CHAPTER

22 Mimicry: Its Ubiquity, Importance, and Functionality

Tanya L. Chartrand *and* Amy N. Dalton

Abstract

This chapter examines the importance of mimicry in social life. It begins with a review of the various types of mimicry that researchers have uncovered. Research documenting verbal, facial, emotional, and behavioral mimicry is discussed, along with evidence for its automatic and nonconcious nature. Next, it is argued that mimicry has major social implications both within the mimicry interaction and beyond it. Evidence is reviewed linking mimicry to rapport and empathy, affiliation motives, and prosocial behavior. Mimicry also appears to impact the individuals being mimicked in nonsocial ways. It influences the cognitive processing style engaged in, the amount of regulatory resources they have, and the attitudes and preferences that they hold. Finally, four different theoretical approaches to the question of why humans mimic are discussed. These include conceptualizing mimicry as a communication tool, as a passive response based on an automatic perception-behavior link, as an adaptive behavior serving an important evolutionary function, and as a translator of neural responses into an understanding of the social environment.

Keywords: mimic, verbal mimicry, facial mimicry, emotional mimicry, behavioral mimicry, social lives

Humans are strongly inclined to notice how others are different from themselves and to draw on these differences—be they socioeconomic, ethnic, or religious—as a source of tension. Indeed, one need only open a history book or turn on the evening news to get a glimpse of how our differences spark conflict in the world. Fortunately, we have another strong inclination that operates as a countervailing force, serving to unite us to others from our infancy. This force is mimicry. Humans automatically mimic other people, and this mimicry facilitates social interactions and interpersonal bonding. We create a sense of similarity by imitating each other in various ways. This mimicry has a powerful effect in facilitating rapport and conveying feelings such as liking and empathy. Mimicry serves an important interpersonal function.

The notion that individuals mimic the behaviors of others has long been of interest to psychologists (e.g., James, 1890). The past 30 years in particular has seen a surge of research exploring the subtle and unintentional ways in which people imitate their social interaction partners, including mimicry of facial expressions, emotions, speech patterns, and physical movements. This unconscious mimicry is notably different from conscious imitation or modeling, an important part of social learning theory (Bandura, 1977). To better understand why we mimic and to articulate the functions

mimicry serves, systematic investigations into mimicry's wide ranging consequences have been conducted, as have investigations into factors that facilitate and inhibit nonconscious mimicry. In light of these trends, this chapter unfolds in the following manner. First, we briefly introduce the various types of mimicry that research has explored. Our approach in this section is one of highlighting representative studies rather than exhaustively reviewing the literature (for more comprehensive reviews, see Chartrand, Maddux, & Lakin, 2005; Dijksterhuis & Bargh, 2001; Hatfield, Cacioppo, & Rapson, 1994). The second section of this chapter discusses the importance of mimicry by reviewing the consequences and moderators of it. Third, we discuss four different theoretical approaches to the question of why we mimic. In so doing, we review empirical support for each of these theoretical approaches.

What Do We Mimic?

When interacting with a person who is lively and animated, one will gesture more. When conversing with a person who has a distinct accent, one's own speech will develop traces of that accent. Even the mere observation of a person who feels sullen and somber will provoke similar feelings. Essentially, social environments are contagious, and people spontaneously imitate or mimic what they see in their social worlds. As these examples illustrate, a broad range of human experience is mimicked. Moreover, mimicry can transpire without an intention to mimic and without any awareness that mimicry is occurring (Chartrand & Bargh, 1999; Scheflen, 1964). In this section, we review evidence for mimicry of speech patterns, mimicry of facial expressions and emotions, and mimicry of nonverbal behaviors, including physical postures, gestures, and mannerisms. At the same time, we review evidence for the automatic and nonconscious nature of mimicry.

Verbal Mimicry

Research finds that a number of verbal tendencies are mimicked. Simner (1971) conducted research with infants and demonstrated that newborns as young as 2 to 4 days old will cry in response to another infant's crying. What is fascinating about Simner's research is the finding that infants do not mimic synthetic cries, suggesting that newborn infants can actually discriminate between real and artificial cries. Research on mimicry of speech patterns conducted with adult participants has shown that speakers tend to adopt each others' accents, latency to speak, speech rate, and utterance duration (e.g., Cappella & Planalp, 1981; Giles & Powesland, 1975; Matarazzo & Wiens, 1972; Webb, 1969). Speakers also use the same syntax (i.e., structure their sentences the same way) as their conversation partners, and this tendency has been shown to persist over multiple sentences (Bock, 1986).

There is evidence that at least some forms of verbal mimicry occur automatically. Levelt and Kelter (1982) demonstrated that during conversations, people use the same words and clauses that their interaction partners use. In one study, they included a condition in which participants were put under cognitive load. The results showed that mimicry occurred even when cognitive resources were highly taxed, suggesting that speakers imitate the words and clauses used by an interaction partner automatically. Another example comes from the work of Provine (1986), who put an end to years of speculation by demonstrating that yawning is indeed contagious—when we see another person yawn, we yawn automatically (see the discussion later in this chapter; see also Platek, Critton, Myers, & Gallup, 2003).

Facial Mimicry

Research has also shown spontaneous mimicry of facial expressions. O'Toole and Dubin (1968) reported that mothers tend to open their mouths in response to their infants opening their mouths to feed. They interpreted this finding as an application of George Herbert Mead's (1934–1967) notion of "taking the role of the other"—the idea that humans adopt each other's psychological standpoints. Zajonc, Adelmann, Murphy, and Niedenthal (1987) found that facial similarity in married couples increased over time and conjectured that this similarity arose as a consequence of married couples frequently mimicking each other's facial expressions. Chartrand and Bargh (1999) examined facial mimicry in a series of laboratory experiments and found that participants mimicked the facial expressions of confederates with whom they interacted, smiling more when they interacted with a confederate who smiled compared to a confederate who did not smile.

Dimberg, Thunberg, and Elmehed (2000) provided compelling evidence that mimicry of facial expressions occurs automatically. Three groups of participants were exposed either to happy, sad, or neutral faces for 30 milliseconds, followed by a neutral face for 5 seconds. This short presentation duration in combination with the backward masking technique prevented participants from consciously perceiving the target (happy or sad) stimuli. While participants viewed the stimuli, their spontaneous facial electromyographic activity was recorded. Dimberg et al. were specifically interested in the activity of the zygomatic major muscle, which elevates the lips during a smile, and the corrugator supercilii muscle, which knits the eyebrows during a frown. Past research had shown that activity in these muscles was spontaneously evoked by exposure to happy and angry faces, respectively (Dimberg & Thunberg, 1998). Dimberg et al. reasoned that if distinct emotional responses can be automatically elicited, then unconscious exposure to happy or sad faces should differentially activate these muscles. The results showed that despite participants' lack of awareness of the happy or sad faces, their facial emotional response patterns showed that zygomatic major muscle activity was highest in response to happy faces and that corrugator supercilii muscle activity was highest in response to sad faces. This pattern of results suggested that facial mimicry occurred spontaneously and unconsciously in response to subliminally perceived stimuli.

Emotional Mimicry

Facial stimuli have been shown to elicit not only facial mimicry but also emotional responses (e.g., Lundquist & Dimberg, 1995). Research has begun to focus on mimicry of psychological states, including emotions (see Hatfield et al., 1994) and moods (Neumann & Strack, 2000). On the basis of facial feedback research suggesting that actions can automatically elicit feelings, Neumann and Strack (2000) tested the proposition that observing another person's emotional expression would elicit a congruent affective state in an observer. Participants listened to a cassette of a target reciting an affectively neutral speech in either a slightly happy or a slightly sad voice. In one study, participants subsequently reported experiencing corresponding mood states. In another study, participants who repeated back the content of the speech imitated the affective tone of the speaker's voice, suggesting that participants adopted a mood state congruent with that of the speaker.

One important moderator of emotion contagion appears to be expressiveness (Friedman & Riggio, 1981; Sullins, 1991). Friedman and Riggio (1981) found that highly expressive participants transmitted

their moods to other, less expressive participants. Amazingly, this effect emerged when the group of participants sat together silently and therefore occurred strictly via nonverbal communication. Sullins (1991) found that this effect is further moderated by the type of mood that is being displayed. When the mood being displayed is a happy mood, both high- and low-expressive participants pass their moods on to others. However, when the mood is negative, high-expressive participants pass their mood to others more than their low-expressive counterparts.

Behavioral Mimicry

Perhaps the first to scientifically investigate behavioral mimicry, the psychotherapist Albert Scheflen was interested in the insights provided by postures and body positioning into the dynamics between interacting individuals. Scheflen (1964) videotaped 18 therapists conducting psychotherapy sessions and analyzed these tapes in order to determine the sorts of behavioral patterns individuals used to communicate. Scheflen argued that mimicry, which he called postural congruence, was an indicator of similarity in views or similarity in roles among interacting individuals.

Other research has looked at behavioral mimicry in more controlled settings. Bernieri (1988; Bernieri, Reznick, & Rosenthal, 1988) conducted a clever study designed to test whether naive judges rate "real" interactions as more synchronous. To do this, Bernieri videotaped several different mother–child interactions, always with the mother on the right and the child on the left. He then created various versions of videos in which mothers were sometimes paired with their own children and sometimes with other children. Participants watched these videos and rated how physically in sync the pairs were. Mothers were judged to be more in sync with their own children than with other children.

Bavelas, Black, Chovil, Lemery, and Mullett (1988) looked at left/right leaning behavior when an observer and target were facing each other. Their interest was in determining whether an observer's motions mirrored the direction of a target (mirror mimicry) or whether an observer's motion is the same as the target's if the observer is rotated into the target's position (rotational mimicry). Across three experiments, the researchers found that participants displayed mirror mimicry—they mirrored the leaning of the target they observed (see also LaFrance & Broadbent, 1976).

Chartrand and Bargh (1999) focused on mimicry of specific mannerisms and confirmed that mimicry occurs spontaneously in dyadic interactions. Participants engaged in a photo description task with two confederates one after the other. The first either moved their foot or touched their face throughout the session. The second confederate performed the behavior the first did not. Hidden videocameras recorded the participants' mannerisms, and coders blind to the hypothesis and condition later rated the amount of participants' face touching and foot moving during the two sessions. Results revealed that participants changed their behavior to match the behavior being displayed in their current environment: They moved their foot more when they were with the foot-moving confederate than the face-touching confederate, and they touched their face more when with the face toucher than the foot mover. This led Chartrand and Bargh (1999) to coin the phrase "the chameleon effect" to describe this nonconscious behavioral mimicry—individuals modulated their own behaviors to blend in with their current environment.

Why Is Mimicry Important?

Is nonconscious mimicry just a funny tendency we humans have, something we

should leave to the realm of entertaining dinner conversation? Or is it justifiable as an important topic of scientific inquiry? There is now strong evidence for the latter. Mimicry serves a critical function not only in our social interactions but for us as individuals as well. There has been a recent surge of research examining the consequences that ensue from imitating others as well as the variables that moderate mimicry effects. These studies illuminate the importance of mimicry in our daily lives. For one, it serves as social glue, binding and bonding people together. Nonconscious mimicry helps us affiliate with others when we are feeling ostracized or different from others or when we are interacting with someone in power. It makes us feel closer to others and leads us to help other people more. It brings our attitudes in line with those of others, saves precious cognitive resources, and improves self-regulation. It also impacts the way we see ourselves and the cognitive processing style we engage in. Mimicry is not just an interesting phenomenon—it is a fundamental, critical process that serves many functions, many of which are currently being uncovered. In this section, we review the social and nonsocial impact of mimicry and answer the questions "is mimicry important?" and "is it worthy of scientific inquiry?" with a resounding "yes."

The Social Impact of Mimicry: Mimicry and Our Interactions With Others

Liking and Rapport

Some of the earliest work on mimicry was conducted in the domains of counseling and clinical psychology, where researchers were interested in the implications of nonverbal behaviors in interactions between psychologists and their clients (Charney, 1966; Dabbs, 1969; Scheflen, 1964). For instance, Charney (1966) examined postural congruence in the context of psychotherapy sessions and found that mimicry increased over the course of a single session and that this increase in mimicry correlated significantly with an increase in rapport between the therapist and client.

LaFrance and Broadbent (1976) hypothesized that nonverbal behavioral mimicry would also be a good index of group rapport. They assessed this hypothesis in college seminar classrooms and indeed found that students rated rapport as higher in classrooms in which there was greater congruence between the body and arm positions of teachers and students. Other research also shows a strong link between mimicry and rapport. For example, the results of a meta-analysis conducted by Tickle-Degnen and Rosenthal (1990) showed that the three facets of rapport—mutual attention, coordination, and positivity—are associated with particular nonverbal behaviors, with the coordination element of rapport being highly linked with mimicry.

The information communicated by nonverbal behavioral mimicry can be understood even by naive, outside observers of an interaction. Grahe and Bernieri (1999) conducted an experiment in which participants were asked to judge rapport in dyadic interactions based on different types of information. Specifically, the participants were given access to the details of the dyadic interaction based on a transcript, audio playback, video playback, video with transcript, or video and audio playback. The results suggested that participants given video information who therefore had access only to nonverbal behavioral information were the most accurate judges of rapport in an interaction. It is somewhat counterintuitive to find evidence that nonverbal behavior may be more important than verbal behavior as an index of rapport.

Although LaFrance and Broadbent's (1976) correlational data did not allow for the conclusion that mimicry causes rapport

to develop, experimental research does support this conclusion. In a series of studies, Chartrand and Bargh (1999) manipulated mimicry in the context of dyadic interactions to show that rapport is a consequence of mimicry. The dyad partners were complete strangers who presumably had no intention to affiliate and certainly no preexisting rapport. One member of each dyad was a research confederate who was instructed to either mimic or not mimic the postures and mannerisms of the research participants while they completed a joint task. When questioned after the interaction, participants who were mimicked liked the confederate more and perceived their interactions as having run more smoothly than participants who were not mimicked. These findings provide firm evidence that mirroring the behaviors of interaction partners facilitates social bonding.

Affiliation Goals

Given that mimicry leads to liking and rapport, it is functional that the motivation to build rapport can automatically increase nonconscious mimicry. Lakin and Chartrand (2003) found that compared to participants without a goal to affiliate, participants who either implicitly or explicitly held such a goal tended to mimic the face-touching behavior of a target while watching the target perform various clerical tasks on videotape. In a second study, they found that compared to participants who succeeded at an affiliation goal in an online interaction with a confederate, those who failed at an affiliation goal tended to mimic more the foot-moving behavior of a second confederate with whom they interacted. The researchers asked the second confederates (who were blind to participants' experimental conditions) to rate their interactions with the research participants, providing a measure of how successful participants were at affiliating. Confederates rated participants who failed at an affiliation goal as more likable and rated the interactions as smoother. These studies suggest that behavioral mimicry is a "strategy" that people employ nonconsciously to affiliate with others. Moreover, this strategy works.

Note that in the Lakin and Chartrand (2003) studies, the affiliation goal was directly given to (or primed in) participants. What are the naturalistic triggers of an affiliation goal? Situations that activate such a goal in individuals should lead those individuals to engage in more mimicry. This idea has been tested recently.

FEELING TOO DIFFERENT FROM OTHERS

One situation that should lead to an affiliation goal (and subsequent mimicry) is feeling too dissimilar from an important in-group. According to Brewer's (1991) optimal distinctiveness theory, people are in a continual quest to balance their need for *distinctiveness* (i.e., seeing themselves as different from others) and their need for *assimilation* (i.e., seeing themselves as similar to others). This leads to the prediction that individuals who currently feel too different from an important group should want to assimilate and should therefore engage in behaviors that bring them closer to the group (i.e., mimicry). In a study testing this, Uldall, Hall, and Chartrand (2008) gave participants false feedback on a bogus "personality inventory" that suggested that they had either a relatively rare or a relatively common personality profile (compared to other undergraduate students at the same institution). After they received the false feedback, they engaged in a task with a confederate who moved her foot throughout the interaction. As expected, participants who were made to feel too distinct by being placed in the rare category mimicked the confederate more than those who were made to feel the same as everyone else by being placed in the common category. Thus, participants mimicked more

when they were in a situation where they felt too different from a peer group.

OSTRACISM

The need to belong is a prominent quality of the human species, perhaps even universally shared (Baumeister & Leary, 1995; Leary & Baumeister, 2000). Because of our high need to form interpersonal bonds, social exclusion can be devastating (Leary, 2001). How do individuals cope with social exclusion? One route is through mimicry. Lakin, Chartrand, and Arkin (in press) studied the moderating role of social exclusion in the form of ostracism and how it promotes mimicry. Based on research showing that socially excluded individuals are more likely to engage in behaviors to promote inclusion, the authors reasoned that some of these behaviors might be automatic means of affiliation, including mimicry.

Ostracism was manipulated in the context of an online ball-tossing game called Cyberball (see Williams, Cheung, & Choi, 2000). Each participant played this online game with three other "participants" who were actually computer controlled to include or exclude the participant from the game. Following the game, participants completed what they believed to be an unrelated study in which they were to describe pictures to another participant (actually a confederate not associated with the Cyberball game). The results of several experiments using this procedure suggest that being ostracized does in fact increase participants' tendency to mimic another person. Mimicry was especially pronounced when participants were excluded by members of their in-group and subsequently interacted with another member of their in-group. It appears that participants tried to recover from their exclusion experience by affiliating with a new interaction partner who could help them reestablish their group identity more than one who could not (i.e., out-group members). Moreover, the participants were successful: The interaction partner for the picture description task rated interactions with excluded participants as smoother than interactions with included participants. These findings highlight once more that mimicry is automatically used to affiliate with others even though this heightened mimicry occurs without intention, awareness, or conscious control.

SELF-MONITORING

Cheng and Chartrand (2003) examined the moderating role of self-monitoring in participants' tendency to mimic in different social contexts that varied in affiliative cues. Not only did high self-monitors engage in more mimicry than low self-monitors, but compared to low self-monitors, high self-monitors automatically responded differentially to social contexts that varied in affiliative cues. In one study, the researchers hypothesized that high self-monitors would be more likely to mimic someone who they believed to be a peer than a nonpeer. High self-monitors who interacted with an alleged college student enrolled in the same introductory psychology class engaged in more mimicry (here, operationalized as foot moving) than high self-monitors who interacted with an alleged high school student or graduate student or than low self-monitors. In a second study, the researchers tested the hypothesis that compared to low self-monitors high self-monitors would respond more to social cues indicating that another is more powerful than they are by engaging in more mimicry than if that other was less powerful than they. They found that high self-monitors who were randomly assigned a "worker" role engaged in more mimicry (here, operationalized as face touching) than high self-monitors who were assigned a "leader" role. Essentially, Cheng and Chartrand (2003)

found that among participants high in self-monitoring, social contextual details could trigger greater amounts of mimicry, but among participants low in self-monitoring, mimicry was less likely to occur regardless of one's social context.

Recently, researchers have proposed that mimicry's relationship with affiliation and liking might be due to a more general effect of mimicry on prosocial orientation. We now turn to research describing the link between mimicry and prosociality.

Prosocial Orientation

As previously described, mimicry leads to prosocial emotion (more feelings of liking and rapport) toward the mimicker. If mimicry leads to a general prosocial orientation, however, it should go beyond the dyad. Ashton-James, van Baaren, Chartrand, Decety and Karremaas (2007) found evidence for this. In one study, participants who were mimicked subsequently reported feeling closer to others in general than nonmimicked participants. This not only is additional evidence of prosocial orientation, but also suggests that the positive feelings engendered by mimicry extend beyond the dyad.

A second study looked at an implicit measure of feeling close to others—seating distance. Following a mimicry manipulation, participants were asked to take a seat in a hallway where several chairs were lined up. Several items were placed on one chair, intended to look like the belongings of another "participant." Ashton-James et al. (2007) were interested in how close participants sat to this ostensibly occupied seat. The results revealed that participants who had been mimicked in the first part of the experiment sat closer to the occupied seat than participants who had not been mimicked, reflecting greater implicit closeness to others. Again, the prosocial orientation fostered by mimicry appears to go beyond the mimicry interaction.

One prosocial emotion more specific than liking or feeling close to others is interpersonal trust. Do the prosocial feelings that mimicry engenders influence trust? Trust is particularly important in negotiations, and Maddux, Mullen, and Galinsky (2008) therefore studied the bargaining power of mimicry. Specifically, they investigated mimicry at the bargaining table to determine what effects it might have on negotiation agreements. Participants were business school students enrolled in a negotiations class. In one study, participants were each paired with one other student, and the pair was instructed to carry out a job employment negotiation. The researchers measured both individual gain from the negotiation (the extent to which individually preferred options were selected) and joint gain from the negotiation (which captured the extent to which mutually preferred options were selected). They found that mimicry had no effect on individual gains but did impact joint gains. Interactions in which one of the participants had been instructed to mimic their opponent yielded higher joint gain compared to interactions in which neither participant was instructed to engage in mimicry. Moreover, the more participants mimicked their opponents, the higher the resulting joint gain.

In a second study, a task was used that made it particularly difficult to come to a mutually preferred agreement. Again, participants interacted in dyads in which one member of the dyad was instructed to mimic their opponent or neither was instructed to mimic their opponent. The results showed that mimicry greatly increased the likelihood that a dyad would come to an agreement. As in the first study, the more participants actually mimicked their opponents, the more likely they were to come to an agreement. Finally, this study showed that the effect of mimicry on making a deal

was mediated by overall dyad trust. Mimicry fostered trust, which in turn facilitated deal making.

Several recent studies have gone beyond prosocial emotions to explore whether mimicry also affects prosocial behaviors, such as helping others. In one study examining monetary generosity toward others as a measure of prosociality, waitresses were instructed to either recite back verbatim their customers' orders or to paraphrase the orders. The results revealed that the waitresses received larger tips from customers they mimicked than from customers they did not mimic (van Baaren, Holland, Steenaert, & van Knippenberg, 2003).

Another study found that participants who were mimicked by their experimenter not only helped that experimenter pick up more pens that "fell" to the floor but also were more helpful to people not directly involved in the mimicry situation by helping a second (nonmimicking) experimenter pick up pens and by donating more generously to a charitable cause (van Baaren, Holland, Kawakami, & van Knippenberg, 2004). These findings confirm a link between mimicry and prosociality and suggest further that mimicry has behavioral consequences (not just affective consequences). Moreover, it provides additional support for the notion that mimicry's effects extend beyond the dyad—that is, beyond the interacting (mimicking and mimicked) individuals.

Ashton-James et al. (2007) have proposed that the relationship between mimicry and prosociality is mediated by self-construal such that being mimicked causes a person to adopt a more interdependent self-construal, which in turn affects their prosocial feelings and behaviors. This prediction was derived from studies by van Baaren, Maddux, Chartrand, De Bouter, and van Knippenberg (2003), who found that an interdependent self-construal was associated with more mimicry than an independent social construal. These results were obtained both when self-construal was primed and when it was inferred from cultural differences between Americans (independent) and Japanese (interdependent).

Ashton-James et al. (2007) conducted a study to test whether mimicry affects prosocial behavior via self-construal. In this study, participants were mimicked or not by an experimenter in an initial interaction and then completed the Twenty Statements Test (Kuhn & McPartland, 1954), a measure of working self-concept in which participants provide 20 different responses to the question "Who am I?" that are later coded to be independent (describe a personal attribute) or interdependent (describe a social role). After completing the self-concept measure, participants were asked if they would be interested in filling out an extra survey for a researcher who did not have funds to pay participants. The results revealed that participants who were mimicked described themselves in a more interdependent manner and were subsequently more likely to volunteer to complete the extra survey. Moreover, interdependence was shown to mediate the relationship between the mimicry manipulation and volunteering. The authors interpreted their findings as an important step in understanding *why* mimicry has positive social consequences.

The Nonsocial Impact of Mimicry: Mimicry and the Individual

Mimicry clearly influences our interactions with others. Is the impact of mimicry limited to the social domain, or does it influence the individual as well? That mimicry is associated with a particular type of self-construal (i.e., interdependence) and with high self-monitoring hints that mimicry may affect the individual, but it is only suggestive. Stronger evidence would demonstrate that mimicry has outcomes that

are clearly nonsocial and is influenced by nonsocial states of mind. For instance, does mimicry influence one's attitudes and preferences, one's self-regulation in nonsocial tasks, or one's cognitive processing style? Is mimicry influenced by one's current emotional and mental state? The answer to all these questions is yes, and it is to this evidence that we now turn.

Persuasion

The prosocial consequences of mimicry have sparked a great deal of interest among researchers interested in its potential persuasive appeal. After all, people are more persuaded by individuals whom they like and who are similar to them (see Cialdini, 2001). Because mimicry has been shown to foster both liking (Chartrand & Bargh, 1999) and a sense of similarity (Bavelas, Black, Lemery, & Mullett, 1986; Bavelas et al., 1988), it is no surprise that researchers have started to explore the potential link between mimicry and attitude change.

Van Swol (2003) asked participants to play the role of a manager of a pharmaceutical company and make a decision as to which of three cholesterol-lowering drugs to market. The three drugs were pretested to be equally viable options. Participants were told that they would be asked to defend their choice in a discussion with two other individuals. The two individuals with whom participants interacted were research confederates. In their discussion, both confederates disagreed with the participant's choice and instead endorsed one of the other two drugs. However, one confederate mimicked the participant throughout the discussion, and the other did not. Following the group discussion, participants rated the mimicking confederate as more confident and more persuasive than the nonmimicking confederate. Interestingly, however, the participant was not more likely to adopt the mimicking confederate's viewpoint over the nonmimicking confederate's viewpoint.

In other words, though mimicry increased the perception of persuasiveness, it did not increase persuasion in this study. This finding was replicated in a similar study (van Swol & Drury, 2007a). Participants interacted with a confederate who disagreed with them on a particular issue and who either imitated their nonverbal behaviors or did not. Although participants rated the confederate as more persuasive and more knowledgeable following mimicry compared to no mimicry, the participants were no more persuaded in the mimicry condition compared to the no-mimicry condition.

However, countering this work is other research that did in fact find differences in persuasion among mimicked and nonmimicked participants. Bailenson and Yee (2005) conducted a fascinating study in which participants were mimicked not by humans but by digital avatars. These avatars were programmed either to mimic the head movements of participants who interacted with them in a virtual environment or to play back head movements from a different participant. The avatar delivered a persuasive message advocating a campus security policy that would require students to carry their student identification cards at all times. The results revealed that avatars that mimicked participants were subsequently rated to be more persuasive and were even evaluated more favorably on a series of trait measures. Moreover, mimicked participants were more in agreement with the avatar's persuasive appeal than were nonmimicked participants. Even though participants were interacting with a nonhuman mimicker, social influence occurred.

Both Scheflen (1964) and LaFrance (1982) proposed that mimicry might be a consequence of sharing viewpoints, but this proposition was first experimentally tested

by van Swol (2003; van Swol & Drury, 2007b). Van Swol and Drury (2007b) examined whether the tendency to mimic another individual would be moderated by whether this person expressed opinions similar or dissimilar to their own. Participants read about two vacation destinations and chose which one they preferred. Following this, they discussed their choice with two other individuals, both of whom were confederates to the experiment. One confederate supported the participants' choices, and the other confederate disagreed with the participants' choices. The participants displayed more mimicry of the confederate who expressed agreement compared to the confederate who expressed disagreement.

Recent research in marketing has begun to examine the ways in which mimicry can affect people's preferences for consumer products. Tanner, Ferraro, Chartrand, Bettman, and van Baaren (2008) proposed two routes by which this can occur. The *mimicking consumer path* suggests that individuals automatically mimic the consumption behaviors of other people and that such mimicry then affects preferences toward the product(s) consumed. The *mimicked consumer path* suggests that being mimicked leads to increased prosociality, which affects preferences for products presented in dyadic interactions.

In a test of the mimicking consumer path, Tanner et al. (2008) had participants observe a confederate who was consuming one of two snacks while engaging in an unrelated task. Some participants had these same snacks available for their personal consumption, and others did not. The results showed that participants were more likely to consume the same snack that the confederate was consuming (if they were able to), and they subsequently reported more favorable attitudes toward the consumed snack. Moreover, they found that the mimicry mediated the effect on preferences. Importantly, participants who merely observed the confederate and did not consume the snacks themselves were unaffected by the confederates' consumption behavior, further suggesting that the results were due to mimicry and not mere observation. This is the first research to focus on the downstream personal consequences (as opposed to social consequences) of mimicking others.

The authors also tested the mimicked consumer path. In two studies, a facilitator told participants about a new snack product that was about to be launched on the market. After the interaction, participants were asked to taste the product and rate how much they liked it, whether they would recommend it to friends, and whether they planned to purchase it themselves. The quantity that they consumed was also calculated at the end as an implicit measure of liking. In both studies, those who were mimicked had more favorable attitudes (as assessed by the measures above) toward the snacks.

In the second study, the facilitator was also either invested in the product's success (i.e., as a salesperson would be) or not. The authors made the counterintuitive prediction that the effect of mimicry would be stronger for invested facilitators than noninvested facilitators. They reasoned that the prosocial orientation induced in mimicked participants would lead to more "helping" behavior toward the invested facilitator, who presumably needed the "help" more than the uninvested facilitator. Thus, in the case where the facilitator has a clear stake in the outcome, the prosocial orientation would manifest itself as a greater tendency to like what is being presented. This prediction was supported by the study results. Overall, the studies by Tanner et al. suggest that mimicry can affect product preferences in two ways: Consumers automatically mimic the consumption of others, and this goes on to affect their preferences, and consumers are

mimicked by others, and this affects preferences for products being presented (and even "sold to") by the mimicker.

Cognitive Style

Noting the apparent link between mimicry and greater environmental attunement, van Baaren, Horgan, Chartrand, and Dijkmans (2004) explored the relation between behavioral mimicry and cognitive style. Cognitive style refers to the ways that individuals tend to process information in terms of perception, organization, and response to stimuli. Van Baaren and colleagues focused on field-dependent versus field-independent processing style and proposed a link between mimicry and field-dependent processing style because field dependence is associated with a greater attunement to and reliance on contextual details. The researchers found that greater field dependence, whether chronic or situationally induced, was related to a greater tendency to mimic a target's behavior. They also found that participants processed information in a more context-dependent manner if they were mimicked than if they were not mimicked in a previous interaction. Again, this research suggests that mimicry is facilitated by factors that are associated with greater attunement to one's context. Van Baaren et al. further showed that cognitive style was a consequence of mimicry. Participants who were mimicked subsequently processed information in a more field-dependent manner compared to participants who were not mimicked.

Mood

One's mental state (cognitive processing style) therefore influences mimicry. So too does one's emotional state. Based on evidence that a positive mood leads people to rely more on automatic processes whereas a negative mood leads people to rely on more deliberate forms of action (e.g., Schwarz & Clore, 1996), van Baaren, Fockenberg, Holland, Janssen, and van Knippenberg (2006) hypothesized that people in a positive mood would mimic more than people in a negative mood. The results of both correlational and experimental studies supported this hypothesis. In one study, a positive or a negative mood was induced by having participants watch either a funny or a sad video clip. Then participants were told that for the next part of the study they would listen to two short pieces of music. Their attention was again directed to the television screen, where they watched an experimenter start the first piece of music (this was actually a prerecorded video). The experimenter remained on the screen while the music played. A second experimenter was then depicted on the screen starting the second piece of music and also stayed on screen for the duration of the piece. The video segments were presented such that participants saw the experimenter play with a pen in one of the video segments but not in the other (the order was counterbalanced). Participants were videotaped while watching the video segments, and their behavior was later coded for the amount of pen playing participants displayed. The results revealed that participants in a positive mood played with their pens more when watching the experimenter who played with the pen than the one who did not. However, participants in a negative mood did not show more pen playing when they viewed the experimenter who played with the pen. Simply put, participants in a positive mood engaged in mimicry of the experimenter, but participants in a negative mood did not.

Self-Regulation

While most research has focused on the positive consequences of mimicry, recently attention has turned to the costs of poorly coordinated mimicry in social

interactions. Drawing on recent research showing that poorly coordinated social interactions pose a self-regulatory burden on interactants (Finkel & Campbell, 2001), Dalton, Chartrand, and Finkel (2007; see also Finkel et al., 2008) explored whether there are basic self-regulatory consequences of well-coordinated or poorly coordinated behavioral mimicry. They proposed that poorly coordinated mimicry can disturb nonconscious social coordination processes, thereby increasing the effort required by a social interaction. This basic hypothesis was confirmed in a series of experiments that used a two-task paradigm: Participants interacted with a confederate who either mimicked or antimimicked (adopted different) physical postures, mannerisms, and gestures, and then participants completed a self-regulatory task on their own. Using measures ranging from fine motor skills to consumption of junk food, the authors showed that interactions involving mimicry or antimimicry differentially impacted self-regulatory performance on the second task. For example, participants who were mimicked during an interaction procrastinated less on a subsequent boring math task than those not mimicked.

Another study that included a mimicry, an antimimicry, and a control condition (in which the participant and confederate were separated by a divider) uncovered that the effect of mimicry on self-regulation is driven by antimimicry depleting regulatory resources rather than by mimicry replenishing regulatory resources (Dalton et al., 2007). But the authors argued that antimimicry per se was not depleting. Rather, antimimicry was depleting only when it was inconsistent with schemas for a given type of social interaction. To test this hypothesis, they examined moderation by participant race. Drawing on research suggesting that nonverbal behaviors tend to differ markedly between same-race and cross-race interactions, the authors reasoned that although antimimicry was depleting in same-race interactions, the presence of mimicry would be schema inconsistent and therefore depleting during a cross-race interaction. The results confirmed that antimimicry interactions impaired self-regulation (assessed via Stroop task interference) in same-race interactions but actually produced the opposite effect in cross-race interactions. Moreover, mimicry's social consequences were dissociated from its self-regulatory consequences: Although mimicry depleted participants in cross-race interactions, they enjoyed mimicry interactions more.

In another study (Dalton et al., 2007, experiment 4), the authors demonstrated that experiencing poorly coordinated mimicry actually increases the attentional demands imposed on participants. The results of this last experiment suggest that poorly coordinated mimicry increases the monitoring and regulation required by an interaction and can thereby lead to subsequent impairments in self-regulatory functioning.

Taken together, research linking mimicry to self-regulation bolsters the notion that well-coordinated mimicry is an adaptive and automatic response. But these studies highlight that the adaptiveness of mimicry comes not only from its role in facilitating positive social interactions but also from its capability to save much-needed cognitive resources.

Thus far, we have reviewed a number of moderators and consequences of mimicry. (Mimicry has also been linked to empathy and perspective taking, which is discussed in detail later in this chapter.) To conclude, the literature documenting mimicry's moderators and consequences is extensive and continues to grow. As the mimicry literature matures, researchers can piece together more and more insights into mimicry's functionality, examining the relationships

between variables and triangulating around a theory as to why we mimic others so frequently and automatically and why it has the powerful impact that it does. In the following section, we describe current and past perspectives on why mimicry occurs.

Why Do We Mimic?

Mimicry as Communication

Research has traditionally adopted a heavy focus on the link between mimicry and rapport, so it is no surprise that one of the earliest theories of mimicry highlighted this link. This theory of mimicry contends that mimicry communicates understanding and togetherness and therefore fosters an empathic bond between interactants that leads to positive social outcomes (Bavelas et al., 1988; Bernieri, 1988; Condon & Ogston, 1966; Condon & Sander, 1974; LaFrance, 1979, 1982).

This proposition stemmed from literature on the communicative function of nonverbal behavior in general (e.g., Scheflen, 1964). An example from this broader research tradition is the findings of Kraut and Johnston (1979), who were interested in the communicative function of facial expressions. In a field study, they found that people were more likely to respond to happy situations with a smile when there was another person around than when they were alone, suggesting that the smile served a communicative function. Bavelas, Black, Lemery, and Mullet (1986) used the findings of Kraut and Johnston (1979) as a starting point for a controlled laboratory study designed to address whether mimicry is communicative. Specifically, they tested whether mimicry is an interpersonal event and whether it is actually received as a nonverbal message that conveys similarity or togetherness (see also Bavelas et al., 1988).

In one study (Bavelas et al., 1986), participants were seated in an experimental testing room and watched as two experimenters moved a television into the testing room. One of the experimenters wore a finger splint to signal that he had an injured finger. The study was rigged so that the television would appear to crush the splinted finger as the experimenters positioned it in front of the participants. Two experimental conditions were included. In one condition, the injured experimenter looked at the participant while he experienced his injury, and in the other condition, the experimenter hunched forward while he experienced his injury so that the participant could see only his facial profile. The experiment showed that participants who witnessed the experimenter wince because of a (fake) injury often winced in response, and the size of the participants' winces reflected how well they could view the wince on the face of the experimenter.

The results of this first study suggested to the researchers that mimicry is in fact an interpersonal response—mimicry occurred the most when interactants could see it occurring. But they also sought to determine whether mimicry is a communicative act. To show that mimicry is communicative, they would need to show that the facial expressions displayed by the participants were meaningful to others. In a second experiment, the researchers provided precisely this evidence. They gave naive decoders videotaped excerpts of the participants watching the staged injuries and asked them to rate the facial expressions of the participants on several dimensions. The naive judges saw only the participants and not the experimenter, so they could not tell what condition participants were in. The results revealed that the facial expressions of participants who saw the face of the injured experimenter (compared to those who saw only the experimenter's facial profile) were judged to be more knowing, caring, and appropriate. The authors concluded that mimicry functions to communicate an observer's vicarious response to an interaction partner.

The conclusion that mimicry occurs because of its communicative function could not account for studies documenting mimicry among participants who were alone and watching videotaped stimuli (Bavelas, Black, Lemery, MacInnis, et al., 1986; see also Hsee, Hatfield, Carlson, & Chemtob, 1990). If mimicry only exists as a communicative response, then why would it occur when a person is alone? Chartrand and Bargh (1999) put forth a different explanation for mimicry, one that could account for these earlier findings. Rather than focusing on the function that mimicry serves, these researchers discussed it in terms of the structures that enable mimicry to occur.

Mimicry as a Passive and Automatic Response

Rather than focusing on the communicative function of mimicry, Chartrand and Bargh (1999) focused instead on the preconscious nature of mimicry, arguing that mimicry is a passive and automatic response. They conducted a series of studies that demonstrated that mimicry occurs automatically. They found that under minimal conditions, among strangers who have no goal to affiliate with each other, mimicry still occurs. They surmised that because mimicry is an automatic response, it does not depend on the operation of goals such as communication or affiliation during the interaction. To get at the automatic nature of the effect, they questioned participants following the dyadic interactions. Specifically, they asked their participants a series of questions designed to probe for awareness of the mimicry. No participants reported that they were aware that mimicry had occurred even when specifically asked about it.

The mechanism considered responsible for mimicry was a passive perception–behavior link. The notion of a perception–behavior link has its roots in the notion of ideomotor action, first proposed by Carpenter (1874) and James (1890). Ideomotor action occurs when the mere act of thinking about an action increases the likelihood of performing that action (see Chapters 2 and 18). Essentially, the regions of the brain that become active on thinking about an action are the same regions that become active when we engage in that action ourselves. Seeing another person engage in a behavior is another way to heighten activation. Thus, we are more likely to engage in a particular behavior when we perceive another person engage in that same behavior. That is, there is a direct and automatic "perception–behavior link." In the following section, we discuss evidence for this link.

BEHAVIORAL EVIDENCE FOR A PERCEPTION–BEHAVIOR LINK

Most of the evidence supporting the existence of a perception–behavior link comes from neuropsychological research on mirror neurons with nonhuman subjects (Gallese, Fadiga, Fogassi, & Rizzolatti, 1996; Rizzolatti, Fogassi, & Gallese, 2001; for a review, see Dijkersterhaus & Bargh, 2001). Using monkeys as research subjects, researchers have even begun to develop a physiological model for the perception–behavior link (Rizzolatti & Craighero, 2004; Rizzolatti et al., 2001; Rumiati & Bekkering, 2003; Williams et al., 2000).

Because the methods are generally unfeasible with human participants, researchers have developed clever techniques to demonstrate the existence of a perception–behavior link in humans. Sebanz, Knoblich, and Prinz (2003) used a spatial compatibility task called the Simon Task (Craft & Simon, 1970; Simon, 1990) to test whether perceiving action performed by another individual in fact activates a cognitive representation for that action in the self. In the task, a finger wearing either a red or a green ring was presented on a computer screen, and participants had to ignore the direction

that the finger was pointing (left, right, or forward) and instead indicate its color by left or right clicking a computer mouse. The responses could be either compatible (finger points toward the correct button), incompatible (finger points toward the incorrect button), or neutral (finger points forward).

One group of participants completed this task alone, and results revealed a spatial compatibility effect—responses were faster on compatible trials and slower on incompatible trials as compared to neutral trials. A second group of participants completed a go/no-go version of the Simon Task in which they responded either to only the red rings or only the green rings and again had to ignore the direction of the pointing finger. This second group of participants completed this task under two different counterbalanced-order conditions: individually (e.g., responding only to red and ignoring green) or with a partner (if responding to red and ignoring green, the partner would respond to green and ignore red).

Sebanz et al. (2003) found that although the task instructions were the same for the participants in both go/no-go conditions (e.g., respond to red and ignore green), the fact that the task was performed either individually or next to a partner had an effect on the pattern of performance. When the task was completed individually, response times were relatively fast for all three types of trials. When the task was completed with a partner, response times were faster on compatible trials than on incompatible trials. In other words, when participants completed the go/no-go version with a partner, their pattern of performance suggested a spatial compatibility effect, mirroring the pattern shown by the first group of participants, who completed the entire task alone. Note that because participants in these go/no-go reaction-time tasks need respond to only one stimulus, spatial compatibility effects usually do not occur. But the authors predicted and found such an effect when the task was completed with a partner.

The authors surmised that participants working with a partner mentally represented their partner's action in the same way they represented their own and that because the representations involved with perceiving the actions of the partner are the same representations that would become active when perceiving and planning one's own actions, participants performed as though they were completing the entire task alone even though they were actually completing the go/no-go version of the task. In another study, the authors ruled out a social facilitation explanation for these effects. Together, the studies provide behavioral evidence for a perception–behavior link.

NEUROPSYCHOLOGICAL EVIDENCE FOR A PERCEPTION–BEHAVIOR LINK

Recent investigations using functional magnetic resonance imaging (fMRI) and positron emission tomography also support the perception–behavior link postulated by ideomotor theory (see Chapter 13). Jeannerod and colleagues (Decety, Jeannerod, Germain, & Pastene, 1991; Jeannerod, 1994, 1997) examined activities such as weightlifting and running and showed that both mentally simulating these activities and performing these activities activated the same premotor cortex neurons in humans (see also Decety & Grezes, 1999; Iacoboni et al., 1999). Likewise, Paus, Petrides, Evans, and Meyer (1993) showed that thinking about words or gestures activated the anterior cingulated cortex in the same way as saying these words or performing these gestures (Chapter 7).

While these studies demonstrate a link between cognition and action, they do not show a link between the perception of another person's behavior and action. However, evidence for such a link does in

fact exist. Several other areas, such as the posterior parietal cortex (Ruby & Decety, 2001) and the cerebellum (Grossman et al., 2000), show similar activation when one performs or imagines and when one observes another perform the same action. These neuropsychological studies provide the most direct evidence for a link between one's own and another's perception–action systems. Researchers have conceptualized this link in a variety of different ways, all of which are variants of the basic ideomotor action hypothesis.

CONCEPTUALIZING THE PERCEPTION–BEHAVIOR LINK

Shared Representations

Prinz (1990, 1997) proposed the common-coding hypothesis, a shared representational system for perception and action that extends the ideomotor action hypothesis to perception of events and actions, and to imitation. Action is presumed to be represented in terms of its perceivable effects (not in terms of the actions per se). These representations automatically give rise to actual behavior after a certain threshold level of activation is reached. This hypothesis has received empirical support with the discovery of "mirror neurons" in humans (Iacoboni et al., 1999; Koski, Iacoboni, Dubeau, Woods, & Mazziotta, 2002) and macaque monkeys (Metzinger & Gallese, 2003; Rizzolatti et al., 2001). Mirror neuron research suggests that common coding occurs in single neurons in the brain. Gallese et al. (1996) discovered premotor cortex neurons in the macaque monkey that fired both when the monkey grasped an object and when the monkey observed an experimenter grasp the object, hence the name "mirror neurons." Other evidence suggestive of common coding comes from a study conducted by Fadiga, Fogassi, Pavesi, and Rizzolatti (1995) that showed that perceiving a target grasping an object and grasping the object oneself result in similar muscular responses (see also Musseler & Hommel, 1997).

Schemas

Other arguments in favor of a perception–behavior link have been made in terms of schemas (e.g., Barresi & Moore, 1996). Unlike the shared representations account, which posits shared systems within the brain, the schema arguments are made from a purely cognitive perspective. According to this perspective, the schemas that activate when one produces an action have significant semantic overlap with the schemas that activate when one perceives and interprets the actions of others. Therefore, these two types of schemas tend to be active at the same time. Thus, not only does perception incite action, but action activates the corresponding behavioral representation and its overlapping interpretational schema (Berkowitz, 1984; Carver, Ganellen, Froming, & Chambers, 1983) and thereby influences the interpretation of one's perceptual landscape (Mussweiler, 2003).

Barresi and Moore's (1996) theory proposes that schemas structure the different sources of information, and therefore first-person and third-person information as well as imagined and perceived information cannot be confused. Because schemas are assumed to impose structure, this theory implies that when one perceives one's own action (e.g., on a videotape), the same system is involved in perception and action, but when one perceives another's action, different systems are involved in perception and action. Two hypotheses derive from Barresi and Moore's theoretical assumptions. First, individuals should be better able to recognize themselves than others, and, second, individuals should be better able to predict the future effects of their own actions than the effects of the

actions of others. Self-recognition does appear superior to other recognition, whether looking at recognition of clapping (Repp, 1987), drawing style (Knoblich & Prinz, 2001), or body movement (Beardsworth & Buckner, 1981). Moreover, it appears that the effects of self-generated action are in fact more predictable than the effects of other-generated action. One study demonstrated that research participants more accurately predicted a dart's landing position on a dartboard when they were watching videos of their own throws compared to the throws of other individuals (Knoblich & Flach, 2001). This schema-based approach to the perception–behavior link is supported not only by these studies but also by neuropsychological evidence that different systems are involved in the perception of self versus others (see the discussion later in this chapter).

Theoretical explanations of the perception–behavior link are useful because they explain how it is that we humans can constantly engage in mimicry without intending to and even without being aware that it is occurring. But evidence for a perception–behavior link and explanations of the cognitive architecture supporting mimicry behavior do not shed light on why mimicry occurs in the first place. Dijksterhuis and Bargh (2001) argue that humans inherited the perception–behavior link from evolutionary ancestors, such as fish and frogs, which relied on perceptual processes to facilitate adaptive behavioral responding. Could it be that the perception–behavior link is a mere by-product of biological inheritance, or is it the case that the perception–behavior link serves an important and unique function to humankind? For these insights, we first turn to a social evolutionary theory of the origins of mimicry and then to recent research and theory in neuropsychology.

Mimicry From an Evolutionary Perspective

Ample evidence has been reviewed in this chapter suggesting that mimicry serves important social functions. For instance, mimicry communicates feelings of empathy to interaction partners and leads to prosocial feelings and behavior toward others. However, it may be erroneous to conclude that mimicry exists *because* of its consequences. These consequences might have evolved over time and actually have little to do with the origin of mimicry itself. The evolutionary perspective on mimicry accepts that the basic perception–behavior link was inherited from prehuman species for its physical survival value, then emphasizes that the prevalence of mimicry among humans today is largely because of its social survival value (Chartrand et al., 2005; Lakin, Jefferis, Cheng, & Chartrand, 2003). This approach highlights the social moderators and consequences of mimicry, which attest to its adaptive nature and social utility, while also acknowledging the cognitive structure supporting the basic perception–behavior link as the predecessor of these social functions.

According to this approach, basic survival benefits might have led to the automatization of mimicry in the evolution of humankind. Imagine, for instance, that you are a caveman (or cavewoman). You spend your day picking berries and hunting bison, all the while hoping that a large bear does not chase you down and eat you. Suppose that you are out berry picking with your fellow cavefolk, and suddenly several of them drop their berries and start running for the hills. Do you pause, assess the situation, and rationally decide whether you should follow? Or, at the sight of the others running, do you also bolt for the hills? In this situation, a caveman who thinks likely dies. A cavewoman who mindlessly follows the others likely survives. If situations of this sort occurred frequently

enough in humans' evolutionary history, then the development of an automatic imitative response would be highly adaptive for survival.

Today, large bears are not hiding in most of our berry bushes. But the cognitive mechanism that enabled adaptive responses in the lives of our predecessors is still in place. In addition, there could still be some value to automatically mimicking those around us, as mimicry does have many positive consequences. So it is no surprise that humans are hardwired to automatically mimic one another. As early as 1 month after birth, infants smile in response to the smiles of other people and stick out their tongues when they observe others doing the same (Meltzoff & Moore, 1977), and by 9 months, infants begin to mimic emotional expressions (Termine & Izard, 1988).

In the next section, we turn to some very recent research from the behavioral mimicry and neuropsychology literatures that might be fruitful in refining current conceptualizations of mimicry. Recent developments demonstrate not only that the perception–behavior link is rooted in our cognitive architecture but also that social responses, such as empathy and perspective taking, are linked to our cognitive architecture. The picture that emerges in light of these findings illustrates that mimicry may be an important process mediating the relation between the perception–behavior link and social responses.

Merging Old With New: The Social Neuroscience Approach to Mimicry

Theories of mimicry started with an emphasis on its social functions and then turned to an emphasis on its cognitive roots. It appears theorizing may come full circle, with research coming to the fore that links social responses to cognitive architecture. Given the importance of mimicry, empathy, and liking in facilitating social interactions, it might come as no surprise that these social feelings and behaviors have neural underpinnings. Knoblich and Sebanz (2006) made the provocative statement that basic perception–action links—evident at the level of single neurons—can actually facilitate positive social interactions and are in fact *crucial* for many social interactions. Another emerging line of research gives us reason to believe that at least some types of mimicry are rooted in the same neural substrates as empathy (Platek, Mohamed, & Gallup, 2005). In light of these and other findings, which are described later, we raise the possibility that mimicry mediates the link between various neural systems implicated in social interaction and their associated social responses, be they cognitive, behavioral, or affective. Granted that the evidence supporting this theory is incomplete, the proposition is exciting and worthy of consideration.

A social neuroscience approach to mimicry argues that it is through the perception–behavior link that we not only mimic others but also understand our social surroundings. From this perspective, mimicry is essential for translating neural responses into an understanding of social stimuli. Such an approach requires that links exist between neural substrates and mimicry; between neural substrates and social responses, including perspective taking and empathy; and between mimicry and social responses. Previously, evidence was reviewed regarding the neural underpinnings of mimicry. We review evidence for the other proposed links next.

MIMICRY AND EMPATHY

Early definitions of mimicry, such as that of Charles Darwin, viewed mimicry as synonymous with empathy. Evidence supporting this comes from some of the earliest

research done on mimicry. The traditional theory viewed mimicry as an indicator of empathy, a vicarious cognitive or emotional experience. For instance, Maurer and Tindall (1983) examined postural congruence effects on client perception of counselor empathy. Adolescents interacted individually with a school psychologist (counselor) to discuss career plans. Counselors either mimicked or did not mimic the client's leg and arm positions throughout the meetings. Immediately following the meetings, clients were asked to rate the counselor's level of empathy via the 16-item Empathy scale of the Barrett-Lennard (1962) Relationship Inventory. As predicted, the researchers found that clients who were mimicked by their counselors perceived these counselors to be more empathic. Therefore, these findings provide evidence for a link between mimicry and empathy.

More recently, the neural mechanisms involved in empathy have received a lot of attention (e.g., Jackson, Brunt, Meltzoff, & Decety, 2005). This research has been conducted as a way of exploring the perception–action model (Jackson & Decety, 2004; Preston & de Waal, 2002), which is a variant of the more general perception–behavior link and proposes specifically that the perception of emotions activates the neural mechanisms that generate those emotions. Jackson et al. (2005) conducted a magnetic resonance imaging study in which they showed participants pictures of people with their hands and feet in painful or nonpainful situations. Participants experienced both "self" and "other" perspectives and were asked to rate the level of pain from these different perspectives. The researchers found many similarities in the neural networks involved in processing pain from "self" and "other" perspectives; however, they also found differences. These differences imply that empathic responding is not the same as self-responding; empathy does not involve a complete adoption of the perspective of another. The authors argued this research helps identify the neural bases of empathy.

Based on this and similar research, Decety and colleagues have argued that the neural architecture involved with the coupling of perception and action plays a significant role in the experience of empathy (Decety & Jackson, 2004; Goldman & Sripada, 2005; Meltzoff & Decety, 2003; Preston & de Waal, 2002). These findings are key in supporting the idea that social behaviors that serve social functions can have neural substrates. Empathy is rooted in basic cognitive structures, as is mimicry.

Research on contagious yawning has taken a similar path. The notion that contagious yawning is a sign of empathy is not new (Lehmann, 1979). Contagious yawning has been described as a primitive reflection of the capacity to empathize with others. However, more recently, neuropsychological research has been gathered that supports the theoretical link between mimicry of yawning and empathy. Platek et al. (2003) showed that susceptibility to contagious yawning was positively correlated with a variety of indices of empathy, including performance on theory of mind tasks and a self-face recognition task. The authors stated that contagious yawning might have been occurring as a result of unconscious empathy and speculated on the basis of other research that unconscious mental simulation by mirror neurons might partially mediate the effect.

Platek et al. (2005) sought to provide fMRI data on the neural substrates involved in contagious yawning. They showed that viewing someone yawn activates brain areas involved in self-processing (e.g., self-referential processing and theory of mind) and concluded that their findings support the notion that contagious yawning is part of the neural network involved in empathy.

This line of research suggests that at least one type of mimicry (contagious yawning) has neural substrates and that these neural substrates are part of the same system involved in empathic responding, perspective taking, and self-processing more broadly.

Taken together, these findings suggest that mimicry is associated with empathy and that both empathy and mimicry are rooted in brain architecture, particularly the architecture implicated in the perception–behavior link. The existence of these links hints at the possibility that mimicry is essential for social responses such as empathy to occur. More direct evidence for the potential mediating role of mimicry in the relationship between brain and social responding will come in our discussion of mimicry and perspective taking, to which we now turn.

MIMICRY AND PERSPECTIVE TAKING

Research supports an association between mimicry and perspective taking, the cognitive component of empathy (Davis, 1983). Chartrand and Bargh (1999) demonstrated that individual differences in the propensity to take the perspective of others moderate the propensity to mimic others. Specifically, Chartrand and Bargh (1999) found greater mimicry of a target's behavior among research participants who scored high on a self-report measure of perspective taking than among those who were relatively low in perspective taking.

There is other evidence for a relationship between perspective taking and mimicry. Wallbott (1991) demonstrated that mimicry increases the propensity to take the perspective of another person in terms of understanding the meaning of their facial emotional expressions. Participants viewed pictures of strangers and were asked to judge the emotional expression conveyed on the stranger's face as happy, angry, sad, and so on. While they viewed the pictures, participants spontaneously mimicked the facial expressions that they saw. Importantly, Wallbott found that the more participants mimicked a facial expression, the more accurate they were at their judgments. This suggests that the more we mimic another person, the more able we are to understand their perspective, thereby hinting at mimicry's mediational role.

Jackson, Meltzoff, and Decety (2006) investigated the neural circuits involved in imitation and perspective taking in an fMRI study. The researchers had participants watch videos of an actor performing simple hand or foot actions. The clips were varied such that they depicted the actions either from the first-person or third-person perspective. The researchers also varied whether participants were instructed to passively observe the videos or imitate the actions performed in the videos. They found that motor production systems were activated equally whether actions were observed or imitated, as ideomotor theories would contend. They also found more activation in the motor production system from the first-person than the third-person perspective, in line with an assumption of ideomotor theory that suggests that more sensory feedback would be available through the first-person perspective as well as differential activation in particular regions. Other research (Samson, Apperly, Kathirgamanathan, & Humphreys, 2005) has examined the regions implicated in third-person perspective and shown that lesions to this region impair perspective-taking abilities. Together, research suggests that the same neural substrates are implicated in imitative behavior and perspective taking. This fact is suggestive of a common biological system linking these various social responses.

Importantly, it appears that mimicry is crucial for perspective taking to occur. Adolphs, Damasio, Tranel, Cooper, and Damasio (2000) examined the ability of their research participants to categorize the facial expressions of others and were specifically

interested in how participants with a lesion in the somatosensory cortex would perform on this task. Participants with somatosensory cortex lesions were impaired at judging emotional expressions, and according to the authors, their impairments occurred because their lesions compromised the mimicry response and resulting somatosensory feedback that facilitate the ability to understand the emotional expressions of others. These data provide compelling evidence for the idea that mimicry mediates the relationship between neural substrates and social responses.

To summarize, these findings bolster the argument that mimicry and perspective taking are supported by the same underlying neural systems. Importantly, the research of Wallbott, as well as that of Adolphs and colleagues, provide clues that mimicry might mediate the link between the neural substrates and their corresponding social responses. At the very least, this research suggests interdependence in the social responses of mimicry and perspective taking.

Humans possess a biologically based system of socially directed cognitions and behaviors, including perspective taking, mimicry, and empathic responding. We have reviewed evidence for the neural substrates of these various social responses. This evidence highlights the overlap in the neural underpinnings of these responses and provides preliminary evidence suggesting that these responses are interdependent. We believe that emerging research in social neuroscience will begin to play a more focal role in our conceptualizations of mimicry by addressing the fundamental theoretical issue of why mimicry occurs.

Conclusion

Mimicry functions as social glue; its presence is magnified when people are motivated to affiliate with others, when we experience certain moods, and when we are processing our environments in certain ways. Research is starting to reveal effects of mimicry that extend beyond the social interaction—mimicry affects how we process the world around us, our openness to persuasion, and even our ability to self-regulate. In this chapter, we described the theoretical and empirical issues that researchers of mimicry have tackled as well as those that have only begun to be understood. Converging evidence suggests that the fundamental purpose of mimicry appears to reside in its capacity to facilitate smooth and enjoyable social interactions. Emerging evidence goes one step further and suggests that mimicry's social role is fundamentally tied to the perception–behavior link that supports it.

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