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**The social functions of mimicry:  
On the consequences and qualifiers  
of facial imitation**

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This research was sponsored by the Netherlands Organization for Scientific Research (NWO).

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Thesis Radboud University Nijmegen –With ref. –

With summary in Dutch

ISBN-10: 9090196544

ISBN-13: 9789090196541

Subject heading: mimicry, empathy, emotions

Photography: Corinne Day, copyright 1998

Print: PrintPartners Ipskamp, Enschede

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**The social functions of mimicry:**  
**On the consequences and qualifiers of facial imitation**

een wetenschappelijke proeve op het gebied van de Sociale Wetenschappen

**Proefschrift**

ter verkrijging van de graad van doctor  
aan de Radboud Universiteit Nijmegen  
op gezag van de Rector Magnificus, prof. dr. C.W.P.M. Blom,  
volgens besluit van het College van Decanen  
in het openbaar te verdedigen  
op maandag 26 september 2005  
des namiddags om 3.30 uur precies

door

**Mariëlle Stel**

geboren op 14 mei 1979

te Ede

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Manuscriptcommissie: Prof. dr. A. F. M. van Knippenberg  
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# Chapter 1

## General Introduction

People constantly mimic each other's postures, behaviors, facial expressions, speech manner and a lot more. If I were to present this orally to you and suddenly look surprised, you will look surprised too. Maybe you have experienced it yourself, that you scratched your face wondering why you did that, because it did not itch, and then suddenly became aware that your interaction partner scratched him- or herself. This mimicry is automatic and happens all around us; you mimic and are mimicked, but why?

Baumeister and Leary (1995) have argued that people have a basic need to belong; they are motivated to form and maintain relationships with other people. It is plausible that mimicry can have a significant role in the bonding process, for mimicry appears to have a lot of positive consequences for us.

Literature about mimicry is extensive, however, existing studies focused on single effects of mimicry, lacking a comprehensive investigation with an overarching theory. In the present dissertation, I want to provide insights by more thoroughly investigating and relating benefits of mimicry to each other within a social approach to mimicry. In addition, I take a first step in creating an overarching theory by defining important factors that can predict limitations of mimicry.

Before elaborating on this, I will provide a definition of mimicry, give an overview of evidence on the existence of the phenomenon as such (do people mimic?) and its origins (why do people mimic?), which includes a description of research on the consequences of mimicry (what do we already know?). Then, I will elaborate on what needs further attention and will be explored in the present dissertation (the present thesis). Finally, I will give an overview of the four empirical chapters of the present dissertation.

### **Mimicry**

Although it was intuitively observed by Adam Smith as early as 1759, mimicry itself was first described by Lipps (1907). He proposed that mimicking movements in postures, vocal and facial expressions creates inner cues, which leads,



via afferent feedback (from the muscle-movements to the brain), to experiencing what the other person is feeling. Lipps called this ‘objective motor mimicry’.

In this dissertation, mimicry is defined broadly as ‘doing what others are doing’. This ‘doing’ can be verbal or nonverbal behaviors and expressions, like words, accents, speech rates, postures, gestures, and facial expressions. Mimicry of these verbal and nonverbal behaviors and expressions can either be conscious (also referred to as imitation), for instance like children intentionally copy behaviors to learn how to use a fork. But lots of mimicry also occurs unconsciously and automatically.

### *Do people mimic?*

Evidence for the existence and, at the same time for the automaticity of mimicry, stems from developmental, neurological, and social psychological research. First, developmental researchers have found newborns and very young infants to imitate eye blinking, vocal sound (Kugiumutzakis, 1996), facial gestures like tongues sticking (Meltzoff, 1988; Reissland, 1988), and emotional facial expressions, like happiness and anger (O’Toole & Dubin, 1968; Haviland & Lelwica, 1987). Mimicry has even been observed by a newborn being on earth for no more than 42 minutes (Meltzoff & Moore 1983, 1989), which provides further support for the notion that mimicry is an innate tendency.

The existence of the innate link between observed and executed action is also strengthened by neurological evidence on mirror neurons. The same neurons within a monkey’s brain become active when observing action or when executing this same action (for an overview see Rizzolatti, Fadiga, Fogassi, & Gallese, 2002). In addition, related findings in humans also demonstrate that common brain areas serve both perception and execution of actions (e.g., Decety, et al 1994, 1997; Decety, Chaminade, Grèzes, & Meltzoff, 2002), providing evidence that there is a close link between perceiving and doing, as was already hypothesized by James (1890). This hypothesis was also supported by Berger and Hadley (1975); they demonstrated that forearm muscle tension increased when watching arm wrestling.

Further evidence for the existence and automaticity of mimicry comes from social psychologists. People spontaneously and rapidly react to facial stimuli with distinct facial electromyographic reactions in the face as a function of the facial expression of the stimuli (Dimberg, 1990), reflecting the existence of *facial* mimicry. This mimicry occurs even when the stimuli are presented outside of conscious

awareness (Dimberg, Thunberg, & Elmehed, 2000). Other evidence comes from Chartrand and Bargh (1999) demonstrating that unconscious *behavioral* mimicry occurs even among strangers in the most minimal circumstances.

Next to facial and behavioral mimicry, people are also known to mimic *vocally*; Capella and Planalp (1981) demonstrated that over time, people in interaction came to match one another's conversational rhythms; meaning that they talked the same amount, and had an equal pausing duration. In addition, people have a tendency to imitate other speech patterns as well, like speech rate (Webb, 1972), pitch, and duration of utterance in conversations (Buder, 1991). In addition, Berger, Carli, Hammersla, Karshmer, and Sanchez (1979) showed people mimic *gestures* and *sign language*.

#### *Why do people mimic?*

There are different proposed functions of mimicry. From a developmental approach, mimicry is proposed to serve a function in social and empathic development. When looking at the evidence for this proposed function, Meltzoff and Moore (1994) showed that infants use imitation to communicate with persons they have seen before and to recognize those persons in a next encounter. They conclude mimicry to be "an important engine in infants' developing understanding of persons". There are also indications that nonverbal mimicry is important in social coordination before language is acquired (Eckerman, Davis, & Diwow, 1989). That children can use mimicry to shape and modulate their environment is also supported by Bates (1975); children who imitated basketball coaches received more positive reinforcements.

In clinical settings, mimicry is proposed to foster understanding and have beneficial effects for the therapeutic relationship and the patient's health. However, to this date there is no empirical evidence that mimicry exerts a causal effect on these variables. Evidence that mimicry may benefit the therapeutic relationship has come from Capella (1981): Congruency in body movements and mirror-imaged postures are positively related to perceptions of affiliation and verbal disclosure. In addition, congruency in posture between two people has been demonstrated to positively relate to a more positive, interpersonal, specific, and bound evaluation of the therapeutic session (Charney, 1966). A well-known study by Schefflen (1964) indicated that congruency of postures in psychotherapy groups positively relates to sharing

ideological positions. However, these studies were all correlational, so no causal conclusions can be drawn.

Social approaches to mimicry propose that mimicry has beneficial effects for all relationships and serves to create bonds between people (Van Baaren, Maddux, Chartrand, De Bouter, & Van Knippenberg, 2003; Van Baaren, Holland, Kawakami, & Van Knippenberg, 2004; Cheng & Chartrand, 2003; Lakin, Jefferis, Cheng, & Chartrand, 2003). Humans are social animals (e.g. Aronson, 1999; Ehrlich, 2002; Wright, 1994) and benefit from forming and maintaining bonds with other people (see Ainsworth, 1989; Axelrod & Hamilton, 1981; Barash, 1977; Bowlby, 1969; Buss, 1990, 1991; Hogan, Jones & Cheek, 1985; Moreland, 1987). Mimicry can play an important role in bonding processes. Chartrand and Bargh (1999) provided some evidence for this view, showing that participants, when being behaviorally mimicked, rated the interaction as smoother and evaluated their interaction partner more positively. This result has been demonstrated in different contexts, showing its robustness (Bates, 1975; Capella, 1993; Manusov, 1993). Interpersonal interactions also benefit from posture mirroring; it has been found to positively relate to rapport (LaFrance, 1979; Bernieri, 1988; Bernieri & Rosenthal, 1991) and involvement in the classroom (LaFrance & Broadbent, 1976). Finally, mimicry increases prosocial behavior; participants who were being mimicked were more helpful and generous towards the mimicker and to other people in general, compared with participants who had not been mimicked (Van Baaren, Holland, Kawakami, & Van Knippenberg, 2004).

*So what do we already know?*

In sum, mimicry is an automatic process that can serve social and empathic development and has benefits for bonding processes. When looking at evidence for the social functions of mimicry, correlational studies showed that *posture* congruency is related to more verbal disclosure, affiliation, rapport, involvement and more positive and personal interactions. Experimental studies on *behavioral* mimicry show that people who are being mimicked rated the interaction as smoother and show more prosocial behavior. In addition, mimicry of behaviors, movements and smiles leads to a more positive evaluation of mimickers.

### The present thesis

The present studies are based on the social approach to mimicry. Because there is accumulating evidence that mimicry is an innate and automatic tendency, mimicry thus should have enhanced, and perhaps still even enhances, chances of survival and reproduction. An influential determinant of physical survival is, according to Buss and Kenrick (1998), successful social interactions with other people. In addition, group living may have been, and still can be, a significant component in survival and reproduction (Brewer, 1997; Caporael & Brewer, 1991). So only those individuals who have been successful in forming and maintaining positive relationships with others survived and passed on their genes. Therefore I think, it is highly plausible that the evolutionary heritage to mimic may have had, and still has, benefits for survival, thus for forming and maintaining positive relationships with others.

The extant work on mimicry focuses on single, isolated effects of mimicry, lacking a comprehensive investigation on support and relations between different social benefits of mimicry. The mimicry-literature lacks an overarching theory that can predict mimicry processes and effects. So first, I want to provide insights by more thoroughly investigating and relating social benefits of mimicry to each other. If mimicry has social functions, mimicked as well as mimickers should benefit from this. Although a benefit for mimickers is that they are evaluated more positively, mimickers themselves have never been the primary reference of investigation. Therefore, it remains unclear what social consequences mimickers themselves experience.

I argue that empathic processes between people are the basis for creating bonds; When being empathic and feeling empathized with, people may feel connected, and an important foundation may be laid for liking and other bonding processes. Because the face is an important communicator of one's feelings, especially *facial* mimicry can play an important role in these empathic processes, and thus in creating bonds between people. Therefore in this present dissertation the social functions of mimicry are investigated using *facial* mimicry. However, there has not been much attention to empathic processes due to mimicry. Though mimicry is hypothesized to be the mechanism behind catching other people's emotions (Adelmann & Zajonc, 1989; Hatfield, Cacioppo & Rapson, 1992; Izard, 1971; Laird, 1984; Lipps, 1907; Tomkins, 1963) and to communicate understanding (Rogers,

1957), this is not supported by empirical evidence yet. If true, this means that mimicry can help feeling what others are feeling and also communicate this to the other person, who in turn feels understood, which is important in bonding processes. So in Part I of this dissertation, I investigate the social functions of mimicry by examining its social consequences; first attention is given to the social consequences of mimicry for mimickers, and secondly I focus on empathic processes in interactions between mimicker and mimickee.

In Part II of the present thesis, I proceed my investigation on the social functions of mimicry by examining its limitations. I believe that because mimicry had direct or indirect service for creating bonds between people, which is important in survival, only individuals with the tendency to mimic others survived and reproduced their genes. This does not mean, however, that mimicry has benefits in every single situation. I argue that mimicry only has benefits in social contexts, in which mimicry originally served its function. This will be investigated in Part II, where qualifiers on the consequences of mimicry are investigated in situations where (a) mimicry does not have (in)direct social benefits, and (b) mimicry even has disadvantages for bonding processes.

Below, I give an overview of the four empirical chapters. These chapters can be read independently from the rest of the dissertation. At the same time, this implies that parts of the introductions of the empirical chapters may have some overlap.

### **Overview of the empirical chapters**

#### **Part I: On the social consequences of facial mimicry**

##### *Chapter 2: Social consequences for the mimicker*

This chapter focuses on the social consequences of mimicry on the side of the mimicker. First, it will be investigated whether mimicry plays an important role in catching the emotions of other people. Next to the influence of mimicry on this affective form of empathy, effects two other empathy-related processes, cognitive empathy and understanding, are tested. As I have argued, these empathic processes should in turn affect bonding-related processes, like similarity and liking. So first, we test whether mimicking another person influences similarity towards and liking for the mimickee. Then interrelations between these consequences are examined, where we expect empathy-related processes to lead to bonding processes.

*Chapter 3: Empathic processes between mimickers and mimicees*

In Chapter 3 I will focus on empathic processes between mimickers and mimicees in interaction. At present we do not know whether social beneficial effects of mimicry occur in simple every-day interactions between people and how the effects on perceivers and targets emerge in real interactions, where the thoughts, feelings and behaviors of both are continuously and dynamically effected by each other. In Study 3.1 we therefore created a real interaction situation between 2 participants, which allows us to examine whether 2 people actually experience the same emotions. In Study 3.2 we investigate whether these empathic feelings activated by mimicry are also communicated to the mimicee, which has not been tested to this date. In addition, two other benefits of mimicry, interpersonal closeness and smoothness of the interaction, are more thoroughly examined.

**Part II: Qualifiers on the consequences of mimicry**

After a thorough investigation on the social functions of mimicry by examining its social consequences, I further examine its functions by discriminating qualifiers on the social consequences of mimicry. By showing limitations on the effects of mimicry, more information is provided about the social functions mimicry is assumed to serve.

*Chapter 4: When mimicry does not have (in)direct social benefits*

If effects of mimicry emerge primarily in settings where mimicry can potentially serve its social functions, the consequences of mimicry should be reduced when mimicry does not have (in)direct social benefits. This means that empathic effects due to mimicry might be reduced when people perceive emotional expressions knowing that emotions are not really experienced by the target. In these cases there is no point in empathizing with the person, because the social function to empathize is reduced. In Study 4.1, we want to test the hypothesis that, when perceivers assume that emotions are acted, i.e., when the expressions to be imitated are not seen as real, imitating these expressions does not have the same effects on empathy than when imitating expressions perceived as real, using a scene from a reality soap, about which, at the time the study was running, there was some debate regarding whether the actors were 'themselves' or were acting. In Study 4.2, we manipulate perceived realness of emotions directly.

*Chapter 5: When mimicry has negative effects for bonding processes*

The consequences of mimicry should not only be reduced when mimicry does not have (in)direct social benefits, but even when mimicry has negative consequences for bonding processes. When creating bonds between people, it is important that people like each other, because only then relationships can be positive, significant, and lasting. Therefore we argue that it is not functional to form a relationship with someone you dislike.

So first, we hypothesize that the automatic tendency to mimic should be reduced when you dislike someone. In Study 5.1 we test this by manipulating a priori liking and measure the amount of mimicry. To make sure that the results also apply to situations where participants had naturally formed an impression, we conducted Study 5.2, in which amount of mimicry was measured towards an unknown target belonging to a negatively stereotyped group compared to a target not belonging to a group which participants had negative attitudes of.

Secondly we hypothesize that, because it is not functional to create bonds with people you dislike, mimicking a disliked person should not enhance liking for this person, which is explored in Study 5.3. In addition, we argue that this function rule only applies to the active person, i.e. the mimicker, in that situation, so in Study 5.4 we created a situation with conflicting social functions of mimicry; where mimicry is dysfunctional for the mimicked, while being functional for the mimicker. In contrast to Study 5.3, we expect mimicry to enhance liking for the disliked person, when this disliked person is the mimicker in this situation.

## **PART I**

On the social consequences of facial mimicry





## Chapter 2

### Social consequences for the mimicker\*

Mimicry is all around us: you mimic and you are mimicked. For instance, when you look around, you may see two people talking to each other in the same postures, and smiles being returned by smiles. Or, when your interaction partner becomes emotional, and looks sad, you may start looking sad as well. Another example is a mother mimicking her baby: the mother opens her mouth when her baby opens its mouth to be fed; this is not because the mother wants to show the baby what to do; the behavior occurs *after* the baby opens its mouth and not when the baby does not open its mouth. So, people constantly mimic one another. Why? If this process is so omnipresent, it may have social functions<sup>1</sup>. What could these be?

One possible social function of mimicry is empathy and better understanding. Through mimicry, one may be able to empathize more with another person, and understand the person better. A good understanding of others enhances the predictability of their behavior, and thus has adaptive value (e.g., Fiske, 1992).

Another possible function follows from the need to belong. Baumeister and Leary (1995) have argued that humans have a basic need to bond with others and feel accepted by others. Mimicry could facilitate the formation and maintenance of satisfying personal relationships in several ways. For the mimicker, it could enhance liking through feelings of similarity and enhanced understanding. The person being mimicked, in turn, may feel better understood and feel that the mimicker is paying attention, which enhances liking for the mimicker. Thus, mimicry may smoothen the interaction and may enhance a sense of relatedness among interaction partners.

#### **Empathy and understanding**

Through mimicry, one may be able to better empathize with and understand another person. Some researchers see empathy as a cognitive process (Deutsch & Madle, 1975; Mead, 1934; Underwood & Moore, 1982). These researchers define empathy as perspective taking or role taking. Other researchers define empathy as a primarily affective process; it entails emotional responsiveness to the feelings

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\* This chapter is based on Stel & Vonk (2004)

experienced by others, in the sense that the observer feels the same emotion as the target person (Bryant, 1987; Eisenberg & Strayer, 1987; Feshbach, 1978; Hoffman, 1984). Still others view empathy as involving shared affect as well as cognitive processes (Davis, 1994; Katz, 1963; Kohut 1959). In our studies, both forms of empathy will be examined.

*Affective empathy.*

Emotions are contagious; people have a tendency to catch other people's emotions (Hatfield, Cacioppo & Rapson, 1992), like joy (Leventhal & Mace, 1970), fear (Kerckhoff & Back, 1968), depression (Teoh, Soewondo, & Sidhartha, 1975), and anger (Reay, 1960). Neumann and Strack (2000) found evidence for vocal mood contagion; emotional vocal expressions of a target induced congruent mood states in listeners. In their second study they demonstrated that participants who had repeated the speech of the target, rated the target as more happy or sad, congruent to the repeated vocal expression. However, it remains uninvestigated whether mimicry is responsible for the congruent mood state in the mimicker.

Lips already proposed in 1907 that empathy is due to an automatic motor mimicry response to another's expression of affect, and that via nonverbal feedback people receive from their own facial expressions or bodily postures, emotions are caught. So affective empathy (emotional contagion) is proposed to be mediated by mimicry. Similarly, later authors (Adelmann & Zajonc, 1989; Izard, 1971; Laird, 1984; Tomkins, 1963) view emotional contagion as a two-step process. First, mimicry occurs automatically and unconsciously. When you look at someone's face, you automatically mimic the expression. The second step in the process is facial, vocal, and posture feedback. In case of facial feedback, Darwin (1872/1965), Izard (1977) and Tomkins (1982) have proposed that the experience of emotions is affected by feedback from the muscles that are activated in the face (see Hess, Kappas, McHugo, Lanzetta & Kleck, 1992 for empirical evidence). This feedback mechanism applies to postures and vocal processes as well.

Hatfield, Cacioppo, and Rapson (1992) even included mimicry in their definition of primitive emotional contagion: "the tendency to automatically mimic and synchronize movements, expressions, postures, and vocalizations with those of another person and, consequently to converge emotionally". However, it has never been shown empirically that there is a direct link between mimicry of facial expressions and emotional contagion. Gump and Kulik (1997), Blairy, Herrera, and

Hess (1999) and Hess and Blairy (2001) failed to find a causal relation between mimicry and emotional contagion. We suggest that this is because all of these studies relied on static (photographs, Gump & Kulik, 1997; Blairy, Herrera & Hess, 1999) or very brief stimulus materials (15 seconds; Hess & Blairy, 2001).

We argue that these stimuli are not sufficient to produce empathy towards the mimicked person, in the way they do in real life. If one wants to investigate emotional contagion as a function of mimicry, one has to investigate it in ecologically valid settings, i.e., in settings where mimicry has a social function. In our study, therefore, we use longer stimulus materials, that allow participants to gradually "get into" the target person's emotions; we present participants with video fragments of a target person talking to a therapist. We hypothesize that imitation of facial expressions during the video will directly lead to more contagion of the target's emotions (affective empathy), compared with no mimicry (Hypothesis 1).

#### *Cognitive empathy.*

Studies about mimicry and empathy all concern affective empathy, except for Chartrand and Bargh's study (1999, study 3), in which they demonstrated a link between mimicry and cognitive empathy. The researchers showed that dispositionally empathic individuals mimic to a greater extent than other people. However, it remains unexplored whether the amount of mimicry affects cognitive empathy towards a specific target person.

Through mimicry, one comes to stand in the other's shoes, which enhances perspective taking. We thus hypothesize that imitation leads to more cognitive empathy compared with no mimicry (Hypothesis 2). In addition, we expect that affective empathy influences cognitive empathy; when one catches the emotions of another person, one should be better able to adopt the other's perspective (Hypothesis 3a). Conversely, we also think that emotions are more strongly caught when one takes the other's perspective (Hypothesis 3b). Thus, we hypothesize that both forms of empathy reinforce one another.

#### *Understanding.*

To understand someone, means to understand the causes of a person's behavior. This way, one can explain behaviors and emotions of others. It allows one to predict other's behavioral and emotional responses, and to act on this sense of understanding. We propose that mimicry could facilitate this process. Although there is a common intuitive notion that mimicry could enhance understanding, no previous

studies have directly investigated the influence of mimicry on understanding, as noted by Hess, Philippot, and Blairy, 1999. Blairy et al (1999) and Hess and Blairy (2001) investigated a related process, namely, emotion recognition. In these studies, no relation between mimicry and recognition accuracy were found. Stel and Van Knippenberg (2002) did show that mimicry affected emotion recognition, using reaction times. Therefore, we think the related process of understanding may also be influenced by mimicry; so we hypothesize that imitation of facial expressions influences the understanding experienced by participants: When expressions are mimicked, participants will report more feelings of understanding compared with no mimicry conditions (Hypothesis 4a). We further assume that this effect is mediated by cognitive empathy (Hypothesis 4b): When you come to stand in the shoes of another person, you take the perspective of the person; as a result, a sense of enhanced understanding may emerge.

### **Bonding**

Mimicry could result in feeling more connected with one another. As noted earlier, this effect could occur on both sides of the interaction, but in this research we focus on the mimicker.

#### *Similarity.*

When facial expressions are mimicked, the emotional and cognitive state of the target person and the mimicker may become similar. This could influence the perceived similarity between the two. So, we expect that perceivers who mimic facial expressions will report more similarity with the target than perceivers who do not mimic (Hypothesis 5). Gump and Kulik (1997) suggested that mimicry may increase coherence between interaction partners by making them more similar to one another. In addition, Bailenson and Yee (2005) demonstrated that mimicry leads to more attitude similarity. But it has never been tested whether people actually *feel* more similar to each other as a result of mimicry.

#### *Liking.*

In addition, we assume that mimicry results in more liking for the target (hypothesis 6). Previous studies, showing that mimicry and 'rapport' are positively related (i.e. Bernieri, 1988; LaFrance, 1979), have been correlational, so no causal effects of mimicry have been tested so far. Chartrand and Bargh were one of the few who did manipulate mimicry in their studies, and found that liking and smoothness of

the interaction was enhanced. The difference with our study is that, in the study of Chartrand and Bargh, a confederate mimicked the behavior of the participant, who as a result liked the confederate more. In our study, the participants themselves were the ones who mimicked. So we test a different hypothesis, namely that mimicking – rather than being mimicked – produces more liking for the target. Van Baaren, Holland, Kawakami and Van Knippenberg (in press) following up on Chartrand and Bargh's work, found that persons being mimicked become more pro-social in general. At present, the explanation for these findings is unclear, but we suggest that mimicry produces a sense of being “in sync” with someone, which in turn satisfies people's fundamental need for relatedness (e.g., Ryan, Sheldon, Kasser, & Deci, 1996). Possibly, this effect emerges automatically. If so, it is conceivable that mimicry, even when done intentionally, has the same effects on the mimicker, and hence produces more liking for the person being mimicked. This important component of the relationship between mimicry and liking has not been examined previously.

An additional question that has not yet been addressed is what precisely mediates the effects of mimicry on liking. A possibility is that liking effects are not a direct result of mimicry itself, but are mediated by felt understanding and cognitive empathy (cf. Arriaga & Rusbult, 1998), and by feelings of similarity (cf. Byrne, 1971). Arriaga and Rusbult (1998) demonstrated that empathy resulted in less negative behavior attributions in situations in which conflicts could arise. So, mimicry could result in more liking for the person being mimicked due to empathic feelings. Mimicry could also result in more liking as a result of the perception of similarity, because we like similar others more than individuals who are less similar (Byrne, 1971). In addition, this enhanced liking, in turn, should influence mimicry, because it has been demonstrated that liking for a target influences the amount of mimicked behaviors (Stel, Van Baaren, Blascovich, McCall, & Vonk, 2005). These possibilities will be examined in this chapter as well.

Emotions are expressed by verbal and nonverbal communication. We assume that the effects hypothesized are due to mimicry of nonverbal facial expressions of emotions. However, it is possible that explicit instructions to imitate or not imitate, as given in our study, have a differential influence on the attention to verbal information of the video, which could (partially) produce the predicted effects. To address this possibility, we include the variable Information in our study; half of the participants

receive verbal and nonverbal information (sound and vision), while the other half only receives nonverbal information (vision only). This allows us to examine, in addition, if emotional contagion is stronger when receiving verbal information as well.

## **Study 2.1**

### **Method**

#### *Participants and design*

Participants were 181 (74 male and 107 female) students at the Radboud University Nijmegen. Their age ranged from 17 to 39 years, with an average of 21.3. They participated for payment (€2,-). They were randomly assigned to the conditions of a 3 (Imitation; yes vs. no vs. control) x 2 (Video; happy vs. sad) x 2 (Information: sound + vision vs. vision only) between-subjects factorial design. Males and females were counterbalanced across conditions.

#### *Procedure*

The study was run individually. Participants were told that they were going to watch a video, but would first work their way through some papers. These included a confidentiality consent form, background information about the video and, in the imitation and no imitation condition, Imitation instructions (see Materials). The experimenter emphasized the importance of these instructions in advance. She also demonstrated how to start and stop the video player and showed the participants the questionnaire, to be filled out after seeing the video. After asking if there were any questions, the experimenter left the room and participants could go through the experiment at their own pace.

Participants were recorded while watching the video in order to check whether the instructions were carried out<sup>2</sup>.

#### *Materials*

*Video.* All participants saw a film of three-and-a-half minutes of a young woman (an actress), named Marije, who acted that she was talking with her therapist. Participants were told that they would see fragments of the therapy session, in which the questions and comments by the therapist had been cut from the video. The video consisted of four fragments. Depending on the video condition, participants saw Marije talking about a happy event or a sad event. On the happy video, she talked about meeting her current boyfriend; she was very happy and excited and she laughed and smiled talking about specific events. On the sad video, she talked about finding

out that her father had Parkinson's disease; her facial expression was sad. She did not cry, but at the end she was not far from it and was suppressing her tears. On both videos, only the face and part of the shoulders were visible.

Half of the participants saw a video with sound and vision, the other half saw the same videos, except that we muted it; participants only saw the nonverbal expressions of the target and did not hear her voice.

*Papers.* Participants were asked to sign a confidentiality consent form to agree that the information they would receive during this experiment would be treated confidentially. We used this consent form to back up our cover story that the woman on the video was treated by a therapist.

The background information informed participants that the video consisted of short fragments and that the comments of the therapist were left out. Additionally, some background information was given which differed depending on Video condition. Both descriptions read that Marije's father had Parkinson's disease and that she was going through a difficult period. In the sad video condition, participants were informed that the video was about the moment that Marije's father told her about his disease. In the happy video condition, the background information read that Marije was starting to pick up life again, and that the video was about meeting a new boyfriend.

One third of the participants received an instruction to imitate the facial expressions that the woman would display on the video, one third received an instruction not to imitate the expressions, while the other third did not receive an instruction. The instructions of imitation and no imitation were very specific and matched for content. For instance, both groups received instructions to pay attention to specific movements of eyes, eyebrows, and mouth, but one group was instructed to imitate them and one group not to. Participants in these conditions were also told to remind themselves of the instructions throughout the video.

The questionnaire contained, respectively, three questions concerning cognitive empathy (Did you take the perspective of Marije? Were you involved with the story that Marije told? Did you place yourself in Marije's shoes?), one about similarity feelings (Do you think you have much in common with Marije?), two about liking (Did you like Marije? Do you think you would get along with Marije?), and one about understanding (Did you understand Marije?). Subsequently, emotional contagion was measured by 11 emotion items, on which participants indicated how



happy, sad, or angry they felt during the video<sup>3</sup>. The emotions were: tense, enthusiastic, pleased, worried, irritated, angry, confused, cheerful, dreary, happy, and sad.

To examine whether perceived affect of the target plays a role in the assumed effects of imitation on affective empathy, these same emotion items were used to measure the perceived affect of the target; participants had to indicate how happy, sad, or angry they thought Marije felt. The order of the emotion ratings for self and target was balanced. For all questions, 7-point Likert scales were used.

At the end of the questionnaire, participants in the imitation and no imitation conditions were asked how difficult they thought the instruction was and to what extent it had affected their attention to the video. In an open-ended question, all participants were asked if they knew what the experiment was about. Finally, background variables were assessed.

## Results

Three participants (1 male and 2 female) did not believe in the authenticity of the video material. They were in different conditions (imitation, sad video, sound + vision; no imitation, happy video, sound + vision; and no imitation, sad video, only vision). Analyses including these participants yielded somewhat weaker effects. They were excluded in the analyses below. Because Sex of participant did not produce any significant effects, it was discarded from the analyses below.

Participants in imitation conditions rated the Imitation instruction as significantly more difficult ( $M = 4.34$ ,  $SD = 1.25$ ) than participants in no imitation conditions ( $M = 3.05$ ,  $SD = 1.72$ ),  $F(1, 117) = 22.04$ ,  $p = .00$ . There was no difference between these two conditions on rated attention,  $F(1, 117) = 1.87$ ,  $p = .17$ .

### *Manipulation check*

To check whether participants carried out the instructions, we coded the facial expressions of all participants, and compared these with the facial expressions of the target person. First, the videos of the target person were coded, using event sampling, i.e., a facial movement was coded whenever it was observed. Next, we further developed the coding system for the expressions of the participants, so that it included all relevant expressions and movements that the target person had shown. All observed behaviors fell into 6 broad categories, namely: blinking, changes in direction of gaze, movements of eyebrows, mouth, nose, and head movements. These

categories each consisted of more specific subcategories, for example, in the mouth category; laughing with mouth closed, with mouth open, yawning, licking lips, biting lips, stiffening lips. Coders had to rate when each of these behaviors was observed.

Three Independent raters coded the facial expressions of the participants. Interobserver reliability, using alpha statistics, of the variable 'amount of mimicry' ranged between .97 and .98. Subsequently, the behaviors of the target person were matched with the behaviors of the participants, using time blocks of 10 seconds. When the behavior of the participant matched the behavior of the target and occurred after the target's behavior within a time block, it was scored as a mimicry behavior.

The instruction to mimic or not to mimic produced a general tendency towards more vs. less facial movement,  $F(2, 115) = 37.55, p = .00$ . This could bias our results: When one has a general tendency to move a lot, the amount of mimicry increases, however, this is a side effect of overall movement. Therefore, we express the amount of mimicry as the proportion of mimicked behaviors out of all the participant's facial movements. A 3 (Imitation; yes vs. no vs. control) univariate analysis of variance (ANOVA) with this index as a dependent variable<sup>4</sup>, showed that the Imitation instructions effected actual mimicry,  $F(2, 115) = 15.97, p = .00$ . Participants who were instructed to imitate the target's facial expressions, mimicked the target more ( $M = 39.03\%$ ) than participants who did not receive an instruction ( $M = 24.22\%$ ),  $F(1, 83) = 8.75, p = .00$ . Participants who were instructed not to mimic, showed less mimicry ( $M = 10.61\%$ ) than those in the control condition ( $M = 24.22\%$ ),  $F(1, 80) = 8.80, p = .00$ . The imitation and no imitation condition also differed significantly,  $F(1, 67) = 38.70, p = .00$ .

#### *Affective empathy*

The items of the emotion scale can be classified into three core emotions: happiness, sadness, and anger. For each emotion, we took the set with the highest Cronbach's alpha. The final set for happiness consist of enthusiastic, pleased, cheerful, and happy ( $\alpha = .90$ ); for sadness: worried, dreary, and sad ( $\alpha = .83$ ); for anger only the item angry was used<sup>5</sup>.

The order of the questions about perceiver's vs. target's affect did not produce any significant effects; it was discarded from the analyses below.

A 3 (Imitation; yes vs. no vs. control) x 2 (Video; happy vs. sad) x 3 (Emotion: happiness vs. sadness vs. anger) x 2 (Information: sound + vision vs. vision

only) multivariate analysis of variance (MANOVA) was conducted with participants' emotion as a within-subjects factor.

A main effect of Emotion,  $F(2, 165) = 234.23, p = .00$ , indicated that participants in all conditions were less angry ( $M = 1.66, SD = 0.96$ ) than happy ( $M = 3.64, SD = 1.46$ ),  $t(1, 177) = 13.78, p = .00$  or sad ( $M = 3.12, SD = 1.50$ ),  $t(1, 177) = 14.30, p = .00$ . The difference between happiness and sadness was also significant,  $t(1, 177) = 2.66, p = .01$ .

This main effect was qualified by Video, demonstrating an overall emotional contagion effect,  $F(2, 165) = 89.49; p = .00$ . Participants reported being more happy ( $M = 4.55, SD = 1.27$ ) and less sad ( $M = 2.14, SD = 0.93$ ) and angry ( $M = 1.40, SD = 0.65$ ) when they saw the video with the happy event compared to the video with the sad event; in the sad video condition participants felt more sadness ( $M = 4.10, SD = 1.30$ ) than happiness ( $M = 2.72, SD = 1.00$ ) and anger ( $M = 1.92, SD = 1.30$ ).

As predicted (Hypothesis 1), this emotional contagion effect was qualified by Imitation,  $F(4, 330) = 2.84; p = .03$ . The pertinent means and contrast tests are presented in Table 2.1.

Simple effects showed that, in the happy video condition, Imitation affected feelings of happiness,  $F(2, 86) = 5.61; p = .01$ , and not feelings of sadness, or anger ( $F_s < 1$ ): participants reported less feelings of happiness when they did not imitate the expressions of the target ( $M = 3.92, SD = 1.40$ ) than when they did ( $M = 4.83, SD = 1.18$ ),  $F(1, 58) = 7.51, p = .01$  or than in the control condition, where they did not receive an Imitation instruction ( $M = 4.85, SD = 1.02$ ),  $F(1, 55) = 8.30, p = .01$ . The difference between the imitation and control condition was not significant,  $F < 1$ .

In the condition with the sad video, Imitation affected only feelings of sadness,  $F(2, 86) = 6.70; p = .00$ , and not feelings of happiness,  $F(2, 86) = 1.72, p = .19$ , or anger,  $F < 1$ : participants reported less sadness when they did not imitate the facial expressions of the woman on the video ( $M = 3.45, SD = 1.20$ ) than when these expressions were imitated ( $M = 4.58, SD = 1.08$ ),  $F(1, 57) = 14.57, p = .00$ , or when they did not receive an Imitation instruction ( $M = 4.27, SD = 1.37$ ),  $F(1, 57) = 5.95, p = .02$ . The difference between the imitation and control condition was not significant,  $F < 1$ . Later in this section, we will discuss the mediating role of actual mimicry in these effects.

There were no significant effects involving Information,  $F < 1$ . Thus, Imitation influenced experienced affect regardless whether the sound was on or off.<sup>6</sup>

Table 2.1. Means and standard deviations of perceivers' feelings of happiness, sadness and anger by Imitation for the happy and sad video (1 = totally not, 7 = very strong).

Video	Imitation	Dependent variable: emotions					
		happiness		sadness		anger	
		M	SD	M	SD	M	SD
happy video	imitation	4.83 <sub>a</sub>	1.18	2.06 <sub>a</sub>	0.98	1.41 <sub>a</sub>	0.76
	no imitation	3.92 <sub>b</sub>	1.40	2.14 <sub>a</sub>	0.73	1.50 <sub>a</sub>	0.69
	control	4.85 <sub>a</sub>	1.02	2.22 <sub>a</sub>	1.06	1.31 <sub>a</sub>	0.47
	total	4.55	1.27	2.14	0.93	1.40	0.65
sad video	imitation	2.99 <sub>c</sub>	0.96	4.58 <sub>b</sub>	1.08	1.83 <sub>b</sub>	0.95
	no imitation	2.59 <sub>c</sub>	0.98	3.45 <sub>c</sub>	1.20	1.83 <sub>b</sub>	1.04
	control	2.57 <sub>c</sub>	1.03	4.27 <sub>b</sub>	1.37	2.10 <sub>b</sub>	1.40
	total	2.72	1.00	4.10	1.30	1.92	1.14

*Note* Means with noncommon subscripts differ significantly ( $p < .05$ ) within each column.

#### *Cognitive empathy, understanding, similarity and liking*

Cronbach's alpha for the three questions about cognitive empathy was .86; for the two questions on liking it was .84.

A 3 (Imitation; yes vs. no vs. control) x 2 (Video; happy vs. sad) x 2 (Information: sound + vision vs. vision only) MANOVA was conducted on cognitive empathy, understanding, similarity feelings, and liking. Hypotheses 2, 4a, 5, and 6 all predict a main effect of Imitation on these variables. This main effect was significant for cognitive empathy,  $F(2, 166) = 13.67$ ;  $p = .00$ , understanding,  $F(2, 166) = 3.86$ ,  $p = .02$ , similarity feelings,  $F(2, 166) = 7.38$ ;  $p = .00$ , and liking,  $F(2, 166) = 6.46$ ;  $p = .00$ . Table 2.2 presents cell means and contrast tests.

Table 2.2. Means and standard deviations on perspective taking, understanding, similarity feelings and liking in imitation, no imitation and control condition (the higher the scores, the more perspective, the more understanding, the more similarity, and the more liking).

	cognitive empathy		felt understanding		felt similarity		liking	
	M	SD	M	SD	M	SD	M	SD
	imitation	4.58 <sub>a</sub>	1.14	5.01 <sub>a</sub>	1.14	2.98 <sub>a</sub>	1.40	4.98 <sub>a</sub>
no imitation	3.70 <sub>b</sub>	1.25	4.61 <sub>a</sub>	1.33	2.23 <sub>b</sub>	1.13	4.22 <sub>b</sub>	1.21
control	4.73 <sub>a</sub>	1.24	5.07 <sub>a</sub>	1.32	3.07 <sub>a</sub>	1.45	4.92 <sub>a</sub>	1.11

*Note* Means with noncommon subscripts differ significantly ( $p < .05$ ) within each column.

As can be seen, the effects are generally due to the no imitation condition. For cognitive empathy, similarity and liking the differences between imitation and no imitation, and also between no imitation and the control condition are significant, whereas there are no significant differences between imitation and the control condition. Thus, when participants did not mimic the expressions of the woman on the video, cognitive empathy was reduced ( $M = 3.70$ ,  $SD = 1.25$ ), participants felt less similar toward the target ( $M = 2.23$ ,  $SD = 1.13$ ) and liked the target less ( $M = 4.22$ ,  $SD = 1.21$ ) compared to when they did mimic ( $M = 4.58$ ,  $SD = 1.14$  resp.  $M = 2.98$ ,  $SD = 1.40$  resp.  $M = 4.98$ ,  $SD = 0.84$ ) and compared to the control condition ( $M = 4.73$ ,  $SD = 1.24$  resp.  $M = 3.07$ ,  $SD = 1.45$  resp.  $M = 4.92$ ,  $SD = 1.11$ ). For understanding, the same pattern was obtained, but here the differences between the imitation and no imitation condition,  $F(1, 117) = 3.02$ ,  $p = .08$ , and between the no imitation and control condition,  $F(1, 114) = 3.38$ ,  $p = .07$ , were only marginally significant. Information did not qualify the effects on cognitive empathy,  $F < 1$ , understanding,  $F(2, 166) = 1.76$ ,  $p = .18$ , similarity,  $F < 1$ , or liking,  $F < 1$ .

An unexpected main effect of Video on similarity feelings,  $F(1, 166) = 5.61$ ,  $p = .02$ , indicated that participants felt more similar to the target when she spoke about a happy event ( $M = 3.08$ ,  $SD = 1.41$ ) than when she told about a sad event ( $M = 2.46$ ,  $SD = 1.29$ ).

In addition, an unexpected effect of Video on understanding emerged,  $F(1, 166) = 4.07, p = .05$ ; participants reported that they understood the target more in the sad video ( $M = 5.01, SD = 1.20$ ) than the happy video ( $M = 4.79, SD = 1.34$ ).

There were also main effects of Information on perspective taking,  $F(1, 166) = 13.26, p = .00$ , and understanding,  $F(1, 166) = 44.11, p = .00$ . When both sound and vision were presented, participants reported more cognitive empathy ( $M = 4.55, SD = 1.25$ ) and more understanding ( $M = 5.27, SD = 1.02$ ) than when only vision was presented ( $M = 3.91, SD = 1.25$  resp.  $M = 4.11, SD = 1.40$ ).

### *Mediations*

*Hypothesized mediations.* How do all these consequences relate to one another; which consequences are influenced directly by mimicry and which are mediated by other variables? First, to examine the relatedness of affective and cognitive empathy (Hypotheses 3a and 3b), we used the regression method proposed by Baron and Kenny (1986). A dummy variable (Condition), contrasting the difference between, on the one hand, no imitation, and on the other hand, imitation and control, produced a significant effect for affective empathy,  $B = -.32, t = -4.83, p = .00$ , and (in a different regression model) for cognitive empathy,  $B = -.32, t = -4.94, p = .00$ . The latter does not fully disappear when we include affective empathy in the regression,  $B = -.15, t = -2.63, p = .01$ , although the effect of affective empathy on cognitive empathy is significant,  $B = .52, t = 8.22, p = .00$ ; but it does reduce the coefficient of the dummy variable from  $B = -.32$  to  $B = -.15$ . The Goodman I version of the SOBEL test indicated that the indirect effect of Condition on cognitive empathy via affective empathy is significant,  $z = -4.13, p = .00$ .<sup>7</sup> In conclusion, affective empathy partially mediates the effect of Condition on cognitive empathy.

Conversely, although the effect of cognitive empathy on affective empathy is significant,  $B = .54, t = 8.22, p = .00$ , the effect of Condition on affective empathy does not fully disappear when we include cognitive empathy,  $B = -.15, t = -2.44, p = .02$ . But again, it does reduce the coefficient of the dummy variable from  $B = -.32$  to  $B = -.15$ . The Goodman I version of the SOBEL test indicated that the indirect effect of Condition on affective empathy via cognitive empathy is also significant,  $z = -4.21, p = .00$ . In conclusion, cognitive empathy also partially mediates the effect of Condition on affective empathy.

Next, we hypothesized that cognitive empathy mediates the effect of mimicry on understanding (Hypothesis 4b). The effect of Condition on understanding,  $B = -.14,$

$t = -2.08, p = .04$ , disappears when we include cognitive empathy,  $B = .00, t = .66, p = .51, z = -4.24, p = .00$ . In this regression model, the effect of cognitive empathy on understanding is significant,  $B = .57, t = 8.49, p = .00$ . So cognitive empathy fully mediates the effect of Condition on understanding.

*Mimicry mediation.* The effects of instruction on affective and cognitive empathy, understanding, similarity, and liking only make sense if actual mimicry mediates these effects. As shown, the instruction to mimic or not to mimic succeeded, but maybe there are other variables than actual mimicry that can cause these effects. Because empathy (affective, cognitive, or both) mediates the instruction effects on understanding, similarity, and liking, we first tested mediation of actual mimicry in the influence of instruction on affective and cognitive empathy.

First, the dummy variable Condition produced a significant effect for cognitive empathy,  $B = -.22, t = -2.70, p = .01$ . This effect fully disappears when we include the proportion of mimicked facial expressions in the regression,  $B = -.14, t = -1.55, p = .12$ ; the effect of actual mimicry on cognitive empathy is significant,  $B = .01, t = 2.30, p = .02$ . According to the Goodman I version of the SOBEL test, the indirect effect of Condition on cognitive empathy via actual mimicry is significant,  $z = -2.14, p = .00$ . Thus, actual mimicry mediates the effect of Condition on cognitive empathy.

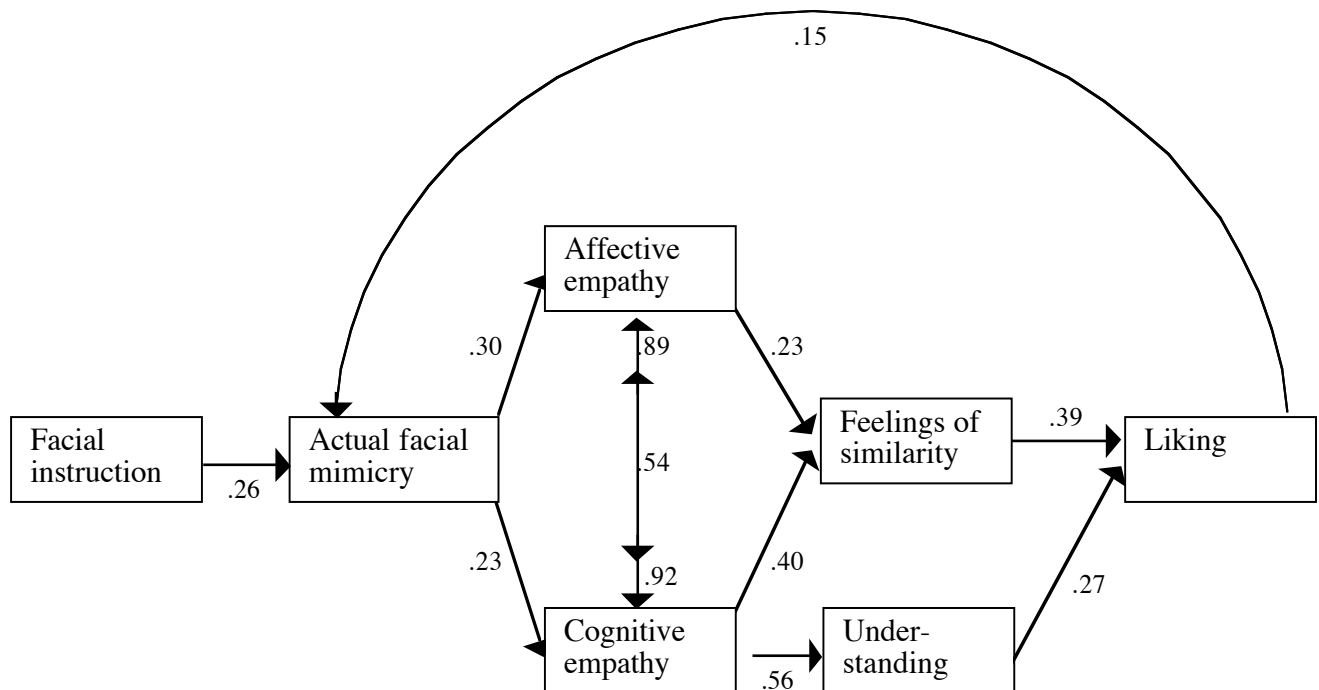
The effect of actual mimicry on affective empathy is significant as well,  $B = .01, t = 2.57, p = .01$ , but the effect of Condition on affective empathy,  $B = -.30, t = -3.54, p = .00$ , does not fully disappear when we include actual mimicry,  $B = -.21, t = -2.23, p = .03$ . However, this does reduce the coefficient of the dummy variable from  $B = -.30$  to  $B = -.21$ . The Goodman I version of the SOBEL test indicated that the indirect effect of Condition on affective empathy via actual mimicry is significant,  $z = -2.39, p = .02$ . So, actual mimicry partially mediates the effect of Condition on affective empathy.

What other factor causes effects on affective empathy? Looking at the mediation analyses concerning instruction, affective and cognitive empathy, one possible factor is cognitive empathy, because affective and cognitive empathy mediate each other. When cognitive empathy and actual mimicry are both included in the regression model, the effect of Condition on affective empathy disappears,  $B = -.12, t = -1.62, p = .11$ , with the effect of cognitive on affective empathy being significant,  $B = -.59, t = 7.52, p = .00$ .

*Pathway analysis*

The hypothesized relationships between all variables were tested in a LISREL model. Our model (see Figure 1) fitted the data well:  $\chi^2(12) = 11.18, p = .43$ ;  $AGFI = .93$ ,  $NNFI = .99$ . The standardized coefficients in the model are all significant ( $p < .05$ ). Looking at the LISREL model, the effects of imitation can be summarized as follows: Imitation influenced the actual amount of mimicry. Actual mimicry, in turn, directly enhances affective and cognitive empathy. As a consequence of perspective taking (more cognitive empathy) and emotional contagion (more affective empathy), similarity and felt understanding are enhanced. Similarity and understanding both enhance liking. This liking, in turn, further enhances the amount of mimicry.

*Figure 2.1.* Model summarizing the consequences for the perceiver of facial mimicry with standardized coefficients.



Note: The value between affective and cognitive empathy depicts a correlation between the error covariances of affective (.89) and cognitive empathy (.92).



## Discussion

This chapter shows that mimicry plays an important role in empathy and bonding related processes; the instruction to inhibit mimicry results in less contagion of the target's emotions, and in less cognitive empathy and understanding for the target compared to mimicry conditions. In addition, non-mimickers felt less similarity to and less liking for the target compared to mimickers. These instruction-effects on empathy and bonding related processes were caused by the *actual* amount of mimicry. Importantly, the control condition produced the same effects as the imitation condition. This is not surprising, because people nonconsciously and automatically mimic facial expressions (Dimberg, 1982), as was also shown in our study: Participants in the control condition mimicked the target person to some extent. Although they mimicked less than participants who were instructed to mimic, the results for these groups were highly similar. This suggests that the effects of mimicry are not gradual (i.e., the more mimicry, the stronger the effects); instead, a certain level of mimicry may be sufficient to produce these positive effects, and this is the level that occurs spontaneously. In spite of the fact that conscious imitation is more difficult, intentionality does not interfere with its effects: the effects of imitation and the control condition were similar.

In sum, the instruction to suppress the tendency to mimic produces reduced affective and cognitive empathy, understanding, felt similarity, and liking. This result emerged regardless whether the target's facial expressions were accompanied by verbal information indicating what the expressed emotions are about. As indicated by the Information effects, emotional contagion does not depend on verbal information. Consistent with previous studies, we found that emotions were caught when no verbal information is given about the causes of the emotion. This applies even to some extent when instructed not to imitate expressions.

Although the absence of verbal information did not reduce affective empathy in any way, it did reduce cognitive empathy and felt understanding. It makes sense that this difference occurred specifically on these two variables, because they both reflect cognitive processes. Affective empathy, felt similarity, and liking are more affectively driven, and were not influenced by verbal information.

We have no indication that other aspects of the instruction account for the effects obtained in our study, for instance, load effects: Participants in the imitation and no imitation condition did not report differences in their attention for the video.

Moreover, the imitation condition was evaluated as more difficult than the no imitation condition. This seems paradoxical; why would something that is so natural be more difficult than something that is, apparently, not a default behavior? Perhaps imitation is just like breathing; one breathes automatically, but when one pays attention to it, it is more difficult. Also, in the mimicry condition it may require more effort to monitor yourself assuring that every movement is correctly imitated, while in the no mimicry condition one can maintain an expressionless face. Indeed, the lower overall level of facial movements in this condition suggests that perceivers simply decided not to move their face at all.

The results can neither be explained by assuming that participants in mimicry conditions received more detailed information about the regions of the face involved in mimicry. Both the mimicry and no mimicry conditions contained instructions to pay attention to the specific features, but one group was instructed to imitate them and one group not to. Note, in addition, that results in the control condition (where participants did not receive any instructions and were not expected to pay attention to specific facial features) did not differ from the mimicry condition. This implies that information about the details of the face did not affect the results.

Another possible alternative explanation of our findings is that the results are due to demand characteristics. However, participants in experimental conditions reported that they thought the study was about load; i.e., the effects of an additional task (the instruction) on attention for the video and the remembrance of details.

Additionally, demand characteristics should produce more positive results in the imitation condition compared to the control condition, and not only reduced effects when expressions were not mimicked. In this context, it is also interesting to note that in a study by Stel and Van Knippenberg (2002), we obtained effects of mimicry on emotion recognition of faces presented for 67 ms. Because of the sub-optimal presentation in this study, participants were not able to intentionally influence the results.

Our results on the effects of mimicry-instructions may remind you of a recent study of Davis, Soderlund, Cole, Gadol, Kute, Myers, and Weihing (2004). They showed that effects of instructions to take perspective were also due to conditions in which participants were asked to inhibit perspective taking. The authors argued that those inhibiting instructions might have led participants to psychologically distance themselves from the target. This might also have happened in our mimicry-inhibiting

condition. However, our instruction-effects on cognitive empathy are fully explained by the amount of mimicry itself. This actual amount of mimicry only partially mediated the effect of mimicry on emotional contagion, the affective form of empathy. However, when cognitive empathy was included in this analysis, the instruction effect on emotional contagion was also fully explained. However we do acknowledge that psychological distancing might have occurred in the mimicry-inhibition condition, it cannot explain our results as such.

Participants generally felt more happiness than sadness. The difference can be explained in several ways. First, it is possible that the happy video is happier than the sad video is sad, which could cause a stronger contagion of the happy emotion. Second, people generally experience more positive than negative emotions. This may also explain why participants felt more similar to the target when she spoke about a happy event than about a sad event. In addition, taking into account their age, it is likely that participants had more experience with meeting a partner and feeling happy about it than with dealing with a dying parent.

The effect of Video on understanding, however, is opposed to that on similarity feelings. Participants reported better understanding of the target when she spoke about the sad event than about meeting her boyfriend. Feelings of similarity and understanding are not related, then, as is also apparent in the LISREL model; there is no path between similarity and understanding. An explanation of this Video effect on understanding is that in the sad video condition, there is more to understand than in the happy video condition. The situation described in the sad video is more complex than in the happy video.

Regarding the relationships between the variables, the LISREL analysis showed that our hypothesized relationships between variables were confirmed. Most importantly, empathy related processes (affective and cognitive empathy and understanding) proved to play an important role in bonding related processes (similarity and liking). This shows that empathy is, next to bonding, another important social function of mimicry.

In addition to this study we have been able to replicate the effects of mimicry on empathy and bonding related processes in more simple design, using the same, as well as a different target.

In sum, our results show that imitation of facial expressions, either controlled or uncontrolled, results in stronger contagion of emotions. This is not just a matter of

mood contagion; the effects obtained are specific for the emotion, because we differentiated negative emotions into sadness and anger: Participants who saw the sad video felt only more sadness when they imitated the target, not anger. Although the idea that imitating facial expressions lead to emotional contagion goes back to Lipps (1907), researchers until now have failed to demonstrate a causal relationship between *actual* mimicry and emotional contagion. Using more ecologically valid materials, we showed that mimicry indeed leads to catching the emotions of other people and we also go beyond that. Next to this increase in affective empathy, mimicry also enhanced cognitive empathy and understanding. Both forms of empathy influenced similarity feelings. Finally, we showed that facially mimicking the target person enhanced liking for this person. Empathy, similarity and understanding played a significant role in this process. So, in addition to Chartrand and Bargh's findings that being mimicked enhanced liking for mimickers, mimickers themselves also feel more bonded with the person being mimicked. This implies that mimicry can satisfy the need to belong for mimicked, as well as mimickers, and can provide a basis of positive and lasting relationships. Finally, this enhanced liking has the effect of further increasing mimicry. So, mimicry effects contribute to a positive circle in which liking and mimicry reinforce each other.

This direct relationship obtained between liking and mimicry suggests that the effects of feelings of relatedness on mimicry may be largely automatic. According to Baumeister and Leary (1995), people are instinctively driven toward developing and maintaining belongingness. If this need to belong indeed has an evolutionary basis, it makes sense that processes that enhance the sense of belonging, such as mimicry, are automatic. It is conceivable, thus, that there is an automatic imitation-relatedness link. This link may exist not only for the mimicker but also for the person being mimicked (Van Baaren, Holland, Kawakami and Van Knippenberg, in press). These effects, in turn, may enhance the smoothness of the interaction. More recent studies, in which we investigated the dynamic effects of mimicry in real interactions, also show (in addition to replicating the effects described in the present paper) that mimicry affects the target person as well (Stel & Vonk, 2005a).

Thus, imitation has positive consequences for people as social beings; it plays an important role in emotional processes, in understanding each other and in social bonding. Our results thereby illuminate the adaptive role of facial mimicry in understanding others and feeling related to others.

### Endnotes

<sup>1</sup> There are other functions of mimicry, i.e. learning and survival. But we restrict ourselves to the functions of mimicry in social interactions.

<sup>2</sup> We recorded everyone in the sound condition to check whether the instructions were carried out. Additionally, participants in the control condition of the no sound conditions were also recorded in order to compare the amount of mimicry of the sound and no sound control conditions.

<sup>3</sup> We included angry emotions, because we wanted to demonstrate that specific emotions are caught, and not just mood (positive vs. negative).

<sup>4</sup> Expressing the mimicry variable as the proportion of mimicry out of all the target's facial movements with taking into account this movement tendency yielded the same effects.

<sup>5</sup> Conceptually, irritated and angry belong together, but because of their low alpha (.32) we excluded irritated; because angry is a more core emotion and irritation might also measure annoyance due to the target person or the film.

<sup>6</sup> To illustrate that perceived target affect does not mediate these effects, a 3 (Imitation; yes vs. no vs. control) x 2 (Video; happy vs. sad) x 3 (Emotion: happiness vs. sadness vs. anger) x 2 (Information: sound + vision vs. vision only) MANOVA was conducted with perceived targets' emotion as a within-subjects factor. As with the perceivers' emotion, there was a Video x Emotion interaction,  $F(2, 164) = 440.77, p = .00$ ; participants perceived the target as more happy ( $M = 5.99, SD = 0.74$ ) and less sad ( $M = 2.16, SD = 0.85$ ) and angry ( $M = 1.41, SD = 0.69$ ) when they saw the video with the happy event than the video with the sad event; in the sad video condition, participants perceived the target more sad ( $M = 5.80, SD = 0.84$ ) than happy ( $M = 2.56, SD = 1.02$ ) and angry ( $M = 3.43, SD = 1.59$ ). This effect was not qualified by Imitation,  $F(4, 328) = 1.89, p = .11$ . This means that perceived target affect does not play a role in the Imitation effects of the targets' emotions. The effect of Video x Emotion x Imitation x Information was nonsignificant as well,  $F(4, 328) = 1.47, p = .21$ . The Video x Emotion effect was qualified by Information,  $F(2, 164) = 6.41, p = .00$ . Simple effects showed that the Video x Emotion effect was present when emotions were both verbally and nonverbally expressed,  $F(2, 113) = 430.44, p = .00$ , and also when only nonverbal emotions were expressed,  $F(2, 50) = 123.37, p = .00$ . However, in the happy video condition, the participants rated the woman as happier ( $M = 6.14, SD = 0.60$ ) and less sad ( $M = 2.01, SD = 0.73$ ) in the sound +

vision condition than in vision only conditions ( $M = 5.68$ ,  $SD = 0.90$  resp.  $M = 2.47$ ,  $SD = 1.00$ ),  $F(1, 86) = 7.85$ ,  $p = .01$  resp  $F(1,86) = 5.90$ ,  $p = .02$ . There was no difference for anger,  $F(1, 86) = 1.87$ ,  $p = .18$ . There were no significant differences of emotional ratings for the Information conditions in the sad video condition,  $F(1, 87) = 2.42$ ,  $p = .12$  resp  $F(1,87) = 3.36$ ,  $p = .07$  resp  $F(1, 87) = 3.00$ ,  $p = .09$  (The marginal differences are of the same pattern as for the happy video).

<sup>7</sup>Using the SOBEL test and the Goodman II version resulted in the same  $p$ -values and approximately the same  $z$ -values for all Goodman I tests.



## Chapter 3

### Empathic processes between mimickers and mimickees\*

Mimicry is said to enhance prosocial feelings. We argue that the evidence for this assumption is incomplete. Studies on prosocial consequences for the mimicker have been either correlational or have relied on video materials, thereby lacking real interaction data, which is an essential component in the assumption. Regarding consequences for the mimickee, researchers have mainly focused on benefits of mimicry for liking, smoothness of the interaction, and prosocial behaviors, lacking evidence whether mimicry causes the target to feel empathized with and understood. In the present article, we therefore more thoroughly investigate prosocial benefits for the mimicker and mimickee in social interactions.

Mimicry has many benefits in social interactions. For instance, students feel more involvement in the classroom when mirroring the teacher's postures (LaFrance & Broadbent, 1976). Mimickers as well as mimickees become more prosocial in general, that is, they show more prosocial behavior towards their interaction partner, as well as other people, and they give more to charity (Van Baaren, Holland, Kawakami, & Van Knippenberg, 2004; Stel, Van Baaren & Vonk, 2005). Another benefit of mimicry is that it satisfies the need to belong, by creating bonds between people; mimicry and 'rapport' are related (i.e. Bernieri, 1988; LaFrance, 1979). Liking is also enhanced by mimicry; When being mimicked, liking for the mimicker is enhanced (Chartrand & Bargh, 1999) and mimickers themselves report more liking for mimicked person (Stel & Vonk, 2004). In addition, mimicry enhances interpersonal closeness between people (Van Baaren & Chartrand, 2005).

Mimicry also has benefits for communication in emotional situations, for it can help interpreting the expressions of one's interaction partners and understanding their feelings and thoughts. Via mimicry, one adopts the same facial expression as the interaction partner. The activated facial muscles, in turn, send signals to the brain so that the corresponding emotions are felt. This feedback mechanism from muscles to the brain was already proposed by Darwin (1872/1965), and was further elaborated by Izard (1977) and Tomkins (1982) (see Hess, Kappas, McHugo, Lanzetta & Kleck,

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\* This chapter is based on Stel & Vonk (2005a)



1992, for empirical evidence). Thus, mimicry in combination with this facial feedback mechanism helps to feel what others are experiencing. This is an affective form of empathy, also referred to as emotional contagion (Hatfield, Cacioppo & Rapson, 1992). The direct link between mimicry and this emotional contagion was first demonstrated by Stel and Vonk (2004). In this study, we also showed that the cognitive form of empathy, perspective taking, is affected by mimicry as well, which in turn enhances understanding of others.

In sum, it appears that mimicry serves the need to belong, facilitates communication by enhancing understanding between people, and creates empathic feelings and behaviors among mimickers (also referred to as perceivers) and mimicked (also referred to as targets). However, the extant evidence for these conclusions is incomplete.

Studies on the prosocial feelings of the mimicker have been either correlational (Bernieri, 1988; LaFrance, 1979; LaFrance & Broadbent, 1976) or, in experimental studies, based on videotapes (Stel & Vonk, 2004), or both (Christholm & Strayer 1995). This means that, at present, we do not know (a) whether the assumed beneficial effects of mimicry occur in simple every-day interactions between people, and (b) how the effects on perceivers and targets emerge in real interactions, where the thoughts, feelings and behaviors of both are continuously and dynamically affected by each other.

In our first study of this chapter, we examine interactions between 2 participants, which allows us to test whether mimicked and mimicker actually experience the same emotions, i.e., whether perceivers catch the emotions of their interaction partner more strongly due to mimicry. This would also provide evidence that mimicry enhances emotional contagion of real emotions, i.e., emotions that are not acted by an actor on a video film. Regarding the cognitive form of empathy and understanding, we expect to replicate effects found in video studies, i.e., enhanced perspective-taking due to mimicry, which in turn is predicted to enhance understanding for the target.

If mimicry enhances empathy and understanding on the side of the mimicker, it is conceivable that this is also communicated to the target via mimicry. Rogers (1957) already assumed that mimicry communicates understanding, and recommended mimicking nonverbal behaviors of clients in clinical settings. To this date, it has been demonstrated that congruency in postures and body movements

characterizes rapport between therapist and client (Schefflen, 1964), and is positively related to perceptions of affiliation and verbal disclosure (Cappella, 1981). In addition, people who imitate others are also evaluated more positively (Bates, 1975; Manusov, 1993; Chartrand & Bargh, 1999). However, it remains uninvestigated whether mimicry truly communicates empathy and understanding. Some indirect evidence that mimicry serves communication purposes has been provided by Bavelas, Black, Lemery, & Mullett (1986). They showed that people wince more when they have eye contact with victims in pain. In addition, participants with increased wincing behaviors were rated as more caring by naive observers. Bavelas et al. concluded that eye contact enhances mimicry and, hence, that mimicry should serve communication purposes. However, the exact causal chain is not entirely clear here. For instance, when having eye contact with other people, one can also come to feel more personally involved, enhancing wincing behavior. In addition, wincing is not actual mimicry of the behavior of the victim, but an automatic empathic response due to seeing someone in pain, which occurs regardless whether the victim winces or not. In our first study, we investigate whether actual mimicry can communicate empathy and understanding to the mimicked person.

The study of real interactions gives us the opportunity to examine two other assumed benefits of mimicry, interpersonal closeness and smoothness of the interaction. Van Baaren and Chartrand (2005) showed that being mimicked makes mimicked feel closer to others *in general*. In Study 3.1, we examine whether this effect occurs *within* the relation between the target and perceiver, i.e., whether the mimicked feels closer towards the mimicker, and whether these effects are mirrored in the perceiver's sense of closeness towards the target.

Regarding smoothness of the interaction, Chartrand and Bargh (1999) showed that targets who were mimicked by a confederate, perceived the interactions as smoother than nonmimicked participants. Our study allows us to test whether these effects can be replicated in real interactions, and whether the perceiver feels the same. This question is important because perceivers are instructed to consciously mimic the target, so they are aware of what they are doing and actually must take extra effort to do it. In spite of this deliberate effort, we assume that the interaction is actually smoothed by mimicry so that mimickers rate the interaction as smoother just as targets do.

To summarize, in our first study we investigate the prosocial feelings due to mimicry on the side of the mimicker in social interactions and whether mimicry also signals empathy and understanding towards the mimickee. In addition, we test whether both target and perceiver feel closer to one another and rate the interaction as smoother due to mimicry.

### **Study 3.1**

#### **Method**

##### *Procedure*

Participants were told that they were going to interact with another participant and talk about a video fragment one of them had to watch beforehand. The cover story informed participants that we were interested in communication skills. After being introduced to each other, it was randomly decided who would be watching the video of about 5 minutes. In the mean time, the other person, the perceiver, received the Imitation instructions, whereas targets thought their interaction partner was working on another short task. Subsequently, both participants were brought to another room and targets were asked to tell perceivers what they had seen on the video and how that made them feel, while perceivers could ask questions. After a 4-minute interaction, they each went to a different room and filled out a questionnaire.

Participants were recorded during the interaction, to check whether the imitation instructions were carried out. Afterwards they were debriefed and were asked for permission to use the recordings.

##### *Participants and design*

Participants were 164 (46 male and 118 female) students at the Radboud University Nijmegen. Their age ranged from 17.50 to 37.50 years, with an average of 21.00. They participated for payment (€2,-) and were randomly assigned to the conditions of a 2 (Role: target vs. perceiver) x 2 (Imitation; yes vs. no)<sup>1</sup> x 2 (Video; positive vs. negative) between-subjects factorial design. Males and females were counterbalanced across conditions.

##### *Materials*

*Videos.* All participants saw a film of five minutes inducing positive vs. negative emotions. The positive video was a fragment from Walt Disney's Jungle Book, in which a little boy is dancing and a catchy song with a bear. The negative

video showed a fragment of Sophie's Choice in which a mother is forced to choose which one of her two children is sent away with a nazi soldier.

*Imitation instructions.* Half of the perceivers received an instruction to imitate the facial expressions the target would display, while the other half received an instruction to suppress the natural tendency to mimic. Participants were told to remind themselves of the instructions throughout the interaction and that they should not feel awkward about imitating or not imitating targets facial expressions, because, they were told, people never notice this. In a previous study (Stel & Vonk, 2004) these instructions were very effective and carried out well.

*The questionnaires.* The questionnaire for perceivers contained 11 emotion items, on which they indicated how happy, sad, or angry they felt during the interaction. The emotions were: tense, enthusiastic, pleased, worried, irritated, angry, confused, cheerful, dreary, happy, and sad. In addition, three questions measured cognitive empathy (Did you take the perspective of your interaction partner? Were you involved with the story that your interaction partner told? Did you place yourself in the shoes of your interaction partner?), and one understanding (Did you understand your interaction partner?). At the end of the questionnaire, perceivers in the imitation and no imitation conditions were asked how difficult they thought the instruction was.

The questionnaire for targets contained the same 11 emotion items on which they indicated how they felt during the video. In addition, targets answered the same questions for emotions felt during the interaction with the perceiver, because other variables than the video and talking about the video could influence targets feelings during this interaction.

Questionnaires for both the target and perceiver contained an adjusted version of Aron, Aron and Smollan's Inclusion of Other in Self (IOS) Scale closeness (1992). This scale presented 6 pictures, each containing two circles where one of the circles represented the participant, and the other their interaction partner. The 6 pictures varied in the distance and degree of overlap between the two circles<sup>2</sup>. Participants were asked to choose the picture that best represented how close they felt towards their interaction partner. In addition, we asked both targets and perceivers to indicate how smooth they thought their interaction had been. In both questionnaires some distracting questions were added about the specific contents the target had talked about, leading both to believe the study was about communication and information transfer. For all questions, 7-point Likert scales were used. Finally, background

variables were assessed and all participants were asked in an open-ended question if they knew what the experiment was about.

### Results and Discussion

Because Sex of participant did not produce any significant effects, it was discarded from the analyses below. None of the targets mentioned spontaneously that they were intentionally being mimicked or not mimicked in the open-ended question, nor did they recognize this when it was suggested directly during debriefing. For perceivers, there was no difference between the imitation and no imitation condition in rated difficulty of the instruction,  $F(1, 78) = 1.10, p = .30$ .

In the analyses, the unit of observation is a couple. One couple is not included in the facial expressions data because of camera problems.

#### *Manipulation check*

To check whether participants carried out the instructions, we coded the facial expressions of all participants and compared these with the facial expressions of the target person. First, the targets were coded, using event sampling, i.e., a facial movement was coded whenever it was observed. Next, we further developed the coding system for the expressions of the participants, so that it included all relevant expressions and movements that the targets had shown. These relevant expressions did not differ from the expressions observed in our previous study (Stel & Vonk, 2004). Therefore, the same coding system was used, consisting of 6 broad categories, namely: blinking, changes in direction of gaze, movements of eyebrows, mouth, nose, and head movements. These categories encompass more specific subcategories, for example, in the mouth category: laughing with mouth closed, with mouth open, yawning, licking lips, biting lips, stiffening lips. Coders rated when each of these behaviors was observed.

4 Independent raters coded the facial expressions of the targets and perceivers. They each rated different parts of the material: Our previous study (Stel & Vonk, 2004) showed that interobserver reliability of these ratings is very high, between .97 and .98. Subsequently, the behaviors of the perceivers were matched with the behaviors of the targets, using time blocks of 10 seconds. When the behavior of the participant matched the behavior of the target person and occurred after the target's behavior within a time block, it was scored as an instance of mimicry.

A 2 (Imitation) x 2 (Video) analysis of variance (ANOVA) with amount of mimicry as a dependent variable, confirmed that the Imitation instructions effected actual amount of mimicry,  $F(2, 76) = 10.50, p = .00$ ; Participants who were instructed to intentionally mimic the target's facial expressions, imitated the target more (25.00 % out of all their behaviors) than participants who were instructed to suppress mimicry (17.64 %).<sup>3</sup>

#### *Affective empathy*

To establish whether mimicry enhances affective empathy (emotional contagion), we analyzed whether targets and perceiver actually felt the same emotions during the interaction due to mimicry. The items of the emotion scale can be classified into three core emotions: happiness, sadness, and anger. For each emotion, we took the set with the highest Cronbach's alpha based on targets and perceivers scores. The final set for happiness consists of: enthusiastic, pleased, cheerful, and happy ( $\alpha = .80$ ); for sadness: worried, dreary, and sad ( $\alpha = .79$ ) for anger only the item angry was used.<sup>4</sup>

In the imitation condition, targets' and perceivers' feelings of happiness were more strongly correlated,  $r = .53, p < .01$ , than in the no imitation condition,  $r = .30, p = .06, z = 1.75, p = .04$ . In addition, sad emotions were marginally more strongly matched in the imitation,  $r = .61, p < .01$ , than the no imitation condition,  $r = .44, p < .01, z = 1.48, p = .07$ . Finally, feelings of anger were more strongly correlated between targets and perceivers in the imitation,  $r = .47, p < .01$  than in the no imitation condition,  $r = .25, p = .11, z = 1.65, p = .05$ .

So in general, targets and perceivers were more emotionally attuned to one another in the imitation than in the no mimicry condition.

*Mimicry mediation.* We used the regression method proposed by Baron and Kenny (1986) to demonstrate that these emotional contagion effects were due to mimicry. First, the dummy variable Imitation produced a significant effect for affective empathy<sup>5</sup>,  $B = -.74, t = -2.06, p = .04$ . This effect fully disappeared when we included the actual amount of mimicked facial expressions in the regression,  $B = -.43, t = -1.18, p = .24$ . In addition, the effect of actual mimicry on affective empathy was also significant,  $B = .10, t = 2.59, p = .01$ . According to the Goodman II version of the SOBEL test, the indirect effect of Condition on cognitive empathy via mimicry is

significant,  $z = -2.03$ ,  $p = .02$ . Thus, actual mimicry mediates the effect of Imitation on emotional contagion.

*Perceiver's cognitive empathy and understanding*

Cronbach's alpha for the three questions about perceiver's cognitive empathy was .83. A 2 (Imitation) x 2 (Video) ANOVA showed main effects on cognitive empathy,  $F(1,78) = 12.73$ ;  $p = .00$ , and on understanding,  $F(1,78) = 8.66$ ,  $p = .00$ ; indicating that mimickers could more easily take perspective ( $M = 5.03$ ,  $SD = 0.75$ ) and understood the target better ( $M = 5.80$ ,  $SD = 0.61$ ) than non-mimickers (resp.  $M = 4.17$ ,  $SD = 1.33$  vs.  $M = 5.24$ ,  $SD = 1.03$ ). There were no effects of Video, nor interaction effects.

In our previous chapter we showed that cognitive empathy mediated the effect of mimicry on understanding. To replicate this, we again used Baron and Kenny's (1986) regression method. The dummy variable Imitation produced a significant effect for understanding,  $B = -.56$ ,  $t = -2.99$ ,  $p = .00$ . This effect fully disappears when we include cognitive empathy in the regression,  $B = -.35$ ,  $t = -1.79$ ,  $p = .08$ . The final condition was also satisfied; the effect of cognitive empathy on understanding was also significant,  $B = .25$ ,  $t = 3.03$ ,  $p = .00$ . According to the Goodman II version of the SOBEL test, the indirect effect of Condition on cognitive empathy via actual mimicry is significant,  $z = -2.36$ ,  $p = .02$ . Thus, cognitive empathy mediates the effect of Imitation on understanding.<sup>6</sup>

*Target's feelings of being empathized with and understood*

Cronbach's alpha for the three questions about target's feelings of being empathized with was .77. A 2 (Imitation) x 2 (Video) ANOVA did not show the hypothesized main effect on empathy,  $F(1,78) = 2.25$ ;  $p = .14$ , nor on understanding,  $F(1,78) = .97$ ,  $p = .33$ . Although nonsignificant, the means are in expected direction (felt empathy:  $M_{\text{imitation}} = 4.93$ ,  $SD = 0.94$  vs.  $M_{\text{No imitation}} = 4.60$ ,  $SD = 0.97$ ; felt understanding  $M_{\text{imitation}} = 5.43$ ,  $SD = 1.17$  vs.  $M_{\text{No imitation}} = 5.19$ ,  $SD = 0.99$ ). There were no effects of Video, nor interaction effects.

*Closeness and smoothness of the interaction*

A 2 (Role) x 2 (Imitation) x 2 (Video) MANOVA showed a main effect of Imitation on closeness,  $F(1,78) = 14.02$ ;  $p = .00$ ; mimickers ( $M = 2.85$ ,  $SD = 1.03$ ) as well as mimicees ( $M = 2.70$ ,  $SD = 0.94$ ) felt closer to one another than in the no mimicry condition (resp.  $M = 2.40$ ,  $SD = 0.96$  vs.  $M = 2.10$ ,  $SD = 0.85$ ).

A 2 (Role) x 2 (Imitation) x 2 (Video) MANOVA on rated smoothness of the interaction showed a main effect of Imitation,  $F(1,78) = 2.12; p = .05$ ; perceivers ( $M = 4.28, SD = 1.22$ ) as well as targets ( $M = 4.78, SD = 1.40$ ) rated the interaction as smoother in the mimicry than in the no mimicry condition (resp.  $M = 3.88, SD = 1.52$  vs.  $M = 4.14, SD = 1.28$ ). In addition, a main effect of Role,  $F(1,78) = 4.58; p = .04$ , indicated that targets in general rated the interaction as smoother ( $M = 4.45, SD = 1.37$ ) than perceivers ( $M = 4.07, SD = 1.39$ ).

To summarize, perceivers and targets were more *emotionally* attuned to one another in the imitation than in the no imitation condition. In addition, perceivers could more easily take perspective of the target due to imitation, which in turn influenced understanding for the target. Both targets and perceivers felt more close to one another and rated the interaction as smoother in the imitation than in the no imitation condition. However, although the means were in the expected direction, targets did not feel more empathized with or understood better due to mimicry.

### Study 3.2

The results of Study 3.1 showed that the beneficial effects of mimicry on empathy and understanding occur in an every-day interaction between people, thereby replicating the effects of more contrived studies using video material with an actor exhibiting highly emotional behaviors. However, our expectancy that mimicry signals empathy and understanding to the target was not confirmed. A disadvantage of the study of real interactions is that they are fraught with error variance. Both targets and perceivers respond to specific individual characteristics and behaviors of the other person. These responses, in turn, influence subsequent behaviors. One of the individual differences involved concerns the perceiver's personality with respect to empathy, friendliness, extraversion – all of which can dramatically affect target's ratings of how understood and empathized with they felt. This could severely reduce the power the test of mimicry effects on these variables.

In our second study of this chapter, therefore, we used a confederate who was trained to behave in a standardized way, and we varied the amount of mimicry (imitation or no imitation of the target). So, no other variables other than mimicry can affect targets' sense of being empathized with and understood.

In addition, we used a different interaction situation than in Study 3.1. In a situation such as the one in Study 3.1, it would be difficult for the confederate to act in



a standardized way without being perceived as cold, because this situation calls for personal, not standardized reactions towards what the target is expressing. Therefore, we created a less personal and emotional situation, while still involving empathy and understanding; targets had to ‘solve’ moral problems; i.e., they had to choose between two bad choices of moral dilemmas and give a motivation for their choices. In this situation, the confederate can act in a standardized way without being perceived as cold and impersonal, and mimicry can still be perceived by the target as a sign of empathy and understanding.

This time we expected to obtain significant effects of mimicry on feeling understood and empathized with. In addition, we expected to replicate the effects found in Study 3.1 for the target on closeness and smoothness of the interaction.

## Method

### *Participants and design*

Participants were 60 (9 male and 51 female) students at the Radboud University Nijmegen. Their age ranged from 18 to 27 years, with an average of 21.23. They participated for payment (€ 2,-) and were randomly assigned to the conditions of a 2 (Imitation; yes vs. no) factorial design.<sup>7</sup>

### *Procedure*

Participants were told that in the experiment they were going to interact with another person to measure conversation abilities. Before the interaction started, they read two dilemmas (see Materials), which were going to be the topics during interaction.

Then, the experimenter brought the participant to the room where the interaction partner was already waiting. Participants were told that the interaction would have the form of an interview in which one of them asked questions about the dilemmas, and the other was the responder. They were told that it had been randomly specified who would fulfill which role. In reality, the interaction partner of the participant was a confederate, and the participant was always assigned to the role of responder. The confederate was trained to interact in a standardized way and was naive about the real purpose of the study. In addition, the confederate was instructed to naturally imitate the participant's expressions, postures and behaviors, or not to imitate. The experimenter told the participant and confederate that she would indicate when the interaction time of 5 minutes was over.

After the interaction, the participant and confederate were asked to fill out a questionnaire (see Materials) in another room. Afterwards all participants were debriefed about the real purpose of the study.

### *Materials*

*Dilemmas.* The dilemmas described two situations, in which the participant had to choose between two options (Spitzer, 2002). In addition, after responding to each dilemma, the confederate read variations on those dilemmas. The first dilemma described a situation in which a train could not be controlled anymore and would kill 5 people within a few seconds. The only possibility was to switch the route the train was on, which would only kill one person. Variations on this dilemma were, for instance, what the participant would do if the one person was his/her friend, and the other five were unacquainted, and what the participant would do when the confederate himself was this one person.

The second dilemma described a situation in which the participant was responsible for assigning donated organs to patients, and was able to save 5 lives by killing a healthy patient. Participants were asked whether they would save the lives of these 5 people or not. Additional variants described for instance that all 5 patients were friends and the healthy patient was not.

*Dependent measures.* The questions about empathy and understanding of Study 3.1 were reframed; participants were asked whether they felt their interaction partner took perspective of what they were feeling; was involved in what they were saying; had placed himself in their shoes; and whether they felt understood. In addition, the questionnaire also contained the same questions on closeness and smoothness of the interaction as in Study 3.1. To ensure results cannot be explained by mood effects, the final questionnaire further contained the same emotion items as in Study 3.1, this time targets had to report which emotions they had felt during the interaction. Finally, background variables were assessed and participants were asked what they thought the goal of the experiment was.

## Results and Discussion

### *Felt empathy and understanding*

Cronbach's alpha for the three questions about cognitive empathy was .76. A 2 (Imitation) ANOVA was conducted on felt empathy and understanding. Imitation affected cognitive empathy,  $F(1, 58) = 5.30, p = .02$ , and understanding,  $F(1, 58) =$

5.33,  $p = .02$ : When targets were mimicked they felt, more than in the no mimicry condition, that the interaction partner empathized with them ( $M = 4.64$ ,  $SD = 0.78$  vs.  $M = 4.13$ ,  $SD = 0.91$ ) and understood them ( $M = 5.33$ ,  $SD = 0.62$  vs.  $M = 4.82$ ,  $SD = 1.01$ ).

We used Baron and Kenny's (1986) regression method to check whether feelings of being empathized with mediate the effect of mimicry on feelings of understanding, as was the case in Study 3.1 for the perceiver. The dummy variable Imitation produced a significant effect for feeling understood,  $B = -.52$ ,  $t = -2.31$ ,  $p = .03$ . This effect *fully* disappears when we include feeling empathized with in the regression,  $B = -.33$ ,  $t = -1.51$ ,  $p = .14$ . Finally, the effect of feeling empathized with on feeling understanding was also significant,  $B = .36$ ,  $t = 2.91$ ,  $p = .00$ . According to the Goodman II version of the SOBEL test, the indirect effect of Condition on cognitive empathy via actual mimicry is marginally significant,  $z = -1.88$ ,  $p = .06$ .

In sum mimicry signals empathy towards the mimickee, and this in turn makes the mimickee feel understood.

#### *Closeness and Smoothness*

A 2 (Imitation) ANOVA was conducted on closeness, and smoothness of the interaction. Main effects of Imitation for closeness,  $F(1, 58) = 5.28$ ,  $p = .02$ , and smoothness,  $F(1, 58) = 6.98$ ,  $p = .01$ , indicated that when participants were imitated, they felt closer to the interaction partner ( $M = 2.96$ ,  $SD = 1.16$ ) and rated the interaction as smoother ( $M = 4.96$ ,  $SD = 1.09$ ) compared to participants who were not imitated (resp.  $M = 2.36$ ,  $SD = 0.86$  vs.  $M = 4.15$ ,  $SD = 1.25$ ).<sup>8</sup>

### **General Discussion**

Our studies unambiguously demonstrate that mimicry has benefits in social interactions. Focusing on the prosocial feelings empathy and understanding, we showed mimicry produced higher correlations between perceiver's and target's emotions. Mimicking perceivers also more easily took perspective of the target, which enhanced understanding. In our second study, we demonstrated that mimicry itself communicates empathy and understanding, even when no other signs of empathy were transmitted; when being mimicked, targets felt more empathized with and, as a result, better understood. In addition, we showed that mimicry leads both target and perceiver to feel more close to one another and experience the interaction as smoother. These effects of mimicry have not yet had any systematic research

attention. On the whole, then, it seems that mimicry leads target and perceivers to become more attuned to one another and more in sync.

Because mimicry is a natural tendency, one might argue that it is more difficult to suppress the tendency to mimic than to intentionally imitate someone's expressions. This would mean that the effects for perceivers in Study 3.1 can be accounted for by cognitive load in the no-mimicry condition. However, perceivers in the imitation and no imitation condition did not report any differences in the difficulty of carrying out the instruction. Note that intentionally performing an automatic and unconscious response also requires effort, because perceivers constantly had to monitor themselves, making sure that every movement was correctly imitated.

Furthermore, perceivers were instructed to pay attention to specific features of the target's face, while one group was instructed to imitate them and one group to suppress the tendency to mimic. So the results obtained for perceivers cannot be explained by assuming that perceivers in the imitation condition received more detailed information about the target's face. Note also that in a previous study (Stel & Vonk, 2004), we showed that results in the control condition (where participants did not receive any instructions) did not differ from the imitation condition. This suggests that information about facial details did not affect the results.

Another competing explanation, that the effects in Study 3.1 were due to demand characteristics (i.e., that participants were aware of the hypothesized effects of mimicry), can also be ruled out. First, targets did not even notice being imitated or not, so they could not have been influenced by demand characteristics. Most perceivers thought the study was about what kind of information and how accurately the information was transferred. In addition, this explanation has also been ruled out by the fact that the control condition in our previous study (Stel & Vonk, 2004) produced similar results as the mimicry condition; if demand characteristics influenced the results, the mimicry condition should have produced more pronounced effects than the control condition.

In Study 3.1, target's and perceiver's emotions on happiness and anger were more strongly correlated with each other in the imitation than in the no imitation condition. For feelings of sadness, the pattern was the same but the difference between conditions failed to reach significance. In the no imitation condition, targets' and perceivers' feelings of sadness were still correlated to some extent. It is possible that some emotions are more easily caught than others (i.e., are more contagious, even

in the absence of mimicry). Sadness may be one of them, because in social interaction it is almost always functional to respond in tune with a sad person (whereas anger, on the other hand, may often require calming the person down rather than catching the anger oneself). At present, however, this explanation is speculative. In future research, it will be interesting to examine if some emotions are inherently more contagious than others.

Although we already demonstrated emotional contagion effects in our previous study, we can now show that mimicry causes a stronger match between emotions of 2 people. Additionally, we showed that emotional contagion effects occur in an every-day real interaction and with real emotions that are less obviously facially expressed than those of an actor on a video.

Mimicry not only enhances empathic feelings and understanding for the perceiver, as shown in Study 3.1, but also communicates this to the mimicked persons. We showed this in Study 3.2, after controlling for individual variations in the mimicker's behaviors. Targets who were mimicked felt more empathized with and understood.

The results of Study 3.2 cannot be explained by mood effects, i.e., that being mimicked makes the target feel more positive in general, which could reflect on our dependent variables; there was no difference in felt emotions in the imitation and no imitation condition. So, mere mimicry communicates empathy and understanding towards mimicees, and communicates that in a way that cannot be misinterpreted: The effects were found regardless whether the mimicker was seen as likeable or not.

In addition to prosocial feelings and communication of those feelings, another benefit of mimicry concerns the smoothness of the interaction. We replicated Chartrand and Bargh's (1999) finding in a real interaction situation; mimicked targets perceived the interactions as smoother than nonmimicked targets. In addition, perceivers felt the same. So mimicry smoothed the interaction so that mimickers rate the interaction as smoother just as targets do, despite their deliberate effort to carry out their instructions.

Finally, we demonstrated that both perceivers and targets report more closeness towards their interaction partner due to mimicry, thereby supporting the assumption that mimicry enhances interpersonal closeness *within* their relationship. We also replicated this finding in Study 3.2 for the target, thereby demonstrating that this closeness effect is caused by mimicry alone, and not by other perceiver

characteristics that may vary along with mimicry. The results of both studies suggest that mimicry not only brings people closer together, or makes them feel closer to other in general, as was shown by Van Baaren and Chartrand (2005), but actually creates a special bond between perceiver and target by making them feel closer to one another.

To conclude, we provided further evidence for the assumption that mimicry has benefits for us in social interactions. As we have shown, mimicry and the prosocial feelings empathy and understanding have a profound relationship; mimicry causes 2 people to become more strongly emotionally attuned to one another, and causes the perceiver to become more empathic and understanding. In addition, mimicry itself communicates this to others and causes the mimicker to feel empathized with and understood. This bi-directional influence of mimicry brings people closer together and creates a special bond.

### Endnotes

<sup>1</sup> We did not include a no-instruction control group, because a previous study (Stel & Vonk, 2004) showed that the effects in the control condition, in which people automatically mimic, parallel the effects in the imitation condition.

<sup>2</sup> The difference with the version of Aron et al's IOS Scale, is that the pictorial measure indicating the least inclusion of the other in self were consisted of two circles contacting each other, but not overlapping; in the picture reflecting highest inclusion, the two circles almost overlapped, as in the IOS Scale.

<sup>3</sup> To ensure perceivers did not compensate inhibiting mimicry behavior by nodding, a 2 (Imitation) x 2 (Video) ANOVA was conducted with amount of nods as a dependent variable. There was no difference in nodding behavior between the Imitation conditions,  $F(1, 76) = 1.39, p = .24$ .

<sup>4</sup> Conceptually, irritated and angry belong together, but because of their low alpha for perceivers (.47) we excluded irritated; because angry is a more core emotion and irritation might also measure annoyance due to other factors.

<sup>5</sup> Affective empathy consists of perceiver's emotions during the interaction that were caught due to the instruction to mimic.

<sup>6</sup> Using the SOBEL test and the Goodman I version resulted in the same p-values and approximately the same z-values for all Goodman II tests.

<sup>7</sup> In the present study, we additionally manipulated Liking for the confederate, because this study was combined with a study conducted on the moderating role of a priori liking on the mimicry-liking link (see Stel, Van Baaren, Blascovich, McCall & Vonk, 2005). Liking did not produce any significant effects and was discarded from the present analyses.

<sup>8</sup> To make sure effects cannot be explained by a more positive mood in the mimicry compared to the no mimicry condition a 2 (Imitation; yes vs. no) x 2 (Mood: positive vs. negative) MANOVA was conducted with targets' emotion during the interaction as a within-subjects factor. For each mood, we took the set with the highest Cronbach's alpha. The final set for positive consist of enthusiastic, pleased, cheerful, and happy ( $\alpha = .82$ ); for negative: tense, worried, angry, confused, dreary, and sad ( $\alpha = .82$ ). A main effect of Mood,  $F(1, 58) = 127.75, p = .00$ , indicated that targets in all conditions felt more negative ( $M = 5.28, SD = 1.12$ ) than positive ( $M = 3.62, SD = 1.06$ ). This can be explained because participants had to choose between

two bad options throughout the interaction. This mood effect was not qualified by Imitation,  $F < 1$ , meaning that there is no differential influence of the imitation instructions on mood.





## **PART II**

Qualifiers on the consequences of mimicry



## Chapter 4

### When mimicry does not have (in)direct social benefits\*

To understand someone, is to feel into someone's emotions and take perspective of the person. This way you empathize and also communicate understanding to the person, who in turn may feel understood. Mimicry facilitates this process.

The facilitation of imitation on *affective* empathy has been hypothesized since 1907 (Lipps). It makes intuitive sense and it can also be deduced from known mechanisms such as facial feedback (Hatfield, Cacioppo & Rapson, 1992). Namely, when people perceive facial expressions, these facial expressions are automatically mimicked (Dimberg, 1982). These mimicked activated facial muscles, in turn, gives feedback to the brains, so that corresponding emotions are felt (Tomkins, 1982; Hess, Kappas, McHugo, Lanzetta & Kleck, 1992). There is lots of evidence that people are highly susceptible to catching other people's emotions (e.g. Kerckhoff & Back, 1968; Schachter & Singer, 1962; Simner, 1971).

Nevertheless, previous researchers did not succeed in demonstrating a causal relationship between mimicry and emotional contagion so far (Gump & Kulik, 1997; Blairy, Herrera, & Hess, 1999; Hess & Blairy, 2001). We have argued (Stel & Vonk, 2004) that if one wants to investigate emotional contagion as a function of mimicry, one has to investigate it in ecologically valid settings, i.e., in settings where mimicry has a social function. This also goes for perspective taking, the *cognitive* form of empathy. The social functions approach to mimicry proposes that mimicry fosters empathy and understanding, and creates bonds between people (Van Baaren, Maddux, Chartrand, De Bouter, & Van Knippenberg, 2003; Van Baaren, Holland, Kawakami, & Van Knippenberg, 2004; Cheng & Chartrand, 2003; Lakin, Jefferis, Cheng, & Chartrand, 2003, Stel & Vonk, 2004). Using richer experimental materials (e.g., longer video films, live interactions) that were sufficient to produce empathy towards the mimicked person, in the way they do in real life, we did demonstrate a causal effect of mimicry on empathy.

In previous studies, we used materials that were presented to participants as

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\* This chapter is based on Stel & Vonk (2005b)

real, i.e., participants assumed that the emotions they saw were actually experienced by the target person. If it is the case, as we have argued, that the effects of mimicry emerge primarily in settings where mimicry can potentially serve its social functions, this means that the effects might be reduced when people perceive emotional expressions knowing that emotions are not really experienced by the target. After all, in these cases there is no point in empathizing with the person, because the social functions of empathy are reduced. In the present studies, we want to test the hypothesis that, when perceivers assume that emotions are acted, i.e., when the expressions to be imitated are not seen as real, imitating these expressions does not enhance empathy compared to not imitating these expressions, whereas imitating expressions perceived as real does.

We tested this hypothesis in two studies. First, we presented participants with a scene from a reality soap about which, at the time the study was running, there was some debate regarding whether the actors were 'themselves' or whether they were acting. We predicted that the effects of imitation are stronger among participants who believe the soap is real than participants who do not believe in the authenticity of the events. In the second study, we manipulated perceived realness of emotions directly.

### **Study 4.1**

#### Method

##### *Participants and design*

42 Female high school students participated voluntarily. Their age ranged from 16 to 25 years, with an average of 18.0. They were randomly assigned to the conditions of a 2 (Imitation; yes vs. no) between-subjects factorial design. We did not include a no-instruction control group, because previous studies showed that the effects in the control condition, in which people automatically mimic, parallel the effects in the imitation condition.

##### *Procedure*

Participants watched a fragment from the reality soap 'The Osbournes' in which Kelly Osbourne was the main character. The video was displayed in a classroom. Beforehand, they received written instructions. Half of the participants received an instruction to imitate the facial expressions that Kelly would display on the video, while the other half received an instruction to suppress the natural tendency to imitate. Both groups received instructions to pay attention to specific movements of

eyes, eyebrows, and mouth, but one group was instructed to imitate them and one group not to. Participants were also told to remind themselves of the instructions throughout the video. Previous studies (Stel & Vonk, 2004; Stel & Vonk, 2005a, Stel, Van Baaren, Blascovich, McCall & Vonk, 2005) have shown that these instructions are very effective and are carried out well. So this time the experimenter observed on the spot to make sure participants carried out their instructions. After the video, participants filled out a questionnaire (see Materials).

### *Materials*

*Video.* All participants saw a 5-minute fragment from “The Osbournes” in which Kelly Osbourne (the daughter of the family) was mad at every one who was near her. She shouted that every one should mind their own affairs, that she could perfectly manage her life on her own and that they had to leave her alone. After yelling to her companion, brother and parents, she left and went to her room sadly. Thus, the emotions displayed in the fragment were anger and sadness.

*Questionnaire.* Emotional contagion was measured by 11 emotion items; tense, enthusiastic, pleased, worried, irritated, angry, confused, cheerful, dreary, happy, and sad. Cognitive empathy was measured by three questions: Did you take the perspective of Kelly? Were you involved with Kelly? Did you place yourself in Kelly’s shoes?

At the end of the questionnaire, participants were asked whether and how frequently they watched “The Osbournes”, if they had seen this fragment before, to what extent they thought Kelly was acting in this fragment and how much they thought that acting takes place generally in reality-soaps. In addition, they were asked how difficult they thought the instruction was and to what extent it had affected their attention to the video. For all questions, 7-point Likert scales were used. In an open-ended question, all participants were asked if they knew what the experiment was about. Finally, background variables were assessed and participants were thanked and debriefed.

## Results and Discussion

All participants carried out their instructions. As in our previous research, participants rated the imitation instruction as significantly more difficult ( $M = 4.20$ ,  $SD = 1.42$ ) than the no imitation instruction ( $M = 2.78$ ,  $SD = 1.34$ ),  $F(1, 40) = 10.40$ ,

$p = .00$ . There was no difference between these two conditions on self-reported attention,  $F < 1$ .

### *Realness*

From the 42 female participants, 20 of them thought that Kelly did not act in the video, while 22 of them thought that she was acting. We included this variable as a factor in our analyses.<sup>1</sup>

### *Affective empathy*

The items of the emotion scale can be classified into three emotion categories: happiness, sadness, and anger. For each emotion category, we took the set with the highest Cronbach's alpha. The final set for happiness consist of enthusiastic, pleased, cheerful, and happy ( $\alpha = .77$ ); for sadness: tense, worried, confused, dreary, and sad ( $\alpha = .81$ ); for anger: irritated and angry ( $\alpha = .74$ ).<sup>2</sup>

A 2 (Imitation) x 2 (Realness) x 3 (Emotion) multivariate analysis of variance (MANOVA) was conducted with Emotion as a within-subjects factor. Our hypothesis predicts that the emotions displayed by the target person (anger and sadness) will be felt more in the imitation than in the no imitation condition, while emotions that were not displayed are unaffected (happiness). The pertinent interaction between Imitation and Emotion was significant  $F(2, 37) = 3.74, p = .03$ . Simple effects showed that Imitation affected feelings of sadness,  $F(1, 40) = 10.57, p = .00$ , and anger,  $F(1, 40) = 7.84, p = .01$ , and not feelings of happiness  $F < 1$ . So when facial expressions were imitated, more emotions were caught than in the no imitation condition. Table 4.1 presents cell means and contrast tests.

Table 4.1. *Means and standard deviations of perceivers' feelings of happiness, sadness and anger by Imitation (1 = totally not, 7 = very strong).*

Imitation	Emotions					
	happiness		sadness		anger	
	M	SD	M	SD	M	SD
imitation	2.78 <sub>a</sub>	1.18	3.51 <sub>a</sub>	1.07	3.90 <sub>a</sub>	1.71
no imitation	3.12 <sub>a</sub>	1.32	2.41 <sub>b</sub>	1.04	2.61 <sub>b</sub>	1.25
total	3.00	1.27	2.80	1.17	3.07	1.54

*Note* Means with noncommon subscripts differ significantly ( $p < .05$ ) within each column.

We also predicted that this effect would occur only among participants who perceived the emotions as real. However, the three-way interaction with Realness was nonsignificant,  $F(2, 37) = 1.23, p = .31$ . So when expressions were imitated, participants caught more emotions than when not imitating expressions, regardless whether the emotions were assumed to be real or not.

#### *Cognitive empathy*

Cronbach's alpha for the three questions across the present two studies about cognitive empathy was .86. A 2 (Imitation) x 2 (Realness) ANOVA was conducted on this scale. There was a main effect of Realness,  $F(1, 38) = 4.63, p = .04$ ; participants took less perspective in general when they thought emotions were acted ( $M = 3.47, SD = 1.21$ ) than real ( $M = 4.03, SD = 1.16$ ). This effect was qualified by Imitation, so this time, the predicted interaction between Imitation and Realness was significant,  $F(1, 38) = 4.39, p = .04$ . Simple effects showed that Imitation affected cognitive empathy when participants thought the expressed emotions were real,  $F(1, 18) = 6.06, p = .02$ ; when these 'real' emotional expressions were imitated, participants took more perspective of the target ( $M = 4.81, SD = 1.17$ ) than when expressions were not imitated ( $M = 3.62, SD = 0.96$ ). This imitation effect was absent when participants thought that the expressed emotions were acted ( $M = 3.25, SD = 1.55$  vs.  $M = 3.60, SD = 1.01, F < 1$ ). Means and contrast tests are presented in Table 4.2.

Table 4.2. Means and standard deviations on cognitive empathy by Imitation and Realness (the higher the scores, the more perspective is taken).

Realness of expressed emotions	imitation	cognitive empathy	
		M	SD
real	imitation	4.81 <sub>a</sub>	1.17
	no imitation	3.62 <sub>b</sub>	0.96
acted	imitation	3.25 <sub>b</sub>	1.55
	no imitation	3.60 <sub>b</sub>	1.01

*Note* Means with noncommon subscripts differ significantly ( $p < .05$ ) within each column.



So the effect of imitation on cognitive empathy depended on whether emotions were seen as real or not; imitation led to more perspective taking when emotions were assumed to be real. In contrast, when the fragment was seen as acted, imitation had no effect.

### **Study 4.2**

In Study 4.1, we found that cognitive empathy is only enhanced by imitation when emotions are seen as real, whereas imitation enhances affective empathy regardless of the perceived realness of the emotions. In Study 4.2, we tested whether these differential results are reliable and whether they are truly due to effects of perceived authenticity. In Study 4.1, realness was not directly manipulated, so it is possible that other differences between believers vs. non-believers are responsible for the effect. In a subsequent study we attempted to manipulate Realness directly using the same video, but this was not effective; participants already had strong opinions about the realness of The Osbournes. Therefore, we decided to use a video from our earlier studies, in which a young woman acted that she was talking with her therapist. In these studies, participants never questioned the realness of the video and the displayed emotions. Because participants were not familiar with the main character, they could not have an opinion beforehand about authenticity. This way, perceived realness was easy to manipulate.

We expect to replicate the results of Study 4.1; more emotions will be caught when expressions are imitated than when not imitated, regardless of Realness (Hypothesis 1). Because the emotions expressed on this particular video are sadness only, we thus expect that imitation enhances feelings of sadness, not anger or joy. In addition, we predict that imitation leads to more cognitive empathy compared to no imitation when emotions are seen as real, but not when they are seen as acted (Hypothesis 2).

### **Method**

#### *Participants and design*

Participants were 83 (21 male and 62 female) students at the Radboud University Nijmegen. Their age ranged from 17 to 27 years, with an average of 20.4. They participated for payment (€ 1, -). They were randomly assigned to the conditions

of a 2 (Imitation; yes vs. no) x 2 (Realness; yes vs. no) between-subjects factorial design. Males and females were counterbalanced across conditions.

### *Procedure and Materials*

The experiment was conducted individually. All participants saw a film of three-and-a-half minutes of a young woman (an actress) named Marije, who was allegedly talking with her therapist. Participants were told that they would see fragments of the therapy session, in which the questions and comments by the therapist had been cut from the video. The video consisted of four fragments. The target talked about finding out that her father had Parkinson's disease; her facial expression was sad. She did not cry, but at the end she was not far from it and was suppressing her tears. The camera position was static; only the face and part of the shoulders were visible.

Participants in the 'real' condition were told that they would see fragments of a woman in therapy. We asked them to sign a consent form stating that they would treat the information strictly confidentially. This procedure was used before successfully (Stel & Vonk, 2004). Participants in the 'acting' condition were told that the woman on the video was an actress and that the video had been made for teaching purposes.

In all other aspects, this study was the same as Study 4.1, except that specific questions about "The Osbournes" were left out. We included a question as to whether the video was real or acted.

## Results and Discussion

All participants correctly carried out the imitation instructions. The Realness manipulation succeeded; none of the participants in the realness condition thought the emotions were acted, and none in the acting condition thought they were real (although some stated that the woman acted really well).

Again, participants in imitation conditions rated the imitation instruction as significantly more difficult ( $M = 4.33$ ,  $SD = 1.86$ ) than in no imitation conditions ( $M = 3.48$ ,  $SD = 1.74$ )  $F(1, 81) = 4.61$ ,  $p = .03$ , and there was no difference between these two conditions on self-reported attention,  $F < 1$ .

### *Affective empathy*

The items of the emotion scale were classified as in Study 4.1. A 2 (Imitation) x 2 (Realness) x 3 (Emotion) multivariate analysis of variance (MANOVA) was

conducted with Emotion as a within-subjects factor. Confirming hypothesis 1, the interaction between Imitation and Emotion was significant,  $F(2, 78) = 6.19, p = .00$ . Simple effects showed that Imitation affected feelings of sadness  $F(1, 81) = 11.07, p = .00$ , i.e. feelings that were in fact expressed on this video, and not feelings of happiness and anger,  $F_s < 1$ , i.e., feelings that were not expressed. So when facial expressions were imitated, emotional contagion was stronger than in no imitation conditions. As in Study 4.1, this effect was not qualified by Realness,  $F < 1$ . Table 4.3 presents cell means and contrast tests.

Table 4.3. Means and standard deviations of perceivers' feelings of happiness, sadness and anger by Imitation (1 = totally not, 7 = very strong).

Imitation	Emotions					
	happiness		sadness		anger	
	M	SD	M	SD	M	SD
imitation	2.73 <sub>a</sub>	0.93	4.17 <sub>a</sub>	1.28	2.41 <sub>a</sub>	1.30
no imitation	2.61 <sub>a</sub>	1.01	3.27 <sub>b</sub>	1.17	2.50 <sub>a</sub>	1.28
total	2.67	0.97	3.73	1.30	2.45	1.28

*Note* Means with noncommon subscripts differ significantly ( $p < .05$ ) within each column.

### *Cognitive empathy*

A 2 (Imitation) x 2 (Realness) ANOVA on the cognitive empathy scale showed a main effect of Imitation,  $F(1, 79) = 11.08, p = .00$ : When expressions were imitated, participants reported more perspective taking ( $M = 4.57, SD = 1.04$ ) than when expressions were not imitated ( $M = 3.68, SD = 1.33$ ). As predicted by Hypothesis 2, this main effect was qualified by Realness,  $F(1, 79) = 4.72, p = .03$ : When participants perceived the video as real, imitation affected cognitive empathy,  $F(1, 42) = 18.67, p = .00$ ; participants could more easily take perspective when they imitated than they did not. In contrast, imitation did not affect cognitive empathy when participants thought that the emotions were acted,  $F < 1$ . Means and contrast tests are presented in Table 4.4. The main effect of Realness on cognitive empathy in Study 4.1 was not replicated  $F(1, 79) = 1.41, p = .24$ .

Table 4.4. *Means and standard deviations on cognitive empathy by Imitation and Realness (the higher the scores, the more perspective is taken).*

Realness of expressed emotions	imitation	cognitive empathy	
		M	SD
real	imitation	4.70 <sub>a</sub>	0.89
	no imitation	3.29 <sub>b</sub>	1.24
acted	imitation	4.44 <sub>a</sub>	1.18
	no imitation	4.15 <sub>a</sub>	1.32

*Note* Means with noncommon subscripts differ significantly ( $p < .05$ ) within each column.

Thus, as in Study 4.1, the effect of imitation on cognitive empathy depended on whether emotions were seen as real or not: When emotions were seen as real, imitation produced more cognitive empathy compared to no imitation, but this effect did not emerge when emotions were assumed to be acted.

### General Discussion

The results of Study 4.1 showed that imitating facial expressions induced more affective empathy, regardless of the perceived realness of the emotions. The effect of imitation on cognitive empathy, however, depended on perceived realness; participants who imitated emotional expressions that were assumed to be real experienced more cognitive empathy than participants who did not imitate, whereas imitation did not affect cognitive empathy when emotions were seen as acted. Study 4.2 replicated these effects, using an experimental manipulation of Realness, thereby ruling out the possibility that the differential effects of imitation were produced by specific characteristics of believers.

With regard to perspective taking, there is a difference between the studies; participants could more easily take perspective of the woman in Study 4.2 than of Kelly Osbourne in Study 4.1. This is not surprising: In Study 4.1, Kelly Osbourne starts to yell and call names to everyone straight from the beginning of the fragment, making the impression that she unreasonable and aggressive, whereas the young woman in Study 4.2 talks sadly about her father having Parkinson's disease, and

appears reasonable. As a consequence, it is probably easier to identify with the woman in Study 4.2.

This may also explain another difference between the two studies: the interaction effect of Imitation and Realness on perspective taking has a different pattern. In Study 4.1, participants took more perspective of the target when imitating emotional expressions that were assumed to be real. This cell differs from the other three (see Table 4.2). So in Study 4.1, imitation of real emotions enhanced empathy, compared with the other conditions. In Study 4.2, on the other hand, the deviating cell is the no imitation / real emotions condition (see Table 4.4): no imitation reduced cognitive empathy. These differences may simply be due to the use of different actors with different facial and expressive characteristics.

Apart from these differences, the general effects and conclusions from both studies are the same. Both studies replicated imitation effects found in previous studies (Stel & Vonk, 2004, 2005b; Stel et al., 2005); imitation of emotional expressions produced more affective and cognitive empathy compared to no imitation. However, when these emotional expressions were perceived as unreal, imitation only affects affective and not cognitive empathy. In addition, the data indicate that the effects of imitation on affective empathy were not just a matter of mood contagion, but were emotion-specific: in Study 4.1, the target showed sadness and anger, and these emotions were more strongly felt by perceivers who imitated; in Study 4.2 sadness was shown and only this emotion was affected by imitation. We already showed that contagion is emotion-specific (Stel & Vonk, 2004), the present studies demonstrate this is also the case when emotions are acted.

As in our previous study (Stel & Vonk, 2004), we have no indication that load effects can account for the effects obtained in our studies. Other competing explanations (e.g., that participants in the imitation condition received more detailed information about the facial expressions compared to no imitation, that the effects were due to demand characteristics or mood) have also been ruled out by previous studies (Stel & Vonk, 2004, 2005a).

The differential effect of Realness on the effect of imitation on affective versus cognitive empathy possibly sheds light on the different nature of these two types of empathy. The effect of imitation on cognitive empathy may be less automatic than on affective empathy, and may only emerge when it is functional, because taking perspective requires cognitive effort. When emotions are real, this effort is useful,

because perspective taking facilitates understanding, as was demonstrated by Stel and Vonk (2004). However, when emotions are acted, the function of perspective taking is reduced, and imitation does not affect perspective taking anymore. More generally, as we have argued previously, effects of imitation may only occur in situations where imitation has social benefits.

In contrast, the imitation-affective empathy link may be more automatic: the effect of imitation on emotional contagion does not require any effort and emerges regardless of 'higher' cognitive considerations. This is in line with the ideas of Hatfield, Cacioppo & Rapson (1992), who called this form of contagion *primitive* emotional contagion and assumed this form to be relatively automatic, unintentional, uncontrollable and largely unconscious. Because humans are social animals, it seems reasonable to assume that some social processes are so rudimentary and 'wired in' in the course of evolution, that they cannot be disrupted. Because of its great benefits in social interaction, the imitation-emotional contagion link is very likely an excellent illustration of this.

**Endnotes**

<sup>1</sup> We collapsed this variable to a binary acting/not acting variable to make the results of Study 1 comparable to the results of Study 2.

<sup>2</sup>The alpha's of affective and cognitive empathy reported here are based on the combined data of the two studies in this paper.

## Chapter 5

### When mimicry has negative effects for bonding processes\*

Both folk- and research psychologists generally assume that mimicry and prosocial or sociopetal feelings have a positive relationship. However, this correlation is surprisingly bereft of theoretical explanation and supporting evidence, leaving the conditions under which mimicry occurs and its functional or strategic value unexplained.

We propose that functionality and role link mimicry and liking. Regarding the former, we hypothesized that mimicking people we dislike is dysfunctional (unless we do so in an intentionally mocking way), and should therefore reduce the automatic tendency to mimic. Although some indirect evidence supports this notion (McHugo, Lanzetta, & Bush, 1991; Gump & Kulik, 1997), to the best of our knowledge, causal experimental evidence does not exist. In Study 5.1 and 5.2, we investigated whether a priori liking for an individual increases the degree of mimicking of that individual. In Study 5.3 and 5.4, we investigated the moderating roles of functionality and role on the mimicry-liking link. We hypothesized that intentional or forced mimicry should not increase one's liking for disliked targets. However, we also hypothesized that such dysfunctionality only applies to the active mimicker in that situation rather than the target. Hence, we hypothesized that mimicry functions to increase the liking of the mimicker by the mimicked person but not vice versa.

Mimicry is related to enhanced positive or prosocial feelings. In a prosocial state, one feels empathic towards other people, has more positive impressions of others, and enjoys easier interactions, a constellation of behaviors that can be regarded as sociopetal and to the benefit of the interaction parties. Concerning the relationship between mimicry and prosocial feelings, Chartrand and Bargh (1999) reported that when individuals mimic the postures of others, mimicry increases liking for the target and fosters smooth, harmonious interactions. Regarding facial mimicry, Stel and Vonk (2004) showed that facial mimicry results in more empathy and bonding

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\* This chapter is based on Stel, Van Baaren, Blascovich, McCall & Vonk (2005)



towards the target. In addition, mimicry not only influences prosocial feelings, but also has beneficial consequences for social interactions (Van Baaren, Holland, Kawakami, & Van Knippenberg, 2004).

However, just as mimicry can influence liking, liking can influence mimicry, an issue unexamined in the literature. Only correlations between mimicry and liking (Bernieri, 1988; LaFrance, 1979) or effects of mimicry on liking (Chartrand & Bargh, 1999; Stel & Vonk, 2004) have been investigated.

Here, we sought to alleviate this deficit by creating a general research program in which we could: first, systematically manipulate liking of an individual towards another and measure the individuals mimicry of that person; and, second, manipulate and cross liking/disliking with mimicry as independent variables. In the first two studies, we investigated whether a priori liking for an individual increases the degree of mimicking that individual. In the last two studies, we investigated the moderating roles of functionality and role on the mimicry-liking link. Because bonding with disliked others is dysfunctional, mimicry should not increase liking for such others. However, we argue that this dysfunctionality only applies to the active mimicker in the situation rather than the target. In Study 5.4, we created a situation with asymmetrical functions of mimicry; that is, where mimicry should function to increase the liking of the mimicker for the mimicked person but not vice versa.

In Study 5.1, we manipulated a priori liking and measured the amount of mimicry. We hypothesized that participants would mimic a target's facial expressions more when the target is liked than when disliked (Hypothesis 1). To determine whether the results also apply to situations where participants have naturally formed a priori affect toward others, we conducted Study 5.2 in which we measured mimicry towards unknown targets who were or were not members of a negatively stereotyped group.

In the first two studies, mimicry should be functional because it should a positive or prosocial relationship. However, we argue that functionality in a strategic sense can moderate the relationship between mimicry and other prosocial feelings. In a study suggestive of this moderation, Stel and Vonk (2004, 2005a) demonstrated a link between mimicry and emotional contagion. Emotional contagion is defined as experiencing the emotions of other people, an affective form of empathy. Stel & Vonk used experimental materials (5-minute videos and interactions) that were sufficient to produce affective empathy towards the mimicked person. In these situations, empathy

serves a function; people have a need to understand other people's feelings and to belong to others (Baumeister & Leary, 1995). In situations in which being empathic does not serve a function, for instance when presented photographs or very short video fragments (15 seconds), mimicry was not causally related to empathy (Gump & Kulik, 1997; Blairy, Herrera, & Hess, 1999; Hess & Blairy, 2001).

As we have argued above, liking should not be enhanced by mimicry in situations when enhanced liking is dysfunctional. It is typically dysfunctional to create bonds with disliked people. Hence, mimicry should not enhance liking for disliked others compared to liked others (Hypothesis 2). Consequently, functionality is expected to moderate the relationship between mimicry and liking. This will be tested in our third study.

An additional question is whether functionality moderates the effects of mimickers who mimic targets who dislike them. Argyle and Dean's (1965) argued that when someone is prevented from making adjustments in nonverbal behaviors in one dimension, veridical affect is shown in a dimension in which there is no restriction. We expect that people adjust their mimicry behavior when disliking someone (see hypothesis 1). However, when participants are asked to mimic a disliked person, they cannot adjust their nonverbal behavior (reduction of mimicry), and therefore should show an increase in negative affect in a different dimension (liking). However, when people are mimicked and not asked to refrain from adjusting their nonverbal behaviors towards the other person, no negative affect is created and, as a result, no differential effects are expected to be found for liked and disliked people. Based on Argyle and Dean's theory, we hypothesized that being mimicked leads to contrasting results than when mimicking another. Hence, when one mimics someone he or she dislikes, liking for this person is not enhanced. However, when being mimicked by a disliked person, liking for this person increases (Hypothesis 3). This rationale suggests that functional moderation operates only for the active mimicker in a situation. Consequently, role (mimicker vs. target) is also hypothesized to moderate the relationship between mimicry and the pro-social feeling or 'liking'.

## Study 5.1

### Method

#### *Participants and design*

Participants were 36 female students at the University of California, Santa Barbara who ranged in age from 18 to 28 years (mean age = 20.0). Participants received payment (\$5) and were randomly assigned to the liking conditions.

#### *Procedure*

Participants were run individually. Participants were told that they would watch a Dutch television program without sound in which people are confronted about their positive and negative behaviors by the program host (see Materials). This video was chosen so that liking of the targets (characters in the video) could be easily manipulated via background information provided before the video screening.

Participants watched the video, while we continuously recorded a multiplicity facial movements and tracked coordinates of facial landmarks (e.g., lips, eyes, etc.) via a video camera and an apparatus and software designed to do so automatically (see below). Participants were told that we were tracking their eye movements in order to investigate what aspects of the video caught their attention. Participants were instructed to attend continuously to the video. Afterwards, all participants completed various questionnaires and finally were debriefed about the actual purpose of the study and were asked if we could use their facial data. All complied.

#### *Materials*

*Video.* Participants saw three video segments, totaling one minute, of a young woman (an actress). This video had been used in previous studies (Stel & Vonk, 2004, 2005). Participants were told that they would see fragments of a Dutch television show in which people are confronted about their good or bad behavior, but in which the questions and comments by the host had been left out. We only used neutral fragments in which the actress talked but did not smile very much, so that liking for the actress could be manipulated independently of her facial expressions. On the video, only the face and part of the actress' shoulders were visible.

*Background information.* Background material informed participants that the video was about a 22-year-old student, Marije, who was in a Dutch television show in which people are confronted about their good and bad behaviors. Specifically, they were told that she was invited because of her extreme opinion on helping behavior.

In the disliked condition, participants read that Marije was invited because she did not advocate helping others in need, and that she explained on the video that she thought it a waste of time to help other people stating that if they cannot survive on their own, they should not be helped. They also read that the host confronted her about a specific incident of not helping an old woman that had negative consequences for the lady; that is, staying out all night in the freezing cold.

In the liked condition, participants read that Marije was invited because she helped lots of people in need, explaining on the video that she thought it an obligation to help other people and stating that if they cannot survive on their own, we should help such people. They also read that the host praised her about a specific incident of Marije who, despite a bad back, helped an old woman who was stuck in her wheelchair thereby preventing her from staying out all night in the freezing cold.

*Camera.* A video-tracking system, Facial Feature Tracker (FFT; NavenVision, Inc), was used to video record, track, quantify, and record the dynamic movements of primitive facial features (e.g., lip corners, lip opening, eyebrow movements, eye movements, cheek movements) on line. The system included a video camera placed above the video monitor on which participants watched the television show, and specialized software. The system recorded the coordinates of the specific facial features every 200 ms. The video fragments were also tracked using this system, so that the amount of mimicry could be assessed by comparing the facial feature coordinates of the woman in the video fragment with those of participants.

*Questionnaire.* A manipulation check was included to determine whether the background information meant to create like or dislike of the target, succeeded. This measure included two questions: “Did you like Marije?” and “Do you think you would get along with Marije?” Demographic and background variables were also assessed. Participants were asked via an open-ended question if they knew what the experiment was about. Finally, participants indicated on a 7-point scale how much the camera distracted them and if they thought the camera had affected their attention to the video.

## Results and Discussion

One participant was excluded from analyses because of problems with the sensor-camera. The FFT system revealed that all remaining participants watched the video without loss of attention.

*Manipulation check*

Cronbach's alpha for the two liking questions was .96. A single factor (liking vs. disliking) univariate analysis of variance (ANOVA) using the average scale data as the dependent variable revealed that the liking manipulation was successful; participants liked the target more when they received positive ( $M = 5.26$ ,  $SD = 1.44$ ) than negative ( $M = 2.86$ ,  $SD = 1.46$ ) background information,  $F(1, 33) = 24.00$ ,  $p = .00$ .

*Amount of mimicry*

We quantified mimicry as the proportion of mimicked behaviors out of all possible such behaviors (i.e., target's facial movements). A single factor ANOVA as above, using this proportion as the dependent variable revealed that participants who received negative background information mimicked the target less ( $M = 7.54\%$ ,  $SD = 6.23$ ) than participants in the positive condition ( $M = 17.23\%$ ,  $SD = 11.59$ ),  $F(1, 33) = 9.64$ ,  $p < .01$ .

**Study 5.2**

Study 5.1 supported Hypothesis 1 such that manipulation of liking/disliking for a target influenced participants' mimicry of the target. Study 5.2 investigated whether participants pre-existing implicit liking of a target would also conform to this hypothesis. Pre-existing liking was operationalized as whether or not the target belonged to a negatively stereotyped group. Unknown exemplars were used as targets. Although explicit attitudes can be suppressed when socially undesirable, implicit attitudes are often expressed via nonverbal behaviors such as mimicry and are much more difficult to suppress (Wilson, Lindsey and Schooler, 2000). Hence, we hypothesized that implicit attitudes would influence mimicry; i.e. when participants are negatively biased towards a stereotyped group on an implicit level, they will mimic a person belonging to this group less than a person belonging to a group that is not negatively stereotyped. We tested this hypothesis by quantifying participant mimicry of a target person belonging to a negatively stereotyped ethnic minority group, (Moroccan) and a person belonging to a majority, non-negatively stereotyped, group (Dutch).

Implicit attitudes towards Moroccans and Dutch people were measured prior to the experiment using an Implicit Association Test (IAT) (Greenwald, McGee, Schwartz, 1998). In response to criticisms of the internal validity of the IAT,

Gawronski (2002) provided evidence confirming the convergent and discriminability validity of prejudice-related IATs; prejudice-related IATs predicted explicit endorsement of prejudiced beliefs. We expected that the amount of prejudice towards Moroccans, measured by the IAT, would predict the proportion of mimicking a target belonging to this group compared to Dutch people. In order to determine whether the results are due to liking and not to in-group favoritism, additional IATs were employed.

## Method

### *Participants and design*

Participants were 54 (22 male and 32 female) Dutch students at the Radboud University Nijmegen ranging in age from 17 to 39 years (mean age =21.87). Participants received payment (\$3,-). They were randomly assigned to the conditions of a 2 (Target; Moroccan vs. Dutch person) x 2 (Order targets; Moroccan first vs. Dutch first) mixed factorial design. Both targets were shown to all participants (within-subjects factor), and the order in which they were shown was counterbalanced (between subjects-factor). Males and females targets were counterbalanced across conditions.

### *Procedure*

Participants were run individually and were told that the experiment was about associations. First, participants completed a computerized IAT, measuring implicit attitudes towards Moroccans compared to Dutch people (*implicit attitude-IAT*). Two additional IATs were completed, one measured the degree of positive associations with self-related words (*self-other-IAT*) and the other the degree to which participants felt they belonged to one group or the other (*groupbelonging-IAT*). Subsequently, participants performed a 5-minute filler task, after which they were brought to another room to watch a video on which the Moroccan and Dutch persons were shown. Participants were told that they were going to watch a video of Achmed and Peter and were instructed to remember what happened on the video in order to assure that participants paid full attention to the video. Specific participant behaviors were recorded during the video in order to quantify mimicry. After watching the video, participants were instructed to write down every behavior they could remember that was shown on the video. Next, they completed questionnaires about explicit stereotypes of Moroccan and Dutch persons. Subsequently, participants were asked if

they knew what the experiment was about. Finally, background variables were assessed. Afterwards, participants were debriefed about the purpose of the study and were asked permission to use their data. All complied.

### *Materials*

The IAT procedure followed the standard paradigm (Greenwald et al, 1998). The *implicit attitude*-IAT was developed to measure the strength of negative associations towards Moroccans. The associative strength between these two concepts was assessed by combining target dimensions (Dutch vs. Moroccan names) with the associated attribute dimensions (positive vs. negative nouns), both in a stereotype-consistent and stereotype-inconsistent manner (see Appendix for target and attribute dimensions).

The *self-other*-IAT was a replication of the *implicit attitude*-IAT, with the only difference that the target categories Dutch and Moroccan were changed into the categories self and other. Dutch names were replaced by self-related words and Moroccan names by other-related words (see Appendix). So self vs. other trials were combined with positive vs. negative trials in order to measure the strength of self-positive associations.

The *group belonging*-IAT replicated the *implicit attitude*-IAT, except that the attitudes categories positive and negative were replaced by the categories self and other (see Appendix). In this IAT, associations were measured between Dutch vs. Moroccan and self vs. other in order to assess the amount in which participants felt they belonged to one group or another.

*Filler task.* The filler task was a large, but not difficult puzzle that took more than 5 minutes to complete. After 5 minutes of work on the puzzle, the experimenter entered the room and asked the participants to stop.

*Video.* The Moroccan or Dutch targets were shown performing routine office tasks such as answering the phone, writing notes in one's notebook, and working on a computer. In one video, the depiction of the Dutch person followed the depiction of the Moroccan per. In the other, the order was reversed. Both actors were confederates instructed to carry out specific behaviors, which included naturalistic face rubbing that was clearly visible on the video.

*Questionnaire.* The explicit stereotypes questionnaire contained questions about criminality, acclimatization, safety and intelligence, thereby measuring the amount of prejudice towards Moroccans in general on an explicit level. As mentioned

above, all participants were asked if they knew what the experiment was about in an open-ended question. Finally, background variables were assessed.

## Results and Discussion

### *The implicit attitude-IAT*

Error trials were excluded from analyses. Response latencies higher than 2000 ms were recoded as missing values and response times were log transformed. An IAT score was obtained by subtracting the average response time of Block 3 (Dutch + positive / Moroccan + negative) from Block 5 (Moroccan + positive / Dutch + negative). Positive scores indicate greater negative associations with Moroccans (and / or positive associations with Dutch) than positive associations with Moroccans (and / or negative associations with Dutch), thus indicating a negative attitude towards Moroccans. The mean score of Block 5 ( $M = 745$  ms,  $SD = 121.30$ ) differed significantly of the mean response times of Block 3 ( $M = 579$  ms,  $SD = 60.66$ ) using a paired sample t-test,  $t(1, 53) = 12.45$ ;  $p = .00$ , indicating an overall negative attitude towards Moroccans compared to Dutch.

### *Mimicry*

The interobserver reliability of two Independent naive raters coding the time of face rubbing was .91. The order of the targets did not produce any significant effects; hence, the analyses reported below are based on data collapsed across this within subjects variable. The amount of mimicry of the Dutch target ( $M = 11.19$ ,  $SD = 25.94$ ) did not significantly differ from that of the Moroccan target ( $M = 16.42$ ,  $SD = 22.80$ ),  $t(1, 53) = 1.30$ ,  $p = .20$ .

In order to test whether the *implicit attitude-IAT* (Moroccans compared to Dutch) predicted the amount of mimicry, we subtracted the amount of mimicking the Moroccan person from the amount of mimicking the Dutch person. Thus, a higher mimicry score means that participants mimicked the Moroccan person less than the Dutch person. We predicted that the *implicit attitude-IAT* measuring negative associations towards Moroccans would predict the amount of mimicry towards Moroccans compared to Dutch. A regression analysis with amount of mimicry as dependent variable and *implicit attitude-IAT* score as a predictor showed that the *implicit attitude-IAT* significantly predicted the amount of mimicry,  $B = 90.00$ ,  $t = 2.26$ ,  $p = .03$ ; such that, the more negative attitude towards Moroccans, the less the Moroccan person was mimicked compared to the Dutch person.



*Explicit stereotype and In-group bias*

Cronbach's alpha for the explicit stereotyping questionnaire was .80. The *implicit attitude*-IAT did not correlate with this explicit measure for negative attitudes towards Moroccans,  $r = .19$ ,  $p = .17$ . In addition, this explicit measure could not predict the amount of mimicry,  $B = 5.42$ ,  $t < 1$ . Hence, as predicted, only the implicit attitude measure predicted the amount of mimicry.

Neither the *self-other*-IAT ( $B = -13.41$ ,  $t < 1$ ), nor the *group belonging*-IAT ( $B = 34.73$ ,  $t < 1$ ) predicted the degree of mimicry, thereby ruling out the possibility that in-group favoritism could account for the effects.

**Study 5.3**

Studies 5.1 and 5.2 demonstrated that disliked or negatively stereotyped targets were mimicked less than liked or non-negatively stereotyped targets. Hence, the automatic tendency to mimic was reduced for disliked or negatively stereotyped targets. In Study 5.3, we sought to determine if intentional mimicry of a disliked person would increase liking of the disliked person on the part of the mimicker.

In this experiment, participants were engaged in a shooting game. This game was played in an immersive virtual environment, in which a disliked target and a neutral person were opponents. We expected that, participants would shoot a disliked target more than a liked target. More importantly, we expected this effect to be qualified by an interaction between imitation of and liking for the target such that when a liked target was imitated, participants would shoot the target less compared when the target was not imitated and when the target was disliked, mimicry would not affect the amount of shots. We also expected that the consequences of the liking and imitation manipulation would be specific for the target, so no effects for the neutral opponent were expected.

**Method***Participants and design*

Participants were 53 female students at the University of California, Santa Barbara ranging in age from 18 to 54 years (mean age = 21.33). Participants received payment (\$10,-) and were randomly assigned to the conditions of a 2 (Information; likable vs. dislikable) x 2 (Imitation; yes vs. no) design.

### *Procedure*

The procedures were embedded in two ostensibly unrelated studies. The first was designed to manipulate mimicry, and the second to measure shooting behaviors. The mimicry procedure was similar to that of the first study. However, we used a different video (see Materials) and different background information. After that they received imitation instructions (see Materials), participants were told that we would record their facial coordinates while they viewed the video, to determine if they carried out the imitation instructions successfully. If there were no questions, the camera was started and participants watched the video. After the video, participants completed a questionnaire.

After reading the instructions, participants engaged in an immersive virtual reality game (see Materials) in which the object was to shoot opponents as many times as possible, while being shot opponents as few times as possible. Participants were informed what the virtual reality program was about. They wore a head mounted display (HMD), which consists of a helmet with internal binocular video displays and devices for sensing the location and head orientation within the immersive virtual environment. These trackers allow the computer to determine where participants are looking in the virtual world so that images that change with their position and head orientation can be displayed correctly via the HMD. Thus, the game is played in an immersive virtual world, which was displayed via the HMDs. The gun controller, that was handed over to them when about to play the game, also appeared in the virtual world. The object of the game was to hit opponents as many times as possible, while being shot by those opponents as few times as possible. A virtual scoreboard informed participants how they were doing.

Afterwards, all participants were debriefed about the actual purpose of the study.

### *Materials*

*Video.* All participants viewed a two-minute video consisting of fragments of the same actress as in Study 5.1. This time, fragments of a sad video, on which she talked about finding out that her father had Parkinson's disease and displayed sad facial expressions, were used. She did not cry, but at the end she was suppressing her tears. Participants were told that the questions and comments by the therapist had been cut from the video. Again, on this video, only the face and part of the target's shoulders were visible.

*Background information.* The background information informed participants that the video was about Marije, who was in therapy. In both background information conditions, participants were informed that Marije did not have contact with her father for the 12 years since her parents divorce and that he now appeared to have Parkinson's disease. In the disliked condition, Marije was also described as a cold person, who blamed her father for the divorce of her parents and did not want contact with him anymore and ignored him even though her father sought for contact with her. She was also described as emotional discussing it in the video, but that she only pitied herself for not having a good father. In the liked condition, Marije was described as a warm person, who did not see her father after the divorce of her parents, because he did not want contact anymore. After 12 years she sought contact, although he ignored her all this time. After a couple of meetings, he told her that he had Parkinson's disease. The background information stated that she regretted the 12 years she lost with her father, but that she did not blame her father for the loss of contact.

*Imitation instructions.* Half of the participants received instructions to imitate the facial expressions that the woman displayed on the video, while the other half received instructions not to imitate. The instructions contained specific descriptions about what to imitate. In the imitation and no imitation condition, participants were instructed to watch the video and pay careful attention to specific facial movements of eye, eyebrows, and mouth. In the imitation condition participants were instructed to mimic these specific movements, while participants in the no imitation condition were asked to suppress the natural tendency to mimic these movements. Participants in both conditions were also told to remind themselves of the instructions throughout the video.

*Camera.* The same system was used as in study. Again, facial coordinates were saved every 200 ms. The video fragments were also tracked.

*The questionnaire.* The same questionnaire was used as in study 1. Additional questions included ones regarding the difficulty of the execution of the instructions, whether participants thought they carried out the instructions well, and if they thought the instructions affected their attention to the video. The questions about distraction and attention to video due to the camera were also asked again.

*Immersive virtual environment technology tracking and rendering equipment.* The location of the participant's head was tracked using a Worldviz© (Precision

Position Tracker 1.1) passive optical position sensing system that tracked the movement of a light emitting diode (LED) positioned on top of the HMD. The orientation of the participant's head was tracked by an Intersense© (model IS300) three-axis orientation sensor. The tracking data were used to render the appropriate virtual scene so that when participants moved their heads, the rendered scene would change appropriately. The immersive virtual environment (IVE) was rendered via a Virtual Research© (Model V8) stereoscopic (HMD) with 680 X 480 dpi resolution LCD panels with a 60 Hz refresh rate. The horizontal span of the HMD was approximately 50 degrees and the vertical span was approximately 38 degrees.

*Agents and room.* The agents (i.e., opponents in the game) in this study were controlled by a computer program (see below). They had photorealistic heads created using Biovirtual 3DMeNow Professional© software that fits a photographic image of a face onto a three-dimensional head mesh. The gunfight exchange occurred in a virtual room (9m x 3.6m x 3.4m) with two pairs of short walls split off either end of the room into smaller areas. The gunfight took place across the length of the room with the participant at one end and the opponents at the other. A scoreboard on the wall opposite the player displayed the player and opponent scores. During the game, participants used a gun controller, which was tracked and rendered in the IVE.

*Virtual gunfight software.* The gunfire exchange IVE was adapted from one developed by Persky & Blascovich (in press). During the game, players shot at two opponents located at the other end of the virtual space. Participants could hide behind either of two virtual walls to dodge opponents' bullets. The software for the game was created in Vizard© 2.0, a software package designed for creating IVEs.

## Results and Discussion

Three participants were excluded from further analysis because of technical problems with the immersive virtual environment technological devices.

### *Manipulation checks*

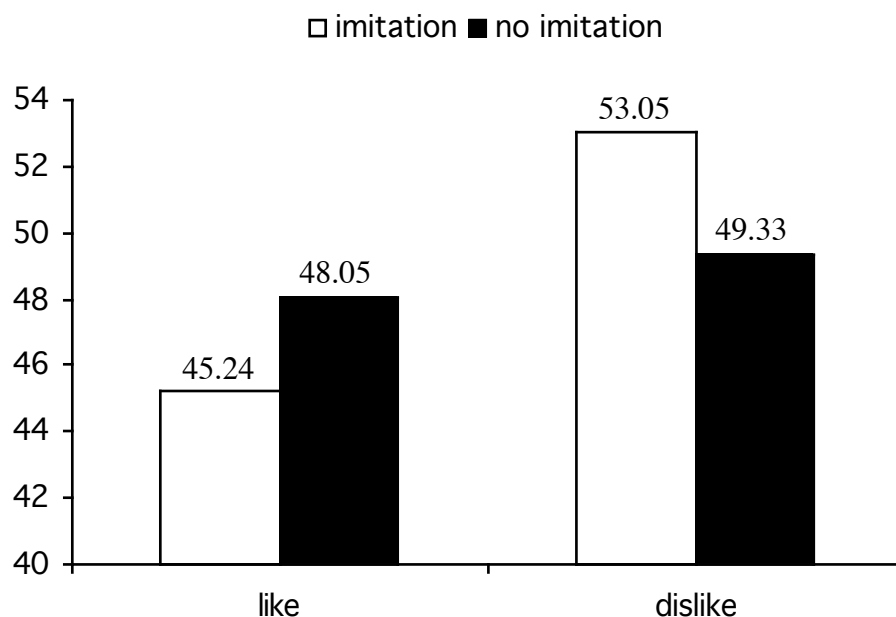
Cronbach's alpha for the two liking questions was .83. A 2 (Liking) one-way ANOVA with this scale as the dependent variable revealed that the liking manipulation was successful; participants liked the target more when they received positive ( $M = 5.48$ ,  $SD = 0.57$ ) than negative ( $M = 3.15$ ,  $SD = 0.84$ ) background information,  $F(1, 46) = 126.95$ ,  $p = .00$ .

As in Study 5.1, we quantified imitation as the proportion of target's facial movements that were mimicked. A one way (Imitation-instruction) ANOVA with this index as a dependent variable, revealed that participants who were instructed to imitate the target, mimicked the target more ( $M = 43.12\%$ ,  $SD = 15.61$ ) than participants in the no imitation condition ( $M = 17.31\%$ ,  $SD = 10.92$ ),  $F(1,43) = 46.09$ ,  $p = .01$ .

This main effect was not qualified by Liking,  $F < 1$ , indicating that the instructions to imitate or not imitate were not differentially carried out for the liked or disliked person.

#### *Virtual shooting game*

We quantified like/dislike toward the target agents as the proportion of hits, i.e., successful shots, on the target out of all shots (hits and misses) such that dislike relative to like would be indicated by a high proportion of hits.. A 2 (Liking) x 2 (Imitation instruction) x 2 (Order)<sup>1</sup> ANOVA conducted on this proportion of hits, revealed that participants who received negative background information shot the target more ( $M = 51.12\%$ ,  $SD = 7.42$ ) than participants who received positive background information ( $M = 46.83\%$ ,  $SD = 6.20$ ),  $F(1, 42) = 7.01$ ,  $p = .01$ . As expected, this effect was qualified by an Imitation by liking interaction  $F(1, 42) = 5.02$ ,  $p = .03$ ; when a liked target was imitated, people shot the target less ( $M = 45.24\%$ ,  $SD = 7.50$ ) compared to no imitation ( $M = 48.05\%$ ,  $SD = 4.96$ ),  $F(1, 19) = 4.52$ ,  $p = .05$ . However, for disliked targets, there is no significant difference between the imitation conditions,  $F(1, 23) = 1.65$ ,  $p = .21$  (see Figure 5.1).



*Figure 5.1.* Mean ratings on proportion of hits on the target by Information and Imitation (the higher the scores, the more successful shots on the target are taken).

### Study 5.4

Study 5.3 demonstrated that when participants imitated disliked targets liking of the targets did not increase. However, the question remained as to whether mimicking another person increases targets liking for the mimicker. Argyle & Deans equilibrium theory predicts that when mimicked by another person, mimicry enhances the target's liking for that person, regardless of whether the mimicker is liked or disliked.

### Method

#### *Participants and design*

Participants were 60 (9 male and 51 female) students at the Radboud University Nijmegen ranging in age from 18 to 27 years (mean = 21.23). Participants were paid (€ 2,-) and were randomly assigned to the conditions resulting from a 2 (Information; positive vs. negative) x 2 (Imitation; yes vs. no) experimental design.

#### *Procedure*

During recruitment, participants completed a helping questionnaire, which was used to manipulate the first impression. They were told that in the experiment they were going to interact with another person to measure conversational abilities and that the interaction partner was assigned to them on the basis of this questionnaire. Before the actual experiment started, participants could look at their scores on the helping questionnaire, to which an interpretation was added. For all participants, this was the same simulated score, which described the participant as ‘altruistic’<sup>2</sup>. Underneath the participant’s score, the target’s score was also printed, from which participants could clearly understand that this was the score of their interaction partner. This score was considerably lower than that of the participant in the negative first impression condition, which described the target as ‘selfish-egoistic.’ In the other, positive impression condition, the score did not differ much from the score of the participants, and the interaction partner was described as ‘altruistic.’

Next, participants received an attitude questionnaire (see Materials) as a manipulation check of their impression of their interaction partners. In addition they read two dilemmas (see Materials) that became the topics for the interaction.

Next, the experimenter brought the participant to the room where the interaction partner waited and told the participant that the interaction would take the form of an interview in which one of them would ask the other questions about the dilemmas. Participants were told that these roles would be randomly determined. Actually, the interaction partner was a confederate, and the participant was always assigned as the responder. This confederate was trained to interact in a standardized way and was naive about the purpose of the study. In addition, in the mimicry condition, the confederate was instructed to imitate expressions, postures, and behaviors naturalistically, or, in the non-mimicry condition to suppress the tendency to mimic. The experimenter told the participant and confederate that she would indicate when the interaction time of 5 minutes was over.

After the interaction, the participant and confederate were asked to fill out a questionnaire (see Materials) in another room. Afterwards, all participants were debriefed about the actual purpose of the study.

### *Materials*

*Helping Questionnaire.* This questionnaire was a short version of the Helping-Orientation Questionnaire (Romer, Gruder and Lizzadro, 1986). Eight questions described specific situations, and participants could choose from four

different alternatives regarding how they would react in this situation. The alternatives differed in terms of the amount of helping behavior; altruistic, selfish-egoistic, self-preserving and other-responsive.

*Attitude Questionnaire.* The attitude questionnaire contained 10 questions designed to measure the initial impression of the confederate; for example, “I think the interaction partner is a nice person’ and ‘I look forward to the interaction’ . Participants responded on a 7-pointscale from 1 (totally disagree) to 7 (totally agree).

*Dilemmas.* The dilemmas described two situations in which the participant had to choose between two options. The first dilemma described a situation in which a runaway train would kill 5 people within a few seconds unless it was switched to a different track in which case it would only kill one person. The participant was asked what he or she would do about switching the train. The confederate asked what the participant would do if the single person was his/her friend, and the other five were strangers, and also asked what the participant would do when the confederate himself was this one person.

The second dilemma described a situation in which the participant was responsible for ‘distributing’ donated organs and was asked when having the opportunity to save 5 lives, by killing a healthy patient, whether they would save the lives of these 5 people or not. Additional variants described for instance that all 5 patients were friends and the healthy patient was not.

*Final Questionnaire.* The same questionnaire was used as in Study 5.1. Again, background variables were assessed and participants were asked about their hypothesized goal of the experiment.

## Results and Discussion

### *Manipulation checks*

Cronbach's alpha for the attitude questionnaire, administered before the interaction, was .87. A one way (Liking) ANOVA with a priori liking as dependent variable revealed that the liking manipulation was successful; participants liked the interaction partner more when they received positive ( $M = 4.93$ ,  $SD = 0.43$ ) than negative ( $M = 3.44$ ,  $SD = 0.66$ ) information,  $F(1, 57) = 62.37$ ,  $p = .00$ .

### *Liking*

Cronbach's alpha for the two liking questions was .73. A 2 (Liking) x 2 (Imitation) ANOVA conducted on this scale revealed that there was a marginal effect



indicating that participants liked the confederate more when they received positive information in advance ( $M = 4.93$ ,  $SD = 0.73$ ) than in the negative information condition ( $M = 4.58$ ,  $SD = 0.75$ ),  $F(1, 56) = 3.79$ ,  $p = .06$ . In addition, a main effect of Imitation,  $F(1, 56) = 4.14$ ,  $p = .05$ , revealed that when the confederate imitated participants, they liked him more ( $M = 4.94$ ,  $SD = 0.71$ ) than in the no imitation condition ( $M = 4.58$ ,  $SD = 0.76$ ). This effect was, in contrast to Study 5.3, not qualified by Liking,  $F < 1$ . So when being imitated liking is enhanced, regardless whether the person was liked or disliked in advance.

### General Discussion

These studies provide further evidence of a link between mimicry and liking, but also demonstrate that this relationship is moderated by functionality and role. Furthermore, we demonstrated that experimentally manipulating liking leads to differences in mimicry. People who are disliked or belong to a disliked group are mimicked less than liked people or people not belonging to a disliked group. Furthermore, we demonstrated that functionality and role-play have important functions in the link between mimicry and liking. Specifically, we showed that a mimicker (i.e., the active person in the situation) when asked to imitate a disliked person did not increase liking for that person. However, we also showed that people increase their liking for that person when they are the targets of mimicry by a disliked person. This research, in contrast to prior studies (Chartrand & Bargh, 1999; Stel & Vonk, 2004), also demonstrated that mimicry does not always enhance liking; more specifically when the person being imitated is disliked (Study 5.3).

According to our functional explanation, imitation should not enhance liking for a disliked person, because it is not functional to create bonds with someone one dislikes. However, for the disliked person, the mimicker or active person in this situation, it is functional to increase liking of the target toward himself or herself. Hence, again mimicry is functional for the active mimicker. Our results support Argyle and Dean's equilibrium theory. These theorists maintain that when someone is prevented from adjusting in nonverbal behaviors in one domain, adjustments appear in a different domain. As Study 5.1 and 5.2 demonstrated, people decrease mimicry toward disliked others. However, when individuals are asked to intentionally mimic a disliked person, they could not adjust their nonverbal behavior (reduction of

mimicry), but show the predictable effect from equilibrium theory of an increase in negative affect on a different dimension.

Such an increase was demonstrated in hostile nonverbal behavior in the virtual shooting game in Study 5.3. In Study 5.4 people being imitated were not asked to refrain from adjusting their nonverbal behaviors towards the other person, so no negative affect was created and, as a result, no differential effects were found for liked and disliked people.

In summary, mimicry can be an effective form of flattery; previous studies showed it enhances liking and smoothens the interaction (Chartrand & Bargh, 1999; Stel & Vonk, 2004, 2005). Here, Study 5.1 and 5.2 revealed that mimicry is also an honest form of flattery; people who are disliked were mimicked less than people who are liked. It is not functional to mimic disliked others because the positive circle of mimicry, creating bonds between people, is not initiated. When this circle is initiated by intentional mimicry by a disliked person, mimicry even does not improve the impression of the mimicker. However, mimicking others does help to improve their impression of an individual even if they initially disliked that individual. Hence, our functional explanation of mimicry only applies to the active agent.

## Appendix

### *Implicit attitude -IAT*

Dutch Names	Moroccan names	positive nouns	negative nouns
Karel	Mohammed	prettig (pleasant)	boos (angry)
Willem	Mustapha	fijn (nice)	lelijk (ugly)
Henk	Ali	geluk (happiness)	gemeen (bad)
Bart	Hassan	goed (good)	verdriet (grief)
Piet	Abdoulah	lief (sweet)	haat (hatred)

### *self-other -IAT*

self-related words	other-related words	positive nouns	negative nouns
ik (I)	jij (you, singular)	prettig (pleasant)	boos (angry)
mij (me)	jullie (you, plural)	fijn (nice)	lelijk (ugly)
mijn (mine)	hun (their)	geluk (happiness)	gemeen (bad)
mezelf (myself)	ander (other)	goed (good)	verdriet (grief)
eigen (my own)	jouw (yours)	lief (sweet)	haat (hatred)

### *group belonging -IAT*

Dutch Names	Moroccan names	self-related words	other-related words
Karel	Mohammed	ik (I)	jij (you, singular)
Willem	Mustapha	mij (me)	jullie (you, plural)
Henk	Ali	mijn (mine)	hun (their)
Bart	Hassan	mezelf (myself)	ander (other)
Piet	Abdoulah	eigen (my own)	jouw (yours)

### **Endnotes**

<sup>1</sup> There were two opponents in the virtual reality game, the target and control person. The positions of these opponents switch during the experiment, however the starting position of the opponents also needed to be counterbalanced.

<sup>2</sup> Real scores on the helping questionnaires indicated that none of the participants had low scores, making this simulated score not implausible. In addition, none of the participants were suspicious about the scores, nor did they look through our cover story.



# Chapter 6

## General Discussion

The purpose of the present dissertation was to conduct a thorough investigation of the consequences of mimicry within an overarching framework. In order to reach this goal we looked at the consequences of facial mimicry for the mimicker and mimicked and its limitations within a social functions approach to mimicry. In this final chapter, I will briefly summarize the main empirical findings that were described in chapters 2 to 5 and discuss how these findings shed light on the social functions of mimicry. Then, I will discuss the strength and implications of our findings, point out some limitations, and give directions for future research.

### Overview of the main findings

#### Part I: On the social consequences of facial mimicry

##### *Chapter 2: Social consequences for the mimicker*

The studies described in Chapter 2 demonstrated that facial mimicry has social benefits for the mimicker and showed how these positive consequences are interrelated. Participants watched a video of a woman, who talked about an emotional event. They were asked to either imitate the facial expressions of the woman, not to imitate, or did not receive any instruction. Participants in no-imitation conditions reported lower affective and cognitive empathy, understanding, similarity, and liking, compared with the other conditions. These differences were mediated by actual mimicry, demonstrating that other effects of the instructions cannot account for these differences. In addition, the control condition, in which people automatically mimicked, produced the same effects as the imitation condition. So although it takes effort to consciously mimic, intentionality does not interfere with these effects. This also suggests these beneficial effects requires a certain level of mimicry to occur, which, under normal circumstances, is reached spontaneously.

The interrelations between the effects on different variables were examined by causal pathway analyses and showed that empathic processes due to mimicry provides the basis for bonding related processes. In addition, there was a direct relationship between liking and mimicry, suggesting mimicry start a positive circle in which liking and mimicry reinforce each other.

*Chapter 3: Empathic processes between mimickers and mimickees*

Chapter 3 focused on the role of empathic processes in social interactions between mimicker and mimickee. In Study 3.1 we investigated whether empathic beneficial effects of mimicry occur in simple every-day interactions between people, most importantly whether 2 people actually experience the same emotions due to mimicry. In addition we tested whether mimicry communicates empathy and understanding towards mimickees. This was investigated by having 2 participants interact with each other, talking about an emotional video one of them saw beforehand. The other participant was instructed to either imitate or not imitate the facial expressions of their interaction partner. We showed that targets and perceivers became more emotionally attuned to one another due to mimicry, i.e., their emotions were more strongly matched when target's facial expressions were mimicked. Concerning cognitive empathy and understanding, we replicated the finding that perceivers could more easily take perspective of the target due to mimicry, which in turn enhanced understanding for the target. In addition, we showed that targets and perceivers became more related to each other due to mimicry: both felt closer towards each other and rated the interaction as smoother due to mimicry.

However, in this study we could not demonstrate that mimicry also communicates empathy and understanding towards mimickees. Because lots of additional factors could have reduced the power of mimicry effects in this rich interaction setting, we constrained the situation in Study 3.2. In this Study we used a confederate who was trained to act in a standardized way so no other factors than mimicry could have influenced the results. We showed that mimicked targets felt more strongly being empathized with and understood than nonmimicked targets. So mimicry itself not only enhances perceiver's empathy and understanding for the target, but also communicates this towards mimickees themselves. In addition, these mimicry signals were not differentially interpreted when the mimicker was disliked, showing the strength of those signals. This bi-directional influence of mimicry and empathic processes brings people closer together and has benefits for social interactions.

## Part II: Qualifiers on the consequences of mimicry

### *Chapter 4: When mimicry does not have (in)direct social benefits*

In order to investigate limitations of mimicry effects, we examined whether effects of imitation on affective and cognitive empathy depend on whether emotional expressions are seen as acted or real. When mimicry is supposed to serve social functions, mimicry effects should be reduced when it does not have (in)direct social benefits, as might be the case when emotions are not real, because the social function to empathize is reduced. In Study 4.1, participants saw a fragment from a reality soap about which there was some debate regarding whether the main characters were 'themselves' or were acting. Half of them received an instruction to imitate facial expressions of the main character, while the other half were instructed not to imitate. We showed that imitating facial expressions facilitated affective empathy, regardless of the perceived realness of the emotions. The effect of imitation on cognitive empathy, however, depended on this perceived realness; participants who imitated emotional expressions that were assumed to be real experienced more cognitive empathy than participants who did not imitate, whereas imitation did not affect cognitive empathy when emotions were seen as acted. Study 2 replicated these effects, using an experimental manipulation of Realness, thereby ruling out the possibility that the differential effects of imitation were produced by specific characteristics of believers.

We argued that these differential effects of perceived realness on the mimicry-empathy link sheds light on differences in nature of the two types of empathy. The mimicry-cognitive empathy link may be less automatic than the mimicry-affective empathy link. So taking perspective via mimicry might take more effort, which is only taken when functional. The mimicry-affective empathy link, on the other hand, is hard-wired and emerges regardless of its functions in social situations.

### *Chapter 5: When mimicry has negative effects for bonding processes*

The consequences of mimicry should also be reduced when mimicry has negative consequences for bonding processes. We argue that is not functional to form a relationship with someone you dislike, because these relationships will not be positive, significant, and lasting. Therefore we expected in Study 5.1 that the automatic tendency to mimic should be reduced when you dislike someone. Liking for the target person was manipulated and perceiver's amount of mimicking this person was measured. We showed that disliked people were mimicked less than liked people.



This was replicated in Study 5.2, where perceiver's impressions of targets were influenced by a group the target belonged to or not; A target belonging to a negatively stereotyped group was mimicked less than a target not belonging to that group.

Secondly, we argued from the social functions perspective that mimicry should not enhance liking, the way it normally does, when the other person is not liked. In Study 5.3 we provided evidence for this; when intentionally mimicking a disliked person, liking for this person was not improved. While mimicry enhanced liking for this same person when a priori liked. We hypothesized that whether being socially functional or not should only affect mimicry outcomes when being the active person, i.e., the mimicker, in that situation. So in Study 5.4 we expected mimicry not only to enhance liking for the a priori liked person, but also for the a priori disliked person. Our hypotheses were confirmed. Taken together, these studies demonstrated that the link between mimicry and liking is not so simple as it was assumed to be; functionality and role appear to be important moderators in this mimicry-liking link.

### **General conclusion & discussion of the main findings**

To conclude, in Part I of the present thesis we showed that mimicry creates special bonds between 2 people; Due to mimicry perceivers feel more empathy and understanding for the target, which in turn makes the perceiver feel more similar to and likes the target more. This liking, in turn, affects the amount of mimicry positively. So mimicry, either intentional or unintentional, starts a positive circle for the mimicker. Not only the mimickers benefit from mimicry, for mimicry also causes targets to feel empathized with and understood more. Both targets and perceivers also feel closer to one another and rate their interaction more positively due to mimicry. This evidence provides clear support that mimicry facilitates empathic and bonding processes between people, and thus serves social functions.

In Part II, we take this social approach to mimicry a step further by showing its some limitations within social situations, namely in social situations where the functions of mimicry were reduced. We were able to show a reduction in mimicry effects on cognitive empathy and liking when the function to empathize or to bond with the other person was reduced. In addition, we showed that the automatic tendency to mimic was itself reduced when it was less functional to mimic. So mimicry effects appear to have limitations when being nonfunctional. However there are two exceptions.

First, affective empathy was facilitated by mimicry regardless of its functions. As we have argued in Chapter 4, the link between the mimicry and affective empathy might be highly automatic and is inaccessible to cognitive considerations. This is in line with Hatfield, Cacioppo and Rapson's ideas (1992) that emotional contagion is relatively automatic, unintentional, uncontrollable, and largely unconscious. So it seems that humans are built in such a way that they can automatically and forcefully experience each other's emotions via mimicry. This can only be disrupted when people are asked to keep their face from moving. However keep in mind that this mimicry-affective empathy link, although automatic, is still only present in social situations. Meaning that mimicry can only facilitate empathy when there is a basis for empathic processes to occur. This explains why earlier studies could not demonstrate this link using materials that did not produce empathic feelings, in the way they do in real life (Gump & Kulik, 1997; Blairy, Herrera, & Hess, 1999; Hess & Blairy, 2001). They did show more general mood contagion, however mimicry could not account for this and was probably caused by other automatic modes, such as classical conditioning or direct association.

We have argued in Chapter 2 that the mimicry-liking link might also be highly automatic, because there is a direct link from mimicry to liking. However, in chapter 5 this link was influenced by functionality, thus cannot be highly automatic. Though, remember that this automaticity lies in the link from liking to mimicry, which is also supported in Study 5.1, showing that a priori liking influences the amount of mimicry. Whereas mimicry effects on liking are also influenced by other factors, such as feelings of understanding and similarity (see Chapter 2). So like effects on cognitive empathy, mimicry effects on liking are prone to be influenced by other processes, and thus can also be affected by functionality.

A second exception to the functionality rule was situated in Study 5.4; Though being nonfunctional for the mimicker, mimicry still had beneficial effects; when being mimicked by a disliked person, liking was enhanced by mimicry. What does this mean for the social functions approach to mimicry? Does this imply that mimicry might not serve social functions in the end? As we have argued in Chapter 5, the a priori disliked mimicker might not get away with this when truly disliked. This means that when someone talked dirty, or when you have created a negative first impression, mimicking others can still provide a way out when it appears that you are not a nasty person after all. So we do not have to abandon the social functions approach of

mimicry, moreover, this provides even stronger evidence for mimicry to serve social functions.

Taken together, it sounds like mimicry is a ‘magic’ mechanism that only affects social situations when being beneficial in those situations; the automatic tendency to mimic appears not only to benefit social situations, but can be inhibited when those consequences are not so beneficial in specific situations. Moreover, when intentionally mimicking in those situations, the mechanism that is normally started via mimicry (also when intentionally mimicking) fails to have its effects. But why, what kind of mechanism could be responsible for this magic? This mechanism probably would have something to do with engaging in unnatural behavior, thus in intentionally not mimicking when it would be functional to mimic (Chapters 2 to 5), or intentionally mimicking others when it is nonfunctional (Chapters 4 and 5). Note that our findings cannot be explained by enhanced negative effect that might result from this unnatural engagement; In Part I we showed that effects emerged regardless of the emotions that were felt (Study 2.1 & 3.1), and that mood effects could not account for the results (Study 3.2).

Alternatively, behaving unnaturally might cause some internal signal to unconsciously compensate for the effects of this behavior. In line with Argyle and Dean (1965), I believe that when deliberately mimicking while this tendency is normally reduced in that situation, this nonfunctional behavior needs to be compensated for. The two exceptions to the function rule, that the mimicry-affective empathy occurs regardless of its functions and that mimicry enhances liking while being nonfunctional for the passive agent in that situation, also coincide with this line of thinking; First, compensation for unnatural behavior is only possible when dealing with less automatic processes. As Bargh (1994) described, one of the features of highly automatic processes is that they occur involuntary and cannot be controlled. Thus this mimicry-affective empathy link cannot be disrupted by functionality. Secondly, a possible compensation mechanism started by an internal signal due to engaging in unnatural behavior cannot start when you are not engaging in unnatural behavior yourself. This can explain why the mimicry-liking link was influenced by functionality when being the mimicker in the situation, thus engaging in unnatural behavior yourself (Study 5.3), while mimicry enhanced liking regardless of its functionality when being mimicked, thus not engaging in unnatural behavior yourself (Study 5.4).

However, this compensation explanation cannot explain why people did not compensate for not mimicking in normal situations. Apparently one can downsize effects due to mimicry, but cannot create things that are not there. So this compensation explanation provides possibilities, however needs further investigation.

### **Strength & Implications**

Former studies investigated single, isolated effects on the side of the mimicker, which in retrospect appeared to fit with the social functions approach. In addition, the focus was on only a small part of the whole process, ignoring a very important factor of social interactions: namely empathic processes between people. The strength of the present dissertation is that we investigated the consequences of mimicry within this social functions perspective and tried to encompass the whole process by investigating empathic as well as bonding-related processes between mimicker and mimicker. In addition, by showing limitations of the beneficial effects of mimicry, we showed that mimicry effects do not appear to be as simple and straightforward as they were assumed to be and also provided further support for the social functions approach.

Our findings have implications for understanding why people nonconsciously and automatically mimic. It seems that mimicry fosters interactions and creates bonds between people. But more importantly, mimicry facilitates empathy and understanding for one another, which is the basis of positive and lasting relationships.

The present dissertation also gives us some insight into the limitations of mimicry; namely when mimicry outcomes are not beneficial. In these cases, mimicry is either reduced, or when intentionally mimicking, its benefits do not occur. Though intentional mimicry normally equals effects of spontaneous, nonconscious mimicry, there effects are not maintained in a situation where they are not beneficial. As we have argued, this is because normally, the tendency to unconsciously mimic is reduced in these situations, and intentionally mimicking someone in this specific situation means engaging in an unnatural behavior and probably disrupting the balance of intimacy, which probably starts a compensation mechanism. So when you think this intentional mimicry would be an effective tool for you to accomplish things, you are wrong. For mimicry to have beneficial effects, its occurrence cannot be forced. Moreover, mimicry is a self-regulating mechanism that does not need to be controlled, for it occurs spontaneously when useful and is inhibited when not being

functional. However, our findings do imply that when other people have a negative first impression of you, mimicking those people does help to get them to like you.

What implications do the present findings have for the debate about the relationship between facial expressions and emotions? There are two allegedly opposing views on this relationship. The first is the *emotional expression view* (Ekman, 1972; Ekman, Friesen, & Ancoli, 1980; Izard, 1991). Important in this theory is the so-called facial affect program, which entails that there is a prewired set of connections between subjective emotional experiences and facial expressions. Thus, according to this theory there is an innate link between one's emotional experience and one's distinctive facial expressions. An alternative perspective on the relationship between facial expressions and emotions is the *behavioral ecology view* (Fridlund, 1991, 1992, 1994; Fernandez-Dols, 1999). According to this view facial expressions serve social motives, *regardless* of people's emotional state. Thus, Fridlund and others state that facial expressions and emotional experiences have no systematic relationship. Facial expressions are proposed to arise from social interaction and should be viewed as communication tools.

Thus, are facial expressions linked to emotional states or do they function in a more social sense, as a communication device? There is a lot of empirical evidence supporting each perspective, but both perspectives also have its limitations and received a lot of critique (for an overview see Manstead, Fischer, & Jakobs, 1999). Manstead, et al. (1999) proposed an integration of these theoretical positions; they argued that facial expressions serve both emotional and social functions. Jakobs, Manstead and Fischer (1999a, 1999b, 2001) and Zaalberg, Fischer and Manstead (2004a, 2004b) reported evidence confirming this integrated view; variations in both emotion and social factors resulted in changes in facial activity.

The studies in this dissertation support the view of Manstead and colleagues; in Study 2.1 and 3.1 we demonstrated that mimicked facial expressions resulted in the experience of the corresponding emotion, showing a positive and direct relationship between facial expressions and emotional experience. In addition, mimicry of these facial expressions also served communicational purposes (Study 3.2) and in general serves social purposes; mimicry enhances empathy and understanding for each other, smoothens interactions, and creates bonds between people.

### **Limitations & Directions for future research**

Although the present dissertation advanced our knowledge concerning facial mimicry, there always remain questions. As was cited earlier, we need to more thoroughly investigate the mechanisms behind mimicry effects. We mainly focused on why people mimic and what the consequences of mimicry are, but not so much on the underlying mechanism behind this. Though we provided the last step of evidence needed for the underlying mechanism of emotional contagion, this cannot account for effects on cognitive empathy and bonding-related process on the side of the mimicker. So, next to his automatic path of mimicry, there should be another, less automatic path. This requires further investigation. What we do know is that these positive consequences of mimicry are due to facial mimicry itself; as we have shown the amount of facial mimicry accounts for the instruction effects on those consequences. Whether this mimicry is unconscious or deliberate, the exact same mechanism is started under normal circumstances. In line with some preliminary data, we expect that those effects are probably not due to sharing the same expressions, but to actively mimicking, either unconsciously or deliberate, those expressions themselves. A possible mechanism that can account for this is simple richer encoding of information. However both mimickers and non-mimickers are provided with the same detailed information about the targets' behaviors, when mimicking others, this information is perceptually as well as motorically encoded, resulting in more involvement, i.e. cognitive empathy, with the target in question. When empathy is enhanced due to this automatic and cognitive path of mimicry, this provides a basis for bonding processes to occur. When unnaturally mimicking deliberately, both paths should be activated too, but compensation mechanisms for this unnatural behavior might downsize the effects of the less automatic path.

Next to mechanisms that cause mimicry to have beneficial effects for the mimicker, clarifying mimicees beneficial effects needs further investigation as well. In addition, I question whether mimicry can communicate empathy and understanding, even when the mimicker does not have a clue what the mimicee is talking about.

A limitation of the present thesis is that we only investigated the limitations of mimicry in situations where its consequences are nonfunctional. We need further evidence that the consequences of mimicry are reduced in other situations where they

would be nonfunctional. In addition, we did not investigate the power of motivation in those situations, and the competing motives that can arise in every day social situations. For instance, what happens when one is forced to associate with someone they dislike and is very motivated to increase rapport. In this situation one would expect compensational mechanism to work against unnatural behavior of increasing intimacy, however it might be functional for mimicry to increase rapport.

Another limitation is that we mainly investigated effects of mimicry via self-report measures. Although we have already demonstrated that effects cannot be due to demand characteristics, one could argue that measuring mimicry effects via more indirect measures would be desirable. At this moment we have already conducted a study using a more indirect measure of empathic behavior, namely donating money (Stel, Van Baaren & Vonk, 2005), showing that engaging in mimicry enhances the amount of donated money. In addition, we are preparing a study using skin conductance measures. In the future, we intend to make use of more indirect measures as the one we used in Study 5.3. Virtual environments provide clear and straightforward methods to measure a lot of indirect behaviors, like interpersonal distance, eye gaze etc.

In the light of virtual reality experiments, it would be an opportunity to investigate whether different facial features can elicit more mimicry. For instance, it is known that status differences between people can influence mimicry behavior (e.g. Brody & Stoneman, 1985). Additionally, it is demonstrated that different faces may transmit different levels of perceived dominance (e.g. Berry & McArthur, 1985; Keating, Mazur, & Segall, 1981; Senior, Phillips, Barnes, & David, 1999). This would imply that different facial features reflecting dominance would influence the amount of mimicry. Other mimicry-eliciting facial features need to be explored as well.

Another question that arises is whether our results also apply to other forms of mimicry, such as mimicry of postures, behaviors, and speech. We have strong reasons to believe they do. We argue that each form of mimicry causes people to behave more similarly, which instigate mimickers' afferent feedback processes and the cognitive path of mimicry. Though I do not doubt that other kinds of mimicry do show the same effects, there might be differences between the strength of those effects, probably reflecting the intensity of the expression that is to be copied. Another related question, as we have shortly reflected upon in Chapter 3, is whether and how one emotion can be more easily caught than others.

Another interesting issue is that facial mimicry is not sufficient to explain empathic and bonding processes. For instance, in Chapter 2, emotional contagion still occurred (although reduced) even without verbal information and without other forms of mimicry. So next to mimicry, other factors need to be addressed as well, for instance, genetically based empathy, motives of the people involved, conditional mechanisms. Additionally, it would be interesting to test to what extent previous associated experiences would affect empathic and bonding-related processes. This will create a full picture of what goes on in between people in social interactions.

### **Concluding Remarks**

Overall, the current thesis shows that mimicry has social benefits for mimickers and mimicees; empathy and understanding is facilitated, which creates a special bond between people. When those consequences of mimicry appear not to be functional in specific situations, its effects are reduced. This implies that mimicry can be a tool to regulate people's social lives, which cannot be forced. However, people catch others emotions due to mimicry regardless it functions. Implying that people have an innate tendency to feel into other people's emotions via mimicry, which can only be disrupted when losing one's facial expressions.





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## Summary

People have the tendency to nonconsciously do what others do. For instance, people mimic each other's postures, behaviors, facial expressions, and speech manner. From a social approach, mimicry is proposed to serve a function in bonding processes between people. However, the extant work on mimicry focused on single, isolated effects of mimicry, lacking a thorough investigation on social benefits of mimicry. Part I of this current thesis was aimed to provide insights on the social functions of mimicry by thoroughly investigating social benefits of mimicry and relating those benefits to each other.

When mimicry is assumed to serve social functions, mimicees as well as mimickers should benefit from this. Mimickers themselves have never been the primary reference of investigation. Therefore the examination of this present thesis began by focusing on the social benefits for the mimicker (Chapter 2). Participants watched a video of a woman and were asked to either imitate her facial expressions, not to imitate her facial expressions, or did not receive any instruction. Participants who inhibited mimicry caught less of the target's emotions (affective empathy), took less perspective (cognitive empathy) and reported less understanding, feelings of similarity, and liking towards the target compared to participants in mimicry condition. Importantly, the control condition produced the same effects as the imitation condition. This is not surprising, because people nonconsciously and automatically mimicked targets' facial expressions. The instruction effects were mediated by actual mimicry, demonstrating that other effects of the instructions cannot account for these differences. Causal pathway analyses on the interrelations between the effects of mimicry showed that empathic processes (empathy and understanding) provided the basis for bonding related processes (similarity and liking).

The studies described in Chapter 3 demonstrated that beneficial effects of mimicry also occur in simple every-day interactions between people and that mimicry also communicates empathy and understanding towards the mimicee. In Study 3.1 we investigated whether two people actually experience the same emotions due to mimicry by having two participants interact with each other, talking about an emotional video that one of them saw in advance. The other participant was instructed

to either imitate or not imitate the facial expressions of the interaction partner. Results showed that targets and perceivers became more emotionally attuned to one another when target's facial expressions were mimicked. In addition, we replicated the finding that mimickers experienced more cognitive empathy and understanding for their interaction partner than non-mimickers. Targets and perceivers also became more related to each other due to mimicry: both felt more closeness towards each other and rated the interaction as smoother due to mimicry. In Study 3.2., we showed that mimicry also communicates empathy and understanding towards mimicked themselves; targets who were mimicked felt more strongly empathized with and understood than nonmimicked targets.

In Part II of the current thesis, the investigation on the social functions of mimicry was proceeded by examining its limitations. We argued that mimicry only has benefits in social contexts, in which mimicry originally served its function. Therefore, qualifiers on the consequences of mimicry were investigated in situations where (a) mimicry does not have (in)direct social benefits, and (b) mimicry even has disadvantages for bonding processes .

Chapter 4 examined limitations of mimicry effects in situations where mimicry does not have direct or indirect social benefits, as might be the case when emotional expressions are not really experienced, because the social function to empathize is reduced. Studies 4.1 and 4.2 examined whether effects of imitation on affective and cognitive empathy depend on whether emotional expressions are perceived as acted or real. In Study 4.1, participants watched a fragment from a reality soap about which there was some debate regarding whether the main characters were 'themselves' or were acting. Half of them received an instruction to imitate facial expressions of the main character, while the other half were instructed not to imitate. Results showed that participants caught more emotions (affective empathy) and took more perspective (cognitive empathy) when imitating expressions. However, among participants who assumed that the emotions were acted, imitation affected affective, but not cognitive empathy. These effects were replicated in Study 4.2, in which we manipulated perceived realness of the emotions, thereby ruling out the possibility that the differential effects of imitation were produced by specific characteristics of people who perceived the emotions as real. The differential effects of perceived realness on the mimicry-empathy link possibly sheds light on differences in the nature of the two

types of empathy. The mimicry-affective empathy link may be hard-wired and emerges regardless of its functions in social situations. The mimicry-cognitive empathy link, on the other hand, may be less automatic; taking perspective via mimicry might take more effort, which is only taken when functional.

In order to investigate limitations of mimicry effects, we examined conditions under which, and the processes by which mimicry and liking are related (Chapter 5). When mimicry is supposed to serve social functions, mimicry effects should be reduced when mimicry has negative consequences for bonding processes, as might be when you dislike someone, because these relationships with disliked people will not be positive, significant, and lasting. Therefore we expected that the automatic tendency to mimic should be reduced when you dislike someone. In Studies 5.1 and 5.2, a priori liking for the target person was manipulated by providing background information about the person herself (Study 5.1) or by group membership (Study 5.2). Perceiver's amount of mimicking the targets was measured. We demonstrated that disliked or negatively stereotyped targets were mimicked less than liked or non-negatively stereotyped targets. Hence, the automatic tendency to mimic was reduced for disliked or negatively stereotyped targets.

In Study 5.3, we sought to determine if intentional mimicking a disliked person would increase liking for this person. Because bonding with disliked others is dysfunctional, mimicry should not increase liking for such others like it normally does when intentionally mimicking others. We crossed a priori liking/disliking with mimicry as independent variables and measured liking for the target after mimicking or not mimicking this target. In a virtual reality shooting game we measured liking as the proportion of successful shots taken on the target out of all shots. We demonstrated that when participants intentionally mimicked a disliked person, liking for that person was not increased, while mimicry enhanced liking for this same person when a priori liked. Thus, functionality of the effects of mimicry moderated the mimicry-liking link.

An additional question that was addressed is whether functionality also moderates the effects of mimickers who mimic targets who dislike them. We argue that the functionality moderation only applies to the active mimicker in the situation rather than the target. When people are not asked to intentionally mimic, but are mimicked, no negative affect is created and, as a result, no differential effects are expected to be found for liked and disliked people. Thus, in Study 5.4, we created a

situation, in which mimicry should be functional for the mimicker, but not for the mimickee in that situation. We showed that mimicry not only enhances liking for the a priori liked person, but also for the a priori disliked person. This suggests that functional moderation operates only for the active mimicker.

Overall, the present thesis showed that mimicry serves social functions: First, mimicry, either unintentionally or intentionally, facilitates *empathic processes* between people; mimickers and mimickees become more emotionally attuned to one another, mimickers experience more empathy and understanding for the target and mimicry also communicates this toward targets, who feel empathized with and understood. Secondly, targets and perceivers became more *related* to each other due to mimicry; they liked each other more, and felt more similar and closer to each other. However, when mimicry outcomes are not beneficial, the automatic tendency to mimic is either reduced or when intentionally mimicking, its benefits do not occur.

## Nederlandse Samenvatting

Mensen hebben de onbewuste neiging anderen te imiteren. Men imiteert bijvoorbeeld elkaars houdingen, gedragingen, gezichtsexpressies en de manier van spreken. Volgens een sociale benadering is imitatie functioneel voor bindingsprocessen tussen mensen. Tot nu toe heeft het onderzoek naar imitatie zich voornamelijk gericht op geïsoleerd bestudeerde effecten van imitatie, waardoor een volledig beeld van de sociale functies van imitatie mist. Deel I van dit proefschrift richt zich dan ook op het verkrijgen van inzichten over de sociale functies van imitatie door middel van grondig onderzoek naar de sociale consequenties van imitatie en naar de relaties tussen de verschillende consequenties.

Als imitatie sociale functies dient, zouden zowel degene die geïmiteerd worden, als degene die imiteren hier voordeel van hebben. Imitatoren zijn tot nu toe niet het primaire referentiepunt van onderzoek naar imitatie geweest. Daarom begint het onderzoek in dit proefschrift naar de functies van imitatie bij de imitator (Hoofdstuk 2). Deelnemers zagen een video van een vrouw en werden gevraagd om haar gezichtsuitdrukkingen te imiteren, niet te imiteren of kregen geen instructie. Deelnemers die niet imiteerden, namen de emoties van de vrouw in mindere mate over (affectieve empathie), verplaatsten zich minder in het perspectief van de vrouw (cognitieve empathie) en rapporteerden minder begrip voor haar dan deelnemers in de imitatie conditie. Tevens ervoeren deelnemers die niet imiteerden minder gevoelens van gelijkheid en gaven ze aan haar minder aardig te vinden dan in de imitatie conditie. De controle conditie liet dezelfde effecten zien als de imitatieconditie. Dit laatste is niet heel verrassend omdat deelnemers de target onbewust en automatisch imiteerden. De instructie-effecten werden gemedieerd door daadwerkelijke imitatie. Dit betekent dat de effecten niet door andere effecten dan imitatie verklaard kunnen worden. Analyses op de causale verbanden tussen de effecten van imitatie lieten zien dat empathische processen (empathie en begrip) ten grondslag liggen aan bindingsgerelateerde processen (gelijkheid en aardigheid).

De studies van hoofdstuk 3 lieten zien dat de voordelen van imitatie ook in alledaagse situaties tussen mensen plaatsvinden. In Studie 3.1 werd onderzocht of twee mensen daadwerkelijk meer gelijke emoties ervaren door imitatie. Dit werd onderzocht door twee deelnemers met elkaar in interactie te laten gaan over een video



die emoties opriep die één van de twee zojuist had gezien. De andere deelnemer kreeg de instructie om de gezichtsexpressies van de interactiepartner wel of juist niet te imiteren. De resultaten lieten zien dat targets (degenen die wel of niet geïmiteerd werden) en observatoren (degenen die wel of niet imiteerden) meer emotioneel op elkaar afgestemd waren wanneer de gezichtsuitdrukkingen van de targets geïmiteerd waren. Tevens repliceerden we het effect dat observatoren die imiteerden meer cognitieve empathie en begrip voelden dan observatoren die niet imiteerden. Targets en observatoren voelden tevens meer binding met elkaar door imitatie; ze voelden zich beiden dichter tot elkaar en vonden de interactie soepeler verlopen bij imitatie. In Studie 3.2. lieten we zien dat imitatie ook empathie en begrip naar de geïmiteerde communiceert; targets die geïmiteerd werden, hadden sterker het gevoel dat de ander empathie en begrip voor hen ervoeren dan targets die niet geïmiteerd werden.

In deel II van dit proefschrift werd het onderzoek naar de sociale functies van imitatie voortgezet door te kijken naar de voorwaarde voor de gevolgen van imitatie. We beargumenteerden dat imitatie alleen voordelen heeft in sociale situaties waar imitatie oorspronkelijk de functies van empathie en binding heeft. De beperkingen in de consequenties van imitatie werden onderzocht in situaties waar (a) imitatie geen directe of indirecte sociale voordelen heeft en (b) imitatie zelfs negatieve consequenties heeft.

Hoofdstuk 4 onderzocht de beperkingen in imitatie-effecten in situaties waar imitatie geen (in)directe voordelen heeft, zoals het geval zou kunnen zijn in situaties waar emoties niet als ‘echt’ worden ervaren, waardoor de functie van empathie reduceert. Studies 4.1 en 4.2 onderzochten of de effecten van imitatie op affectieve en cognitieve empathie afhangen van de manier waarop de emotionele expressies gezien worden, namelijk als echt of geacteerd. In Studie 4.1, zagen deelnemers een fragment van een reality soap waarover op het moment van afname een discussie gaande was of de hoofdpersonen zichzelf waren of dat ze acteerden. De helft van de deelnemers kreeg de instructie om de gezichtsuitdrukkingen van de hoofdpersoon te imiteren en de andere helft kreeg de instructie deze niet te imiteren. Resultaten lieten zien dat deelnemers in de imitatieconditie meer emoties overnamen (affectieve empathie) en meer perspectief namen (cognitieve empathie) dan deelnemers in de niet-imitatie conditie. Onder deelnemers die dachten dat de emoties geacteerd waren, beïnvloedde imitatie de affectieve, maar niet de cognitieve empathie. Deze effecten werden

gerepliceerd in Studie 4.2, waarin we de waargenomen echtheid van de emoties manipuleerden, zodat de verschillende invloeden van imitatie niet verklaard konden worden door de karakteristieken van deelnemers die dachten dat de emoties echt waren. De differentiële effecten van de waargenomen echtheid op het effect van imitatie op affectieve versus cognitieve empathie geven een indicatie dat de twee typen van empathie verschillend van aard zijn. Het effect van imitatie op cognitieve empathie zou minder automatisch zijn dan op affectieve empathie en zal zich alleen voor doen wanneer het functioneel is, aangezien cognitieve empathie meer cognitieve inspanning kost. De imitatie-affectieve empathie link zou echter meer automatisch kunnen zijn: het effect van imitatie op emotie overname heeft geen extra inspanning nodig en ontstaat ongeacht 'hogere' cognitieve processen.

Om de beperkingen van imitatie verder te onderzoeken, exploreerden we condities waaronder en de processen waarbij imitatie en liking (aardig vinden) gerelateerd zijn (Hoofdstuk 5). Wanneer imitatie sociale functies heeft, zou de natuurlijke neiging om te imiteren moeten verminderen wanneer imitatie negatieve consequenties voor het bindingsproces heeft, zoals in de situatie wanneer je iemand onaardig vindt, omdat relaties met een onaardig persoon niet positief, belangrijk en voortdurend zullen zijn. We verwachtten dan ook dat de mate van imitatie vermindert wanneer je iemand onaardig vindt. In Studies 5.1 en 5.2 werd a priori liking van een target persoon gemanipuleerd via achtergrondinformatie over de persoon (Studie 5.1) of via de groep waar de persoon toe behoort (Studie 5.2) en vervolgens werd de mate van imitatie door de observator werd gemeten. We lieten zien dat onaardige of negatief gestereotypeerde targets minder geïmiteerd werden dan aardige of niet negatief gestereotypeerde targets.

Omdat binding met onaardige personen dysfunctioneel is, zou liking niet moeten toenemen wanneer je onaardige personen intentioneel imiteert. Dit in tegenstelling tot de tot nu toe gevonden link tussen imitatie (zowel automatische als intentionele) en liking. Dus het intentioneel imiteren van een onaardig persoon zou niet moeten helpen om die persoon aardiger te vinden. In Studie 5.3 hebben we a priori liking/disliking gekruisd met imitatie als onafhankelijke variabelen en liking voor de target *na* de imitatie manipulatie gemeten. In een virtueel schietspel maten we liking uitgedrukt in de proportie succesvolle schoten van alle schoten. We lieten zien dat wanneer deelnemers een onaardige target imiteerden, de liking voor deze persoon

niet toenam, terwijl imitatie wel zorgde voor toegenomen liking wanneer de target aardig werd gevonden.

Functionaliteit van de effecten van imitatie modereerde dus de relatie tussen imitatie en liking. De vraag was nu of dit ook het geval is wanneer observatoren targets imiteren die hen onaardig vinden. Oftewel, als jij geïmiteerd wordt door een onaardige persoon, ga je die persoon dan aardiger vinden? Wij beargumenteerden dat de dysfunctionaliteit alleen geldt voor de actieve imitator in die situatie en niet voor de geïmiteerde. Wanneer mensen niet gevraagd worden om een onaardig persoon intentioneel imiteren, maar geïmiteerd worden, zal er geen negatief affect gecreëerd worden en als gevolg ervan geen verschillende effecten voor aardige en onaardige mensen gevonden worden. In Studie 5.4, creëerden we een situatie waarin imitatie functioneel zou moeten zijn voor de imitator, maar niet voor de geïmiteerde in die situatie. We lieten zien dat imitatie niet alleen liking voor de a priori aardige persoon verhoogde, maar ook voor de a priori onaardige persoon. Dit suggereert dat de functionele moderatie alleen voor de actieve imitator in een situatie geldt.

Samenvattend laat deze dissertatie zien dat imitatie sociale functies dient: Ten eerste vergemakkelijkt zowel intentionele als niet intentionele imitatie *empathische processen* tussen mensen; imitatoren en geïmiteerden raken meer emotioneel op elkaar afgestemd, imitatoren ervoeren meer empathie en begrip voor de target en imitatie communiceert dit ook naar de target, die zich meer begrepen voelt. Ten tweede hebben targets en observatoren meer *binding* door imitatie; ze vinden elkaar aardiger en voelen zich gelijk aan en dichter tot elkaar. Echter wanneer imitatie-effecten niet functioneel zijn, wordt de automatische tendens om te imiteren gereduceerd. Imiteert men toch, dan vinden de voordelen van imitatie niet plaats.

## Dankwoord / Acknowledgments

Veel mensen hebben direct of indirect bijgedragen aan dit proefschrift. Naar al deze mensen gaat mijn grote dank uit.

Allereerst wil ik Ad van Knippenberg met wie de ideeën omtrent imitatie en emoties zijn gestart. Een speciaal woord van dank gaat uit naar mijn promotor, Roos Vonk voor het mogelijk maken van het project, voor haar nuttige schrijftips, en vooral omdat ze mij heeft geleerd zelfstandig te worden in de wetenschap. Marijke wil ik graag bedanken voor het regelen van zeer uiteenlopende zaken. Verder wil ik alle collega's uit Nijmegen bedanken voor hun bijdrage aan mijn proefschrift, nuttige tips en adviezen, en natuurlijk voor alle gezelligheid! Ad, Harm, Marina, Rob, Martijn, Rick, Raymond, Miquelle, Jaap, Wendy, Jaqueline, Mark, Dirk, Berlinda, Daniel, Aafje, Roos, Severine, Madelijn, Marieke, Ischa, Ron en Bjorn, bedankt!

Onmisbaar voor dit proefschrift zijn Heiko Bergmann, Clemens Janssen, Barbara Muller en Alfred Wagenaar. Study 5.4 was er zonder hen niet geweest! Ook wil ik Evelien Kinds, Anne Wevers, Vincent Kempen en Lonneke Boer bedanken voor de samenwerking op imitatiegebied.

Verder wil ik iedereen bedanken die bij heeft gedragen aan mijn opleiding, mijn kennis en voor belangrijke leermomenten hebben gezorgd. In het bijzonder wil ik het Kurt Lewin Instituut bedanken voor de cursussen, workshops, en themagroepen die enorm hebben bijgedragen aan dit proefschrift en mijn opleiding tot sociaal psychologisch onderzoeker. Tevens heb ik dankzij het KLI vele leuke en leerzame contacten met collega's opgebouwd.

Graag wil ik NWO bedanken voor de financiële ondersteuning van het project. Ook alle 733 proefpersonen die dit proefschrift mogelijk hebben gemaakt, superbedankt!

*Special thanks are expressed to Jim Blascovich, Andrew Beall, Jerry Tietz, David Hamilton and all other researchers of ReCVEB and the Social Psychology department of the University of California, Santa Barbara. My stay at UCSB was extremely valuable for the completion of my project. Thanks for your hospitality, knowledge and inspiration!*

*I would like to thank my roomies Cori, Jen, Sarah, Becky and also Brandon, Matt and Christena for making my stay in Santa Barbara very enjoyable and fun. I*

*will never forget the hot tub, the best ice cream ever, our shopping-trips, the superbowl party and a lot more. It was a great pleasure to be surrounded by such warm, caring and enjoyable people. Thanks!*

Graag wil ik ook wat vrienden bedanken voor de niet onbelangrijke en inspirerende ontspanning. Miquelle, Maarten, Mathilde, Ron, Martijn en Manja bedankt voor de zeer ontspannende avondjes in de Gonzo en andere (film) avonden. Karen, Martijn, Edward, Esmée en Gérard, zonder de onvergetelijke kolonistenavonden, BBQs, ‘zwemfestijnen’, festivals en concerten was het niet gelukt. Hilde, Michiel, Melanie en Remco bedankt voor alle fun tijdens Ardense wandelingen, klimavonturen en gezellige feestjes.

Ik wil graag mijn hele familie bedanken voor alle steun en het vertrouwen dat ik heb gekregen. Speciaal wil ik Ron, Magda, Margarita, mijn oma, mijn vader, mijn moeder en Frank bedanken voor alle warmte en liefde die ik heb gekregen.

Een speciaal woord van dank wil ik richten tot Miquelle Marchand, die altijd voor me klaar heeft gestaan en met wie ik veel leuke momenten heb meegemaakt.

De laatste en allerbelangrijkste dank is voor Raymond Smeets. Raymond heeft een groot deel van dit proefschrift gelezen en van commentaar voorzien. Daarnaast laat je mijn hart op hol slaan en maak je mijn leven geweldig. Bedankt voor alles wat je voor me hebt gedaan, maar vooral om wie je bent!

Mariëlle Stel  
juli 2005

## **Curriculum Vitae**

Mariëlle Stel werd op 14 mei 1979 geboren te Ede. Na 8 bijzonder leuke jaren op de basisschool 'De Beatrixschool' te Ede, ging Mariëlle naar de middelbare school 'Het Streek' eveneens te Ede. In 1997 werd haar het VWO-diploma uitgereikt en in datzelfde jaar startte Mariëlle met haar studie Psychologie aan de Katholieke Universiteit Nijmegen, die ze afrondde met een scriptie over de rol van imitatie in emotieherkenning. In april 2001 studeerde ze cum laude af en begon de daarop volgende maand als AiO op de vakgroep Sociale Psychologie aan dezelfde universiteit. Tijdens Mariëlle's promotieperiode veranderde zowel de naam van de aanstelling als de naam van de universiteit en kreeg ze dus als junioronderzoeker aan de Radboud Universiteit Nijmegen in mei 2005 de goedkeuring van dit proefschrift, die op 26 september 2005 verdedigd gaat worden. Inmiddels is ze op de vakgroep Sociale- en Organisatie Psychologie aan de Universiteit Leiden werkzaam als Universitair Docent/Onderzoeker.