Imitated actions of group members will also tend to be repeated over time, so that imitation a key part of cultural learning (Tomasello & Kruger, 1993).

Because mimicry can be usefully be interpreted by models as a sign of ingroup membership, the act of mimicry acquires a second use, as a means of gaining affiliation with models. After briefly reviewing empirical evidence regarding mimicry and associated phenomenon, it is further argued that the costs of mimicry help to make it credible as an affiliation signal, and that credible mechanisms for strategic mimicry are compatible with the current account.

Human Mimicry: Core Empirical Findings

An early demonstration of the automaticity and affiliation properties of mimicry was provided by Chartrand and Bargh (1999), who showed that subjects were unaware of their tendency to mimic a partner that had been paired with them in a task. This same paper showed that mimicry can play a

causal role in affiliation. When participants in a second experiment were mimicked by a confederate, they reported a greater quality of interaction. Interestingly, this tendency is present at a young age – even 18-month old children are more likely to help to pick up pencils after an experimenter has mimicked them (Carpenter, Uebel & Tomasello, 2008).

Various experiments have also shown that mimicry levels are sensitive to the ingroup status of models. For example, subjects who write positive, as opposed to negative, written reports about their models show greater facial mimicry (Likowski, Muhlberger, Seibt, Pauli and Weyers, 2008), and subjects' implicit attitudes towards an outgroup predict their tendency to mimic that group (Likowski, et al., 2011).

Further, these findings cannot be explained as merely the result of attention paid to a target. For example, Lanzetta and Englis (1989) showed that subjects adopted opposite facial gestures when they saw a competitor frown or smile but produced congruent expressions while viewing teammates. This anti-mimicry of competitors, which clearly requires perception of and attention towards the competitor, happened as quickly as mimicry of teammates, showing that attitudes can moderate responses to gestures. These findings need not imply an "unbounded rationality" behind our mimicry actions, however. Instead, humans may simply tend to have enough familiarity with competitive situations to develop automatic, non-imitative responses.

The tendency for mimicry to be produced in a manner that is consistent with strategic affiliation goals was first shown by Jessica Lakin and Tanya Chartrand (2003). These investigators tested the idea that a failure to affiliate with one person would spur subjects towards increased mimicry in a second interaction with another person. Participants were first unconsciously primed with an "affiliation goal", or with neutral words, and then took part in an online interview session. Here, participants asked an experimental confederate a series of scripted questions. The answers were either friendly or unfriendly, so that the participants' "goal" was either fulfilled or frustrated after this initial contact. Finally, participants had a live interaction with a second experimental confederate, who gave neutral answers to the confederate's questions. Among those participants who did not have an affiliation goal, the success of online interactions did not affect mimicry levels. However, when participants who were primed with prosocial words "failed" in their first affiliation attempts they mimicked the second interaction partner more.

Further evidence for strategic mimicry was produced by Wang, Ramsey, and Hamilton (2011), who had participants interact with others who were either powerful or not powerful, and friendly or not friendly (i.e. 2x2). If mimicry were solely based on rapport, one might expect friendly people to be mimicked regardless of their power. Results showed, however, that mimicry was greatest when subjects interacted with powerful, rude individuals. These results seem to show that mimicry is increased when the attainment of good rapport is desirable, but difficult. Thus it seems that mimicry is either deployed strategically, or alternatively, wedded at a deep level to a strategic process that produces mimicry as an output.

Based on these results that the same researchers (Wang and Hamilton, 2012) have proposed that mimicry is Machiavellian in nature. While evidence shows that mimicry is performed in a manner consistent with goal pursuit, the current review argues that novel mechanisms are not required for explaining unconscious strategic behavior. Humans may simply notice the tendency of (by definition consciously available) intentional states, such as prosocial thoughts about the other, to be connected with successful affiliation. Thus humans have an incentive to adopt these states, which lead to mimicry, when interacting with those that they would like to affiliate with. This point will be discussed in greater detail after further consideration of the underlying mechanisms and consequences of mimicry.

The Mechanisms of Mimicry

Reams of evidence show that observation of actions has a tendency to automatically produce similar actions. This tendency to automatically imitate is not easily controlled consciously, but is modulated by the allocation of attention, the degree of experience in performing an action, and attitudes towards the model (see Heyes, 2011, for a review). Many of the relevant findings regarding mimicry's basic mechanics come from the "automatic imitation" literature, which is built around a stimulus-response compatibility (SRC) paradigm. This involves asking subjects to respond with physical actions when they see colored stimuli (e.g. "open hand if red", "close hand if blue"). Subjects are presented, however, with stimuli having action characteristics in addition to the task-relevant characteristic (e.g. hands that are opening or closing, and colored red or blue). It is consistently found that responses are slowed when "task irrelevant" action characteristics of the stimuli are incompatible with the required response. As might be expected, factors that modulate this effect are broadly similar to those that have been found to modulate mimicry in social psychology research. The SRC paradigm, however, offers far tighter experimental control.

An important result established by SRC tasks is that intentional attitudes moderate imitation, even though imitation cannot be "turned off" by direct intentional intervention. That is, despite instructions to the contrary, subjects in this paradigm find themselves unable to suppress their tendency towards imitation (Heyes, 2010). It appears then, that control of just what we will imitate is beyond human means. On the other hand, moderation of automatic imitation effects have been shown by manipulating attitudes towards action stimuli, such as by having subjects unscramble words related to prosociality (Leighton & Heyes, 2010). This shows that our tendency to imitate actions in general can be moderated by our attitudes towards the model, when experience shows that attitudes are valid cues to the appropriateness of automatic imitation.

Imaging studies have shown that familiarity with an action mediates the tendency of observations of that action to result in activation of motor areas (e.g. Cross, Hamilton & Grafton, 2006; Haslinger et al., 2005). In the best known, fMRI was used to compare neural responses of Ballet Dancers and Capoeira while viewing videos of performances from both of these disciplines (Calvo-Merino, Glaser, Grezes, Passingham, & Haggard, 2005). Greater activation in classical "mirror areas" was observed while dancers watched their own discipline.

Criteria that an Explanation of Mimicry Should Satisfy

With the relevant empirical facts now reviewed, it is useful to consider some explicit criteria by which explanations of the observed pattern of results should be judged. A theory of mimicry should explain why i) mimicry itself is adaptive "or ecologically rational" that is, it brings positive rewards to the mimic. It is equally important, however, to show that ii) models' affiliation with the mimic is adaptive. This is not necessarily the case if mimicry is costlessly produced for Machiavellian purposes. Also, an explanation of mimicry should iii) explain observed ingroup-outgroup differences and strategic mimicry, and iv) be compatible with the idea that imitation is often a means of learning (Tomasello, Kruger, & Ratner, 1993), with past imitated behaviors being more likely in the future. A theory should also v) explain why subtle and automatic imitation is more effective in affiliation than perfect mimicry (Chartrand & Van Baaren, 2009). Finally a theory should be vi) consistent with the notion that much of non-verbal behavior, though not well understood at an explicit level by humans (even researchers), is actually meaningful. Humans weigh non-verbal behavior greatly in their judgments of others (e.g. Tsay 2013). If the weight we give to this behavior is adaptive, then it is a merit of a theory if it treats this behavior as meaningful.

Extant Accounts of Mimicry

An early and appealingly simple explanation of mimicry, proposed by Chartrand and Bargh (1999), is that mimicry results from simple ideomotor mechanisms, whereby perception of actions simply primes the production of the same action. Though intuitively appealing, this proposal has received less attention as key empirical results, such as anti-mimicry of outgroup members and strategic mimicry (criteria iii, above), have cast doubt on the idea that attention alone moderates mimicry levels.

A far more sophisticated decision process is posited by the Machiavellian mimicry theory of Wang and Hamilton (2012). These authors believe that mimicry is strategically and flexibly employed to achieve goals. As alluded to earlier, this theory conflicts with the criteria ii) in that it does not state an adaptive reason for affiliating with mimics. Also, it does not engage with evidence of the role of mimicry in learning and the value of non-verbal behavior

(criteria iv & vi). This theory usefully points out, however, that the ecological rationality (i.e. adaptiveness) of models' affiliation with mimics is complicated by mimics' incentives to exploit mimicry for Machiavellian means. The current proposal holds that, like other non-verbal signals, mimicry is more credible if it is often truly reflective of a disposition of the mimic. Smiles and laughter, for example, can be "faked" but the signal value of these affected expressions derives from their similarity to true (i.e. duchenne) signals of meaningful internal states.

Another explanation is the 'like me' theory of Over and Carpenter (2012), which posits that mimicry arises so as to demonstrate likeness with others, and thereby achieve affiliation. As we prefer similar others, it is observed, demonstrations of similar postures and expressions will in turn make us more liked. Though these statements are broadly true, it is not clear why subtle mimicry (criteria v) should be the most effective kind. It seems, rather that more extreme imitation would be more effective under this proposal. Further, if mimicry does not necessarily imply more than surface perceptual similarity, it is not clear why an affiliative response to mimicry is adaptive (criteria ii).

Under the current proposal, mimicry arises as a visible consequence of the internalization of others' non-verbal information, so that the production of the signal is not necessarily the end of mimicry, but rather an outcome of an adaptive learning process. The current proposal posits that the learning aspect of imitation implies a cost, and likely a convergence between the mimic and her model on socially meaningful dimensions. To set up a discussion of the costs of mimicry, which is a distinguishing characteristic of the current theory, we now briefly turn to evidence on the relationship of postures and expressions to mental states.

Postures and Gestures Affect Intentional States

As we all have heard, and as has been demonstrated experimentally, adoption of a smile expression seems to play a causal role in increasing our feelings of happiness (Zajonc, Murphy, & Inglehart, 1989). A growing body of evidence generalizes such "feedback effects" to adopted postures. This evidence is important to consider in connection to human mimicry, because like evidence showing that emotions can be judged from postural cues (Dael, Mortillaro, & Scherer, 2012), it shows that the bodily actions "shared" during mimicry can be indicative of real changes in mental states.

In an example directly relevant to intentional behavior, Riskind and Gotay (1982) had participants adopt either a slumped or upright posture, and then measured their persistence in trying to solve an impossible task. Participants in the upright posture condition persisted longer, thus confirming that posture is bi-directionally linked to intentional behavior. Leaning forward while looking at a stimulus has also been shown to affect neural responses in a manner consistent with increased desire. Harmon-Jones and Peterson (2009) had participants either

sit upright or lean forward while looking at pictures of desserts, and found greater left frontal activity, which is consistent with approach behavior. The same investigators showed that subjects who received insulting feedback while in a reclined position showed less neural activity consistent with anger than those who were sitting upright.

As fMRI studies of mirror areas show, congruent somatosensory activation may also be produced by simply watching other's actions without any outwardly observable behavior (Calvo-Merino et al, 2005). The extent to which emotions coincident with mimicry are due to feedback effects from physical actions, versus neural "mirror activity" that precedes mimicry is unknown. In any case, feedback effects give cause to believe that mimicked postures (and even covert "simulation") are associated with meaningful internal states.

Why Mimicry is Selectively Employed

If mimicry is part of process by which we internalize others' meaningful bodily information, this helps to explain why it is selectively employed, despite its tendency to help make friends, influence people, and receive their aid. Mimicry and contagion processes inevitably create somatic sensations, which, as the outcomes of an automatic process, are not easily recognized as being caused by the model. Rather, higher-level attribution processes may tend to view sensations as originating internally.

A striking example, which many will have encountered in daily life, is finding oneself genuinely laughing at a joke even though one didn't hear the punch line. At these points it is made obvious to us that mirth is contagious. But in fact, the presence of others, especially close others, often causes us to laugh more (Provine, 2001), and when we do so we will likely decide that the joke is funnier (Bush, Barr, McHugo, & Lanzetta, 1989). It is just not obvious, when we know the punch line, that others "cause" our mirth. In fact, according to now-classical theories of misattribution, confusion about the source of feelings is commonplace.

The classic demonstrations of misattribution show that arousal caused by fear-inducing stimuli, such as a rickety bridge (Dutton & Aron, 1979), can be misattributed to the attractiveness of an experimenter. More recently, the feelings-as-information approach (Schwarz, 2011) has extended this idea to somatic experience generally. That is, feelings are interpreted and explained by higher-level cognition using whatever information is available. Given that the true source of mimicked actions is routinely not recognized (i.e. mimicry is *unconscious*), feelings-as-information theory predicts that the possibility of "misattributions" is heightened.

As an example, consider the following situation -- if you are looking at a product with another customer and they smile, automatic mimicry would result in you feeling positively while looking at the product. Thus you might attribute your affect to the product itself. This attribution is all the more likely because our smile is not consciously perceived *as an act of mimicry*. In fact, Ramanathan and McGill (2007) have produced results consistent with this idea. Subjects viewed a video program in a room either while seated alone, next to a person that they could not see, or next to a person that they could see. Attitudes towards the video program converged more when subjects could see their partner, and a follow-up analysis showed that this effect was mediated by mimicry.

Thus, there is cause to believe that the structural coupling of others' bodily experience to our own affects our thoughts, attitudes, and actions. Mimicry should be engaged in when we have prior beliefs that attendant "feelings" constitute "desirable information". However this process should be disengaged when prior beliefs indicate that it will introduce "undesirable information" into the cognitive system.

What general characteristics will determine when it is advantageous to "share feelings" with others? As noted, there is a great deal of evidence that humans form groups around similarities in values, beliefs, and priorities (e.g. McPherson, Smith-Lovin, & Cook, 2001). Some obvious cases when convergent emotional states and opinions and tastes will be useful are when one needs to share an opinion with another, such as a plan of action, to decide how to allocate shared resources. When we decide collectively what to build, what to eat, where to go, how to spend scarce money, or whether to engage in a relaxed or very active activity, shared feelings are important. Thus the characteristics that mark someone as a member of an "ingroup" are much the same as the conditions under which it is advantageous to share feelings.

Revisiting Mimicry as an Affiliation Signal

It is worth revisiting the question of why mimicry signals affiliation, in light of the reviewed theory and findings. If mimicry and intersubjective experience are most advantageous to the mimic when convergence with her model is desirable, in terms of reactions, tastes, attitudes and interests, then, *as an observable action*, mimicry is a valid cue that the mimic sees the model as a good source from which to learn bodily actions and emotional responses (i.e. feelings). As mentioned, ingroup members are exactly the people from whom we can most profitably learn adaptive non-verbal behavior. Thus, if this *socio-cultural learning* motive is the major reason for mimicry, then models should tend to respond positively to mimicry, as it is a true signal of similarity, or a desire for similarity, in attitudes, values, and so on – a similarity which, in turn, signals the likelihood of high-quality personality interaction.

However, if models respond to mimicry positively, by affiliating with the mimic, then the anticipation of this response creates further incentive to mimic others *in order to gain their affiliation* rather than for the socio-cultural learning purposes described previously. If "Machiavellian" motives for seeking affiliation are strong enough then we might expect mimicry in the absence of socio-cultural learning motives, or even despite cost associated with

"learning" bad non-verbal habits. From the standpoint of ecological rationality, models' tendency to respond positively to mimicry should increase with the likelihood that the mimic sees model as a good source of emotional information (i.e. as an ingroup member).

Thus, an "ecologically rational" actor who has been selected as a model for mimicry should seek a priori reasons for believing that either Machiavellian or socio-cultural learning motives are driving his mimic. If there is good cause to believe that mimicry is advantageous from a socio-cultural learning perspective, then the model should respond positively, but if there is cause to believe that Machiavellian motives for mimicry predominate, then models should respond less positively. If there is no specific information about an individual's interests, then the model will likely rely on information known about a population, or sub-population that the mimic is perceived to be part of. Such subtlety of response can be likely be implemented by simply forming expectations of levels of mimicry, based on what we know about an interaction partner, and then taking the degree of consistency with these expectations into account when responding. That is, if our prior knowledge about a mimic (e.g. he is a member of an outgroup, or is antisocial) leads us to expect low levels of mimicry, but in fact we see high mimicry, then our suspicion may be aroused.

A final question that some readers might have regarding affiliation is why seemingly inconsequential gestures produce affiliation. It might seem, for example, that mimicry of leg crossing does not have the potential to "cost" the mimic much. That is, by crossing one's leg, one does not seem to risk altering one's feelings in a greatly inappropriate, or maladaptive way. A first response to this concern is that our puzzlement over mimicry is, itself, evidence that our explicit understanding of nonverbal behaviors is often lacking. This should caution us against great faith in our subjective estimates of the consequentiality of non-verbal behavior. Secondly, all intersubjective processes seem to be moderated by similar factors (Heyes, 2011; Preston & de Waal, 2002), which implies that imitation of leg crossing is a good indicator that other, more consequential forms of intersubjective linkage and contagion are likely to be engaged in, and that a judgment of social closeness has been arrived at. Thirdly, It is unlikely that behaviors are mimicked based on a thorough, behavior-specific evaluation of costs or benefits, rather it seems that imitative tendencies as a whole are moderated by our intentional states (Heyes, 2011). If this were so, it should be possible for participants to avoid automatic imitation effects when given incentives. In fact, explicit incentives for non-imitation have no effect (Belot, Crawford, & Heyes, 2013). Thus, some inconsequential behaviors will be mimicked as part of a process that is, as a whole, quite consequential.

How Mimicry is Used Strategically

The next challenge for this perspective is to explain strategic mimicry. If mimicry is the result of a commitment to a form of perception that is automatic and whose affects on the perceiver are not easily monitored, then by what means is it used strategically? One possible answer starts with the fact that there is a statistical dependence between adoption of intersubjective perception (which results in mimicry) and the success of social affiliation attempts. It is also the case that intentionally available information, such as the prosocial words unscrambled by participants (Leighton & Heyes, 2010) can increase imitation. This being the case, it would seem that internally generated attitudes could also produce embodied processing and mimicry. In other words, an effective means of gaining affiliation with another is simply the adoption of prosocial attitudes towards that person.

If social actors are able to learn this dependency, then they should adopt intentional states that lead to unconscious mimicry. Thus mimicry may be the proximate means by which affiliation is achieved, and participants may not be aware of mimicry, but nevertheless this dynamic may be a straightforward consequence of intentional states. This explanation has the attractive feature of relying solely on already established mechanisms, requiring no "multiplication of entities". Intentional states can indisputably be adopted strategically, and mimicry has been shown to follow from intentional states.

Conclusion

It has been proposed that mimicry emerges from the imitative, intersubjective learning of non-verbal, including emotional, information from conspecifics, and that the conditions under which automatic internalization of such information is adaptive are virtually synonymous with the conditions determining ingroup membership. The mechanisms proposed to explain empirical results in the mimicry literature require no new cognitive capabilities or modules, but rather follow as a consequence of the simultaneous truth of several empirically well-grounded notions.

It is indisputable that humans imitate skillfully and automatically, and it seems certain that imitated actions will tend to be repeated by mimics in the future, even in the absence of the model. Though the import of some mimicked behaviors is hard to establish, intersubjective processes seem to be moderated by similar factors, so that evidence of one act of mimicry is evidence of emotional contagion. Thus, mimicry entails meaningful future actions or reactions – our friend's "contagious enthusiasm" for the works of Bach may stay with us, even if our friend moves away. Ingroup membership can be defined in terms of shared values, opinions, and goals, all of which imply shared feelings about events, practices, and people. Thus mimicry, as a signal of the "sharing of feelings", is a signal that the mimic believes that she is likely to have beneficial social interactions with her model. Though this signal is, just like a

simple smile, complicated by incentives to exploit the positive responses it evokes for Machiavellian means, such exploitation likely comes at a cost, and must be credible, given other information known about the mimic, such as group membership and reputation. Finally, strategic patterns of mimicry do not necessarily argue for complex unconscious thought mechanisms, but can be explained as the outcome of strategically adopted intentional states.

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