

Subtle Signs of Exclusion

How lack of mimicry affects the perception of self and others

Marina Kouzakova

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How lack of mimicry affects the perception of self and others

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op het gebied van de Sociale Wetenschappen

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To Sergei Kouzakov and Larisa Kouzakova
who taught me the most important things in life

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Chapter 1

Introduction and Dissertation Overview

Every once in a while you may find yourself in an awkward interaction with another person. Although the content of the conversation may not suggest any frictions, the interaction somehow seems uncongenial and effortful. You simply do not feel at ease with your conversation partner. Unbeknownst to you, a lack of behavioral correspondence between yourself and your interaction partner may cause this unpleasant feeling about the interaction.

Behavioral correspondence arises when one's nonverbal behaviors such as gestures, postures and mannerism are mimicked by one's interaction partner. Behavioral mimicry¹ is a widespread behavior in social interactions and its foundation and consequences have been well studied over the past decades. Scholars from fields ranging from social, developmental, animal and neuropsychology have recently stressed their belief in the importance of mimicry (Byrne, 2009; Meltzoff, 2005, 2009; Bekkering, 2002; Gallese, Fadiga, Fogassi, & Rizzolatti, 1996; Gattis, Bekkering, & Wohlschläger, 2002; Dijksterhuis, 2001; Heyes, 2001; Chartrand & van Baaren, 2009; Zentall, 2003). Mimicry of commonplace and idiosyncratic movements takes place on a daily basis and is a communication tool (Bavelas Black, Chovil, Lemery, & Mullett, 1988; Bavelas, Black, Lemery, & Mullet, 1986). It signals understanding, similarity and appreciation by the interaction partner, which is an important message given that people generally strive for others' acceptance and positive evaluation. Despite the social importance of behavioral mimicry, the consequences of interactions lacking mimicry are still largely unexplored.

Although interpersonal mimicry is a prevalent behavior, a number of individual, motivational and contextual factors that moderate the occurrence of mimicry in interactions have been identified. For example, individuals who are involved in a romantic relationship mimic an attractive other less than single individuals do. This effect is stronger the closer they feel towards their romantic relationship partner (Karremans & Verwijmeren, 2008). Furthermore, priming a person with a more independent self-construal results in less mimicry than priming one with an interdependent self-construal (van Baaren, Maddux, Chartrand, De Bouter, & van Knippenberg, 2003). Refraining from mimicry may lead to a more objective assessment of the truthfulness of a message (Stel, van Dijk, & Olivier,

¹ Copying of familiar, observed body movements is known as *mimicry* in the literature on social interaction, and as *imitation* or *automatic imitation* in cognitive neuroscience. Here we use *mimicry* and *automatic imitation* as synonyms.

2008). Conversely, outgroup members or disliked persons are mimicked to a lesser degree than ingroup members or liked persons (Yabar, Johnston, Miles, & Peace, 2006; Stel et. al, 2008). In addition, a number of individual differences moderate mimicking behavior. For instance, cultural differences in self-construal may reduce spontaneous mimicry (van Baaren et. al, 2003; study 2). Individual differences in self-monitoring affect the amount of mimicry (Cheng & Chartrand, 2003). Finally, those low in perspective taking show less mimicry than those high in perspective taking (Chartrand & Bargh, 1999, study 3). The many instances in which behavioral mimicry does not take place warrant the assumption that lack of mimicry is a meaningful and an ecologically substantial interpersonal behavior. However, its consequences are not yet fully understood.

The goal of the present dissertation is to further our understanding of how the lack of mimicry from others affects the self-perception of the non-mimicked individuals and their perception of the non-mimicker. Thus, the present dissertation has two objectives. First, we aim to demonstrate that a lack of mimicry in interpersonal interactions affects the perception of others. We argue that non-mimicry reduces the perceived self-other overlap between the self and the non-mimicker. The self serves as a template to gauge personality and attitudes of the other when the other is perceived as similar to the self. The behavioral synchrony between self and other in an interaction corroborates this self-other similarity. However, non-mimicry is assumed to disrupt this self-other overlap. This then prevents the use of self-knowledge as a proxy for knowledge concerning the personality and attitudes of the non-mimicked interaction partner, which is hypothesized to affect our perception of the non-mimicker.

The second objective of this dissertation is to show that a lack of behavioral mimicry from an interaction partner conveys a specific message to non-mimicked individuals. Specifically, we aim to show that non-mimicry from an interaction partner is informative of the degree of social inclusion of the non-mimicked individual. This claim derives from the notion that not being mimicked by others is perceived as a signal that the others attempt to distance themselves from the non-mimicked individual, which thwarts the latter's sense of being socially included. Lack of mimicry from others may thus be perceived as a behavioral cue signaling interpersonal exclusion. As such, it gives rise to a number of cognitive and physiological consequences in the non-mimicked individuals that correspond with the

consequences of social exclusion. How do people cope with behavioral signals of exclusion from others? Overall, we argue that non-mimicry from others sets off self-regulatory processes in the not mimicked individuals by affecting their physiological state and implicit self-esteem as well as the motivation to seek compensation for the experienced exclusion elsewhere.

We examine the outlined consequences and test the proposed underlying processes in four empirical chapters. Before delineating the empirical chapters, we will provide a concise overview of the literature on social inclusion and exclusion. Next, we will argue that human sensitivity to nonverbal cues is aimed at the detection of one's current inclusion status, followed by a brief alignment of the literature on behavioral mimicry in support of this claim. In a last step, we discuss the empirical evidence described in this dissertation and conclude with a review of the implications of the present research.

Inclusion and exclusion

Human social life takes place within a framework of relationships providing inclusion and belongingness. The formation and maintenance of social bonds is a critical ingredient for human psychological and physical well-being (e.g., Bowlby, 1969, 1973; Guisinger & Blatt, 1994; Hogan, 1983; Maslow, 1968; Ryan, 1991; Williams, 1997, 2001). Although the degree to which one experiences the need to be included by others may vary between people, this human need seems to be universal and plays an important role in many social interactions. The need to be included makes people reluctant to break their social bonds even when these bonds were temporary to begin with (Baumeister & Leary, 1995; Egan, 1970; Lieberman, Yalom, & Miles, 1973; Bridges, 1980). Moreover, this need for social bonds may even be hardwired as scholars from developmental psychology suggest that newborns' crying may be a genetically encoded separation distress (Christensson, Cabrera, Christensson, Uvnäs-Moberg, & Winberg, 1995; McBride, & DiCero, 1991).

The fundamental and motivating nature of the need to be socially included is best demonstrated through the negative consequences that occur when one's social inclusion is threatened. Threatened inclusion status negatively impacts individuals' cognitive, emotional and physical functioning (Leary, 2005; Williams & Zadro, 2005;

Baumeister & Tice, 1990; Peplau & Perlman, 1982); Williams, Shore & Grahe, 1998; Twenge, Catanese, & Baumeister, 2003; Baumeister, Twenge, & Nuss, 2002; Zhong & Leonardelli, 2008). Social exclusion threatens people's desire to be accepted more than other types of unpleasant contact, such as a verbal disagreement (Zadro, Williams & Richardson, 2005), enhances one's cortisol levels (Blackhart, Eckel, & Tice, 2007) and can cause what is often called 'social pain' – a feeling that resembles physical pain (Eisenberger, & Lieberman, 2004; Eisenberger, Lieberman, & Williams, 2003; MacDonald & Leary, 2005). Feeling excluded has negative consequences for one's state self-esteem (Leary, 2005) as well as the perceived meaningfulness of life itself (Stillman et. al, 2009). Summarizing, believing that one is appreciated, included, or otherwise valued fosters well-being, self-esteem, and confidence, whereas feeling unappreciated, excluded, or devalued evokes negative emotions, lowers self-esteem, and may result in antisocial reactions such as aggression or withdrawal.

Another consequence of social exclusion is that it elicits attempts to engage in behaviors that will re-establish individuals' acceptance into the group. Empirical evidence confirms that people go to great lengths in their efforts to fortify threatened inclusion (e.g., Williams, Cheung, & Choi, 2000; Carter & Williams, 2005; Ouwerkerk, Kerr, Galucci, & van Lange, 2005; Williams & Sommer, 1997). Although there is some evidence of self-defeating or anti-social responses to exclusion (e.g., Twenge, Baumeister, DeWall, Ciarocco & Bartels, 2007; Twenge, Catanese & Baumeister, 2002), generally, people have been shown to become more socially attentive, hard-working, conforming, and even gullible following exclusion (Spoor & Williams, 2007). Excluded individuals are motivated to reconnect to others by turning to other sources of acceptance to compensate for experienced exclusion (DeWall, Maner, & Rouby, 2008). For example, Maner, DeWall, Baumeister and Schaller (2007) reported that individuals experienced an increased drive to build new social bonds after being excluded, or after a reminder of a previously experienced instance of exclusion. Also, Karremans, Heslenfeld, van Dillen and van Lange (2009) showed that turning to familiar sources of acceptance shield one from the negative effects of being rejected. Moreover, activating mental representations of important others can have effects similar to their actual presence (Fitzsimons & Bargh, 2003; Mikulincer & Shaver, 2001). Together, these findings suggest that inclusion threats motivate people to seek connectedness with others to re-establish their sense of being

socially accepted. Furthermore, they suggest that such compensatory sources of acceptance need not be physically present.

Behavioral cues of inclusion and exclusion

Exclusion cues

The above summary suggests that human cognitive, motivational and even physical functioning benefits from being socially included. To establish and maintain social relationships, a person needs to be sensitive to cues communicating the extent of their inclusionary status. From an evolutionary perspective, humans should therefore be sensitive to various social exclusion threats. Indeed, in their model of ostracism Spoor and Williams (2007) state that people are inclined to detect cues of possible exclusion to the extent that we would rather overreact to false alarms than take a risk of being truly rejected.

Nonverbal behaviors play a significant part in the communication of important messages (DePaulo & Friedman, 1998). Therefore, people's sensitivity to exclusion signals becomes evident in their impact on low level cognition such as the perception of emotional expressions and intonation. Specifically, individuals who are particularly susceptible to social exclusion (those with a high trait need to belong) show an increased sensitivity to nonverbal social information cues such as vocal tones and enhanced accuracy on social sensitivity tasks (e.g., facial emotional detection task) (Pickett, Gardner, & Knowles, 2004). Downey and Feldman (1996) demonstrated that individuals who are sensitive to exclusion tend to categorize ambiguous social cues as signs of interpersonal rejection. Social exclusion enhances an individual's attention to social information and the accuracy of its recall (Gardner, Pickett, & Brewer, 2000) as well as enhances the selective attention to positive social stimuli such as smiling faces (DeWall et. al, 2008).

Inclusion cues

One way that social bonds can emerge or be reinforced is through smooth social coordination (Galinsky, Ku, & Wang, 2005). By creating a psychological sense of similarity and a feeling of behavioral and mental connectedness, social

coordination is the glue that binds and bonds social relationships. What behaviors are available to aid in the pursuit of social bonds?

Mimicry is a prime example of a nonverbal behavior that signals inclusion. It has been reasoned that if the behavior of others communicates (social) information relevant for survival, being tuned to the perceptions of others' behaviors may then be used to guide our own behavior in order to sustain our group inclusion (Chartrand, Maddux, & Lakin, 2003). Being mimicked promotes social bonding by increasing one's liking of the other and smoothing social interactions (Chartrand & Bargh, 1999; Chartrand, Cheng & Jefferis, 2002; Lakin & Chartrand, 2003). Interpersonal mimicry has been labeled a 'social glue' between individuals as it fosters pro-social tendencies and feelings of inclusion in the mimicked individuals (Ashton-James, van Baaren, Chartrand, Decety, & Karremans, 2007; Lakin, Jefferis, Cheng, & Chartrand, 2003; van Baaren et. al, 2002; van Baaren, Holland, Kawakami, & van Knippenberg, 2003). In fact, people can directly address threatened inclusion by nonconsciously increasing their own mimicking behavior of important others after an instance of social exclusion (Lakin, Chartrand, & Arkin, 2008). Following this logic, in the present dissertation we propose that if mimicry *increases* the sense of social inclusion (Ashton-James et al, 2007), non-mimicry should relatively *decrease* it. Specifically, if non-mimicry indeed signals exclusion, it should lead to several cognitive, motivational and physiological intrapersonal consequences related to exclusion.

Overview of the present dissertation

The overarching goal of the present dissertation is to investigate how lack of behavioral mimicry in social interactions affects the self-perception of the non-mimicked individuals and their perception of others.

Perception of others

The first objective of the research reported in the present dissertation is to examine the consequences of lack of behavioral mimicry for the perception of the non-mimicker. Previous research has suggested that being mimicked may cause a shift in how people perceive themselves in relation to others (Ashton-James et. al, 2007). However, little is known about how non-mimicked individuals perceive others

in relation to themselves. The present dissertation provides the first empirical test of the curbed projection of one's personality and attitudes as a function of lack of behavioral mimicry in interpersonal interactions. We aimed to test this assertion in the first empirical chapter.

The anchoring of others' characteristics in self-referential information, also called social projection, is a common tool when gauging others' characteristics (Krueger, Acevedo & Robbins, 2005; Mussweiler & Bodenhausen, 2002). People have a strong tendency to rely on their self-knowledge in gauging other's personality traits and attitudes. Behavioral correspondence fosters a mapping of the self onto the other (Barsalou, 2008; Mitchell, Banaji & Macrae, 2005). It has indeed been found that being mimicked increases perceived closeness towards others (Ashton-James, van Baaren, Chartrand, Decety, & Karremans, 2007). Conversely, a lack of mimicry could then inhibit the use of the self as a template for understanding the other person. The perceived cognitive dissimilarity to the non-mimicker is then reflected in the perception of the non-mimicker's personality traits and attitudes being dissimilar to those of the non-mimicked person.

Three studies provide empirical evidence for the hypothesized reduced social projection following interactions lacking mimicry. Study 2.1 demonstrates that not being mimicked by a confederate (compared to being mimicked) leads to a more dissimilar perception of this interaction partner's personality compared to the own personality.. Importantly, Study 2.1 further shows that reduced perceived self-other overlap with the interaction partner mediates this effect. Study 2.2 extends these findings by introducing a yoked observer condition in which new participants merely watched a videotaped behavior of the mimicking or non-mimicking confederate instead of interacting themselves with this confederate. The results of these two studies indicate that the mimicked participants perceived the interaction partner's personality as similar to themselves (i.e., projection of self onto other), whereas the non-mimicked participants as well as the observers did not project. The present findings constitute the first empirical evidence that a subtle nonverbal behavior such as lack of mimicry may moderate the 'stubborn' projective bias.

Self-perception

The second objective of the present dissertation is to examine how lack of behavioral mimicry affects the self-perception of the non-mimicked individuals. Three empirical chapters (Chapters 3, 4 and 5) focus on this issue.

Taken together, there is ample evidence for the implications of behavioral mimicry for the social inclusion of the mimicked individuals. Empirical evidence for the implications of a lack of mimicry for the non-mimicked individuals is however scarce. The present dissertation provides the first empirical test of the influence of non-mimicry on the non-mimicked individual's physiological, motivational and cognitive states as well as test of a regulatory mechanism which allows the non-mimicked individuals to cope with the effects of non-mimicry. Our central hypothesis is that lack of mimicry from an interaction partner is perceived by the non-mimicked person as an exclusion cue from the non-mimicker. As social exclusion triggers a variety of negative consequences that demand an immediate mending of the inclusionary status of the excluded individual, we expect a regulation mechanism to be triggered after a person has not been mimicked in an interpersonal interaction.

In line with these considerations, the three pertinent empirical chapters consistently show that non-mimicry from an interaction partner impacts physiological (Chapter 3), motivational (Chapter 4 and 5) and cognitive (Chapter 5) states of the not mimicked person in a similar fashion as social exclusion does. Furthermore, in the research reported in each of these empirical chapters the experienced exclusion threat is measured (using a need to belong scale) as the process underlying the effects of non-mimicry on the not mimicked person. Given the bonding effect of behavioral mimicry we propose that participants' need to belong will be satisfied after mimicry, but will be enhanced after lack of mimicry. Specifically, in Chapter 3 we examine whether non-mimicry evokes an endocrine stress response in the non-mimicked individuals. In Chapter 4 we explore an enhanced motivation of the non-mimicked individuals to reconnect to others by upgrading their close relationships. Finally, in Chapter 5 we test whether non-mimicry from an interaction partner affects the individual's implicit self-esteem. We propose and test a comprehensive model of the regulation of self-esteem after non-mimicry.

Overall, the second objective of the present dissertation is to examine whether non-mimicry from others serves as a subtle behavioral cue of social exclusion, which

sets off self-regulatory processes in the non-mimicked individuals such as an increased motivation to compensate for the experienced exclusion in order to normalize one's implicit self-esteem².

Physiological consequences of non-mimicry

Chapter 3 is aimed at demonstrating that lack of mimicry from an interaction partner evokes a physiological stress response in the non-mimicked individuals. The literature on acute social exclusion from peers reports enhanced levels of cortisol (a stress hormone) in excluded participants (Blackhart et. al, 2007; Dickerson, Kemeny, Aziz, Kim, & Fahey, 2004; Gunnar, Seban, Tout, Donzella, & van Dulmen, 2003). Therefore, in the present study we tested whether not being mimicked by a peer (an alleged other participant in the study) evokes a stress response that is typical of social exclusion. Importantly, the present study explored the role of need to belong in the occurrence of the stress response. Participants' levels of salivary cortisol were assessed 3 times: before the interaction (baseline cortisol), after the interaction (post-stressor cortisol) and 45 minutes after the interaction (rest period cortisol). The stressor was manipulated by mimicking or not mimicking the participants' nonverbal behavior during a 10 minutes long interaction with a confederate. After the interaction, participants' indicated their current need to belong among filler questions. The non-mimicked participants showed enhanced concentrations of salivary cortisol after the interaction, whereas salivary cortisol of the mimicked participants remained unaffected. The concentrations of salivary cortisol at the rest period assessment did not differ between the conditions. The cortisol reactivity was partially mediated by participants' current need to belong, which was enhanced after non-mimicry, but not after mimicry.

Thus, we found that lack of behavioral mimicry in an interpersonal interaction induced a physiological stress response in the non-mimicked participants, which was related to their thwarted need to be socially included. Jointly, these findings support the idea that non-mimicry may serve as a psychosocial stressor.

² Please note that each of the four empirical chapters of the present dissertation comprises a published or submitted article that can be read independently. As a consequence, some minor overlap in terms of theoretical background and methodology may be encountered.

Motivation to reconnect

Chapter 4 explores how the non-mimicked individuals deal with the unpleasant and stressful experience of not being mimicked by their interaction partner. Two studies aimed to examine whether the exclusion threat that non-mimicry in social interaction poses to the not mimicked individuals motivates them to seek reconnection to others than the perpetrator of the exclusion threat. Recent research shows that excluded individuals do not attempt to seek affiliation with the perpetrator of the exclusion, but instead turn to other sources of acceptance such as their pre-existing or potential social network to compensate for the experienced exclusion (DeWall et. al, 2008; Maner et. al, 2007). Therefore, in Study 4.1 we hypothesized and found that non-mimicked individuals evaluate their relationship with their romantic partner as more stable than mimicked individuals or those who had no prior interaction. Study 4.2 showed a similar impact of non-mimicry on a variety of close relationship evaluations using a pre-post measure design. Furthermore, moderated mediation analyses in Study 4.2 revealed that the link between mimicry and relationship evaluations was mediated by increased need to belong, specifically for the non-mimicked participants.

Together, these studies show that after an interaction with even a perfect stranger, non-mimicry may frustrate one's need to be socially included by others and therefore may lead to strengthened bonds with one's close others.

Implicit self-esteem

Chapter 5 provides a test of the negative influence of non-mimicry on implicit self-esteem of the non-mimicked individuals. The assumption that people are motivated to achieve and maintain positive self views is commonplace in psychological theory and it is rarely challenged. William James (1890) saw this motive as a fundamental aspect of human nature. It has since then figured prominently in the theories and models of many reputable psychologists working from a number of diverse perspectives (e.g., Allport, 1955; Epstein, 1973; Greenwald, 1980; Maslow, 1943; Rogers, 1951; Solomon, Greenberg, & Pyszczynski, 1991; Steele, 1988; Tesser, 2003) and maintaining positive self-view has recently been shown to be crucial for one's experience of a general meaningfulness of life (Stillman et. al, 2009). Sociometer theory postulates that in striving for positive self-worth, people derive their self-esteem from their current inclusion status by others (Leary, 1999; Leary & Baumeister, 2000). According to this theoretical account, state self-esteem functions

as a psychological mechanism that monitors social environment for the information regarding an individual's level of social acceptance and relays this information back to an individual in feelings of self-worth. Self-esteem provides information regarding one's fitness for inclusion in important social groups (Leary & Baumeister, 2000). After an instance of social exclusion, state self-esteem decreases as a warning that the individual's level of social acceptance is potentially low (Leary, Haupt, Strausser, & Chokel, 1998). Fluctuations in one's self-esteem after non-mimicry could thus be indicative of the current inclusion level by one's interaction partner.

In three studies, we tested the assumption that non-mimicry from others decreases one's implicit self-esteem. This effect is assumed to be related to the enhancement of individuals' current need to belong. Furthermore, we propose that non-mimicked individuals may restore their decreased implicit self-esteem by upgrading their longstanding relationships. Therefore, in Chapter 5 we tested a process model - the Behavioral Asynchrony Induced Keeping Away Loneliness (BAIKAL) model - of the regulation of implicit self-esteem after non-mimicry. The model comprises two distinct processes: (1) the effects of non-mimicry on self-esteem that are moderated by trait need to belong and mediated by state need to belong and (2) the subsequent recovery of self-esteem by seeking reconnection via the enhancement of longstanding relationship evaluations.

Study 5.1 shows that non-mimicry from an interaction partner reduced participants' implicit self-esteem (as measured by a Single Target Implicit Association Test), but not their explicit self-esteem, compared to both mimicked participants and participants who had no prior interaction. Study 5.2 replicates the effect of mimicry on implicit self-esteem and further shows that the impact of non-mimicry on self-esteem is, as predicted, mediated by temporarily enhanced need to belong. In line with the model's predictions, Study 5.2 also demonstrates that trait need to belong (as assessed in a pre-interaction measure) moderates the indirect effect of non-mimicry on reduced implicit self-esteem. That is, we find that the impact of non-mimicry on one's state need to belong is influenced by individual differences in need to be socially included such that non-mimicry exerts its influence on participants' state need to belong only when their trait need to belong is high. Study 5.3 confirms the second part of the model entailing that non-mimicked individuals whose implicit self-esteem had been reduced indicate enhanced evaluation of their

close relationships, which leads to the subsequent recovery of their implicit self-esteem to normal levels (i.e., to the level of mimicked participants).

Dealing with subtle signs of exclusion

Conclusions and Implications

The research reported in the present dissertation provides a new look on the role of lack of behavioral mimicry in social interactions. The present dissertation had two main objectives. First, we aimed to demonstrate that lack of mimicry in interpersonal interactions reduces perceived self-other overlap between the non-mimicked person and the non-mimicker which affects the perception of the non-mimicker. Second, we aimed to demonstrate that lack of behavioral mimicry is perceived as a signal of exclusion by that partner, thereby eliciting aversive cognitive, motivational and physiological effects in the non-mimicked individuals.

The results generally support this viewpoint. In exploring the effects of non-mimicry on the perception of others, we showed that non-mimicry in interpersonal interactions precludes the commonly occurring perception of the interaction partner's personality and attitudes as being similar to one's own personality and attitudes (Chapter 2). This effect was explained by the reduced self-other overlap due to lack of mimicry. This conclusion is corroborated by the findings described in Chapter 3 concerning an increased perceived distance to the interaction partner after non-mimicry. In line with this argument, we showed in Chapter 3 that not being mimicked by an interaction partner increases perceived bonds with close others of the non-mimicked individuals.

In exploring the effects of non-mimicry on the self-perception, we showed that interactions lacking mimicry influence the non-mimicked individuals internal states. After not being mimicked, individuals showed a neuroendocrine stress response and a lowered implicit self-esteem. A decrease of implicit self-esteem following non-mimicry points to the efficiency of non-mimicry as an exclusion detection tool. The vulnerability of one's implicit self-esteem to a subtle behavioral mismatch suggests that nonconscious detection of non-mimicry from others is a low-cost device of tapping one's current level of connectedness with others. We also consistently showed that these effects were mediated by enhanced need to belong after not being

mimicked, but not after having been mimicked. Furthermore, throughout chapters 4 and 5 we demonstrated that non-mimicry from others instigated self-regulatory processes which prompted the non-mimicked individuals to restore the experienced inclusionary imbalance. Specifically, we demonstrated that non-mimicked individuals showed an enhanced motivation to reconnect to other sources of acceptance that were available to them. A symbolic re-affirmation of their close bonds led to the recovery of implicit self-esteem in the non-mimicked individuals.

Perceived self-other overlap and social exclusion

The present findings raise a number of intriguing questions. One salient question concerns the possible relationship between the reduction of the perceived self-other overlap and social exclusion. In this dissertation we treated the mechanisms underlying the effects of non-mimicry on the perception of the self and others as the separate consequences of non-mimicry. However, these processes may be closely related. What is it that transforms a person from being perceived as “the same” or “different” to being an insider or an outsider? As a self-expansion account would suggest, people strive to expand their self concept by cognitively incorporating others’ mental resources, perspectives and identities into their own self-views (Aron & Aron, 1996, 1997). By expanding one’s social resources one not only increases one’s survival chances, but also increases the probability to attain one’s personal goals. In a stable and positive relationship, such a cognitive inclusion becomes mutual, to the effect that both partners in the relationship gain access to each other’s resources. This notion is supported by the research on social projection, which shows that people have a strong (and not necessarily warranted) tendency to perceive others’ characteristics as similar to their own (Krueger et. al, 2005; Mussweiler & Bodenhausen, 2002). Conversely, neuroscientific evidence suggests that when people judge others’ characteristics, an increased activity in the brain regions associated with processing of self-related information is observed (Mitchell et. al, 2005; Mitchell, Cloutier, Banaji, & Macrae, 2006). These findings suggest the prevalence of the tendency to include others into the self. Notably, this tendency to include others into the self is complemented by human motivation to be included by others. This line of reasoning implies that by preventing the inclusion of one’s identity into the others’ identity (e.g., by not mimicking the other person), one reduces the possibility of the formation of a relationship with that person. In other words, non-mimicry may communicate a lack

of intention to include that person into one's social network. The fact that mimicry in interpersonal interactions reflects an expected emergence of affiliation between the interaction partners (Chartrand & Bargh, 1996; Lakin & Chartrand, 2003) corroborates this idea. It is thus conceivable that the perceived cognitive dissimilarity between oneself and the person who did not mimic may lead to a feeling that one is not being included by that person, which poses an exclusion threat. Following the results obtained in the present research one would predict that a reduction of the perceived self-other overlap between oneself and one's close other may be related to decreased state self-esteem. Exploring the link between reduced perceived self-other overlap and social exclusion constitutes an intriguing question for further research.

Information value of non-mimicry

Another implication of the research presented in this dissertation concerns the communicative value of lack of behavioral mimicry. As mentioned earlier in this chapter, mimicry from others is the prevailing behavior (Chartrand & van Baaren, in press). The reason of its prevalence lies in the human need to form stable and positive connections with others and mimicry fosters the formation and maintenance of such connections. Considering that most of our daily interactions take place within our existing social network, the interactions we find ourselves in are usually positive ones. Mimicry in such interactions is thus expected. Similarly, when we seek interactions with strangers (or when they invite us to interact), these interactions naturally suggest the formation of affiliation. Thus, we expect (and usually find) ourselves to be mimicked in most of the interactions with unfamiliar individuals as well. This reasoning implies that mimicry in interpersonal interactions resembles a default option, whereas lack of mimicry may be perceived as unexpected. According to the expectancy violation account (Burgoon, 1978; Burgoon & Jones, 1976; Guerrero, Andersen, & Afifi, 2001), violations of expectancies cause arousal and compel the recipient to initiate cognitive appraisals of the violation. From this perspective, occurrence of physiological stress reaction after non-mimicry converges with the idea that non-mimicry from others is unexpected. According to the Information Theory (e.g., Shannon, 1948), something that is unexpected has more informational value than the prevalent default option. Therefore, lack of mimicry has greater communicative value than being mimicked. Thus, the relative infrequency of non-mimicry, renders lack of mimicry in interactions highly informational.

The view of non-mimicry as expectancy violating (and thus information-rich) behavior has interesting implications for possible differential processing of social interactions by the interaction partners. For example, as behavior violations call attention to the qualities of the violator, it is interesting to explore whether non-mimicked individuals would show a better memory of the interaction than the non-mimicker or the mimicked individuals. Similarly, future neuroscientific exploration of the expectancy violation related brain activity after non-mimicry may shed light on the processes that are instigated by unreciprocated mimicry. Note however that sometimes the conditions of interacting with others may not be conducive of mimicry, neither in reality nor in people's expectations, as for instance when members of antagonistic social group meet each other. In such hostile intergroup conditions, non-mimicry may be the norm and mimicry might be then unexpected. In these conditions, mimicry may have more information value than non-mimicry.

Differential processes after mimicry versus non-mimicry

The present research provides support for the notion that not being mimicked by others may trigger other processes than the processes prompted by mimicry. Specifically, we found that non-mimicked individuals employ a different strategy for gauging others' characteristics than the mimicked individuals do. Research on social projection tells us that when people perceive others as dissimilar to themselves, they rely on different techniques such as stereotyping to infer others' properties (Ames, 2004a, 2004b; Kunda, Davies, Adams, & Spencer, 2002; Kunda & Spencer, 2003). Although in the present dissertation we focused primarily on identifying the extent of perceived overlap between the personalities and attitudes of the (non)-mimicked individuals and their interaction partners, exploring what strategies non-mimicked individuals use when gauging characteristics of their interaction partner offers one possible avenue for future research. Conversely, the results obtained in the present dissertation imply that non-mimicry may influence human functioning on a broader level than the bulk of the existing literature on (positive) consequences of mimicry suggests. Non-mimicry does not necessarily produce similar, but weaker consequences as mimicry does. Instead, it may instigate the use of other social strategies such as in the case of gauging others' attributes. Future study of mechanisms triggered by lack of mimicry should further our understanding of the range of influences that this behavior engages.

Influence of non-mimicry on cognitive functioning

Given the informative value that non-mimicry has concerning exclusion threats, not being mimicked may influence one's cognitive functioning on a broader level. Literature on social exclusion effects suggests that excluded individuals accommodate their cognitive resources (e.g., enhanced memory and attention for social cues) to cope with social exclusion threat (Gardner et. al, 2000). Hence, we suggest that non-mimicry may enhance cognitive functioning in a similar fashion. Such a response would seem functional as it promotes the mobilization of the necessary resources to cope with exclusion threat. Finkel, Campbell, Brunell, Dalton, Scarbeck, and Chartrand (2006) suggest that a behaviorally uncoordinated interaction (i.e., one that lacks mimicry) impairs one's intrapersonal cognitive capacity. Perhaps research investigating non-mimicry-induced resource depletion should tap into other aspects of executive functioning. Indeed, preliminary results from our research suggest that although non-mimicry impairs performance on cognitive tasks such as a Stroop task and decreases one's verbal fluency, it enhances memory for emotional faces (Kouzakova, 2009).

Related to this issue, the present research primarily highlights the disadvantageous effects of non-mimicry, although it seems worthwhile to also explore the conditions under which these behavioral cues prove functional for the receiver of non-mimicry.

Conclusion

To conclude, in the present dissertation we proposed that lack of mimicry in dyadic interactions affects both the perception of the interaction partner and the self-perception of the non-mimicked person. The presented findings generally support the proposed theory: whereas being at synch with your conversation partner may imply social acceptance, a behaviorally awkward interaction may enhance the psychological distance between yourself and your interaction partner and threaten your sense of being socially included. These findings make a strong case demonstrating the regulatory function of lack of behavioral mimicry in dyadic interactions. The present work emphasizes that the functionality of non-mimicry lies in disrupting social relationships (or precluding their formation), thereby highlighting the communicative value of lack of mimicry for the recipient of this treatment.

Chapter 2

Mental Mirrors: Behavioral Mimicry Moderates

Projection in Social Judgment

Abstract

How do we estimate others' personality and opinions? Three experiments investigated whether nonconscious behavioral mimicry during interpersonal interactions moderates social projection. Study 2.1 showed that mimicked participants projected their own personality profile onto their interaction partner, whereas non-mimicked participants described their interaction partner differently from themselves. This effect was mediated by perceived similarity to the interaction partner. Study 2.2 replicated these findings and demonstrated that social projection indeed depends on the amount of mimicry during an interpersonal interaction. In Study 2.3, the topic of projection was shifted from personality profiles to opinions and again an effect of mimicry on projection was obtained. Together these studies set boundaries for the occurrence of social projection and provide further understanding of the role of mimicry in interpersonal interactions.

Keywords: behavioral mimicry, social projection, similarity, personality traits, attitudes, social judgment, self-referential thought

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When people confront the daily task of intuiting others' personalities and attitudes, they often use themselves as a template, assuming others share their own traits, beliefs, and values (Kenny & Acitelli 2001; Krueger, Acevedo & Robbins, 2005; Mussweiler & Bodenhausen, 2002). Indeed, brain regions that show activity during the processing of self-related information seem to be similarly involved in judgments of others, suggesting that self-knowledge may act as an anchor or lens when judging others (Mitchell, Cloutier, Banaji, & Macrae, 2006). According to some accounts, this impulse to project oneself onto others is so strong and stubborn that curbing it may require deliberate attention, considerable cognitive effort, and perhaps even incentives for accuracy - and even then, projection may nonetheless exert some biasing influence (e.g., Epley, Keysar, van Boven, & Gilovich, 2004; Krueger & Clement, 1994).

But does this image of the “sovereignty” of social projection go too far in casting the self as an irresistible starting point? Some boundaries have been identified, such as Clement and Krueger's (2002) finding that projection is greater for ingroup targets than outgroup targets. Recently, Ames (2004a; 2004b) suggested that a subjective sense of similarity moderates projection: people who see themselves as similar to a target individual or group display higher levels of projection whereas those who see dissimilarity seemingly eschew projection, turning instead to other inferential sources such as stereotypes. However, Ames' manipulations of general perceived similarity were overt and effortful, such as telling perceivers to ruminate on selected similarities or dissimilarities. Likewise, the work on diminished projection to outgroups involved a conscious recognition of group boundaries on behalf of perceivers. Could something more subtle - even implicit and unconscious - shift levels of projection? Evidence of such an effect could challenge scholars in multiple traditions to adapt psychology's portrait of interpersonal cognition to feature a more dexterous (but not necessarily more accurate) perceiver. Behavioral mimicry - a common and naturally occurring nonverbal coordination between interaction partners - may play the role of such a subtle moderator, implicitly shaping the extent to which one perceives oneself as similar to one's interaction partner and thereby promoting or inhibiting projection (Ashton-James, van Baaren, Chartrand, Decety, & Karremans, 2007; for a review see Chartrand & van Baaren, 2009). Mimicry is grounded in the notion of the recognition of oneself in one's interaction partner, thereby fostering a

mapping of the self onto the other (Meltzoff, 2005; Ames, Jenkins, Banaji, & Mitchell, 2008). The absence of mimicry could inhibit the use of self as a template for understanding another. Since perceptions of behavioral synchrony or non-synchrony typically register outside of conscious awareness, the moderating effect of mimicry of social projection would seemingly be implicit and automatic—in contrast to the view of projection as stubborn and irrepressible.

The present research

In the present studies, we predicted that mimicked individuals would use themselves as a template for understanding the mimicker—that is, mimicry would facilitate projection due to increases in perceived similarity. This stands in contrast to two alternatives: first, that something as subtle and implicit as mimicry would not be capable of heightening or dampening projection (i.e., only explicit and laborious efforts can curb projection), and second, that if mimicry does affect projection, it does so through enhancing or undermining liking for a counterpart (rather than promoting or inhibiting the use of self as a template, regardless of liking). If our predictions are borne out, they would extend the active, but heretofore separate, traditions of work on interpersonal mimicry and social projection. More generally, our results could advance psychology's account of how people intuit others' characters and attitudes.

In Study 2.1, we hypothesized that being mimicked in an interpersonal interaction would heighten the projection of our own personality traits onto the mimicker, which is mediated by perceived similarity. Study 2.2 replicated this design by gauging self-views before the mimicry manipulation and extended it by controlling for the possible influence of systematic differences in the confederate's behavior. In Study 2.3, we conceptually replicated the previous studies, but this time used opinions instead of personality traits.

Study 2.1

Method

Participants and design. Forty-two undergraduate students (26 female), mean age 23.4 years, from Radboud University participated for credit in a single-factor between-participant experiment (mimicry: being mimicked vs. not being mimicked)

with self-description post-test and description of interaction partner's personality as the dependent measures.

Procedure. In pairs, participants and a male confederate were brought into a room and were seated. After giving initial instructions, the experimenter left, returning after 10 minutes. During the interaction, the partners completed a set of neutral pen-and-paper tasks. In the mimicry condition, the trained confederate mimicked participants' upper body postures and gestures. In the non-mimicry condition, the trained confederate subtly, yet deliberately, stayed out of sync with participants, but moved as often as in the imitation condition. The confederate was unaware of the hypothesis. After the interaction, participants completed a computer survey in a separate cubicle. They described how similar they felt towards the interaction partner using the Inclusion of Other in the Self scale (Aron, Aron, & Smollan, 1992) with higher scores (up to 7) indicating a great deal of self-other overlap and lower scores (down to 1) indicating no overlap. Next, participants described themselves and their interaction partner using 38 items from the Adjective Check List (ACL, Gough & Heilbrun, 1983) with the order of self-description and partner-description counterbalanced. ACL is a widely used instrument to describe one-self or others with adjectives such as "intelligent" on scale ranging from 1 ("not at all") to 5 ("very much so"). On completion of the funnelled debriefing (Chartrand and Bargh, 1999), participants were thanked, paid, and debriefed. None of the participants accurately guessed the purpose of the experiment or became aware of (not) being mimicked.

Results

To test whether non-mimicked (compared to mimicked) participants displayed less projection of their personality onto the interaction partner, we computed a measure of projection by correlating participants' personality ratings for self and partner across the 38 ACL items and then Fisher transformed the resulting value for each participant. A one-way ANOVA with this measure of projection revealed that mimicked participants showed greater projection ($M = .77$, $SD = .03$) than non-mimicked participants ($M = .42$, $SD = .04$), $F(1, 40) = 36.32$, $p_{\text{rep}} = .99$, $\eta_p^2 = .48$.

Mimicked participants also reported higher levels of similarity to the confederate on the IOS scale ($M = 4.46$; $SD = .23$) compared to non-mimicked

participants ($M = 3.00$; $SD = .23$), $F(1, 40) = 19.51$, $p_{\text{rep}} = .99$, $\eta_p^2 = .33$. As expected, perceived similarity to the confederate mediated the influence of mimicry on the projection of personality profile (Sobel test: $Z = 1.99$, $SE = .1$; $p_{\text{rep}} = .92$; bootstrapping: $M = .19$, $SE = .1$, confidence interval .01 - .39).

Consistent with the typical mimicry effect (Chartrand & Bargh, 1999), mimicked participants ($M = 4.41$, $SD = .16$) reported enhanced liking of the confederate compared to non-mimicked participants ($M = 3.2$, $SD = .16$), $F(1,40) = 24.99$, $p_{\text{rep}} = .99$, $\eta_p^2 = .4$. However, liking of the confederate did not mediate the mimicry and projection relationship ($Z = .51$, $p_{\text{rep}} = .64$).

There was no main effect or interaction involving order of descriptions ($F < 1$).

Study 2.2

Compared to non-mimicked participants, mimicked participants in Study 2.1 appeared to show greater levels of projection in gauging their counterpart's personality. However, given that self-ratings of personality were taken after the interaction, it cannot be ruled out that mimicked participants' personalities somehow changed toward or converged with counterparts' personality during the interaction. Thus, in Study 2.2, participants provided self-ratings of personality before interacting with a mimicking (or non-mimicking) counterpart. We expected greater projection from participants who were mimicked.

Method

Participants and Design. Thirty-seven undergraduate students (31 female), mean age 22.11 years, participated for credit in a single factor between-participant experiment (mimicry: mimicked vs. not mimicked).

Procedure. The procedure was the same as Study 2.1, except that self-descriptions on the ACL were completed before the interaction. The confederate in Study 2.2 was a different male than in Study 2.1. He underwent similar (non-)mimicry training as the confederate in Study 2.1.

Results and Discussion

To test whether non-mimicked participants projected their personality onto the interaction partner to a lesser extent than mimicked participants, we correlated and

transformed participants' self-reported personality with their estimations of their counterpart's personality in the same manner as in Study 2.1. The results of an ANOVA were consistent with higher projection in the mimicry condition ($M = .73$, $SD = .05$) than in the non-mimicry condition ($M = .32$, $SD = .05$), $F(1,37) = 31.58$, $p_{rep} = .99$, $\eta_p^2 = .47$.

Despite careful training, the confederate may have inadvertently behaved differently in other ways than just refraining from mimicking the participant (e.g., he may have behaved more awkwardly) which may have caused participants to describe his personality quite differently from their own. To rule out this alternative explanation, we added a yoked observers condition in which participants did not interact with the confederate, but merely watched his videotaped behavior during one of his previous interactions with the participants from the two conditions in Study 2.1. The same dependent measures were administered to these 'observer' participants as to the participants in the two interaction conditions. The 'observers' who watched an interaction from the mimicry condition showed similar levels of personality projection to the target as compared to 'observers' who watched a non-mimicry interaction ($M_{mimicry} = .33$, $SD = .07$; $M_{non-mimicry} = .25$, $SD = .06$), $F(1,20) < 1$, see Figure 2.1.

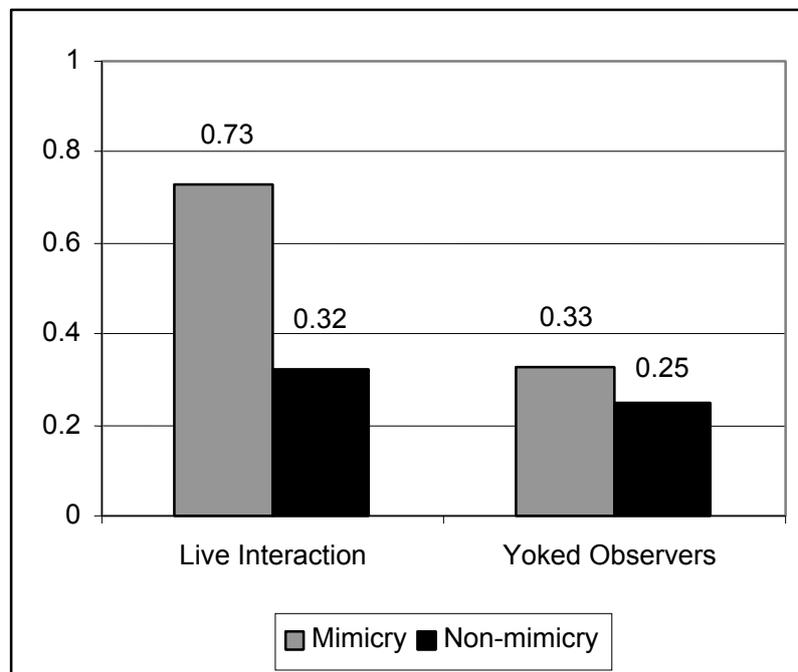


Figure 2.1. Correlations of self-other personality profile overlap showing Live Interaction Partners and Yoked Observers for mimicry vs. non-mimicry conditions in Study 2.2.

Study 2.3

Like Study 2.1, Study 2.2 suggested that mimicry may play the role of a subtle moderator of social projection: those who are mimicked may be more inclined to use the self as a template in their judgments of others; those who are not mimicked may be less so. However, both of these studies focused on personality judgments. In Study 2.3, we tested our expectation that these effects would extend to judgments of others' attitudes. By gauging judgments of specific attitudes that were fully unrelated to the content of the interaction, Study 2.3 also addresses alternative explanations centered on behavioral and other evidence offered during the interaction.

Participants and design

One hundred and ten undergraduate students (93 female), mean age 20.9 years, participated for credit in a single-factor between-participant (mimicry: mimicked vs. not mimicked).

Procedure

The procedure was comparable to that of Study 2.1, except that participants reported and judged a series of specific attitudes rather than general personality traits. After their interaction with the confederate where pairs engaged in a photo description task (after Lakin, Chartrand, & Arkin, 2008), participants indicated their own attitudes and the confederate's attitudes about six different topics, including quality of school exams, violence on TV, capital punishment, other people's lying behavior, being afraid to catch a disease, and their friends appearance. Participants rated statements (e.g., 'High school examinations are getting easier') on scale ranging from 1 ("not at all") to 5 ("very much"). The order of self and counterpart responses was counterbalanced. We also measured participants' perceived similarity to their interaction partner using the IOS scale. Finally, participants followed a funnelled debriefing procedure as in the previous studies.

Results and discussion

We computed a measure of projection as in Studies 2.1 and 2.2. As expected, mimicked participants showed greater apparent projection of their attitudes ($M = .55$, $SD = .04$) than non-mimicked participants did ($M = .37$, $SD = .04$), $F(1,108) = 5.88$,

$p_{\text{rep}} = .95$, $\eta_p^2 = .05$. There was no main effect or interaction involving order of descriptions ($F < 1$).

As in Study 2.1, mimicked participants perceived greater similarity using the IOS scale ($M = 3.51$; $SD = .21$) compared to non-mimicked participants ($M = 2.80$; $SD = .21$), $F(1, 108) = 5.52$, $p_{\text{rep}} = .95$, $\eta_p^2 = .05$. A Sobel test indicated that perceived similarity mediated the influence of mimicry on the projection of personality profile ($Z = -2.08$, $SE = .05$, $p_{\text{rep}} = .93$).

General Discussion

Understanding others through the lens of the self seems to be a fundamental building block of social judgment. Some accounts suggest that anchoring on the self when judging others' personalities and attitudes is not only pervasive, but also stubborn, undone only through deliberate attention and considerable effort. In contrast, we believe that perceivers may be sensitive to even subtle clues about the applicability of the self as a template for judging an interaction counterpart. Drawing on past research on behavioral mimicry, we expected that perceivers would project more to counterparts who non-verbally mimicked them and less to counterparts who did not, even though perceivers would not be aware of these differences in synchrony. We expected this effect to emerge not because of liking (e.g., people project more to mimicking partners because they like them) but because of perceived similarity (i.e., people see mimickers as more like them and, thus, project their personality and attitudes onto them).

Three studies were consistent with our account. Mimicked participants in Studies 2.1 and 2.2 showed greater levels of personality projection to counterparts than non-mimicked participants did. In Study 2.3, mimicked participants showed greater levels of attitude projection to counterparts than non-mimicked participants did. Our results also suggest these differences in projection were accounted for by increased perceived similarity towards the counterpart, not by liking. Overall, our results were consistent with our argument that being behaviorally coordinated during interpersonal interaction is related to a perceived similarity. When synchrony emerges, one recognizes oneself in a counterpart and may turn to the self as a source for intuiting the counterpart's personality and attitudes; when synchrony is lacking,

one may sense a poor fit between self and other, eschewing projection and turning to others sources of social judgment.

For scholarship on social projection and simulation approaches to mind reading, our findings partially reaffirm what many accounts suggest: that the self may typically act as an anchoring template in understanding others. Yet our results also show that this anchor may not be entirely stubborn and immovable. The fact that mimicry appeared to moderate projection across our studies is, we believe, the first evidence of a subtle moderator, operating without effort or awareness. For scholarship on interpersonal mimicry, our findings extend a body of work that has shown effects ranging from rapport to pro-social behavior. Here, we provide what we believe is the first evidence that mimicry affects the use of projection in judgments of a counterpart's personality and attitudes.

More generally, we believe our results add another tile to the mosaic of findings about the interpersonal entrainment of bodies and minds. In the past generation, developmental, cognitive, clinical, social, and personality psychologists have made great advances in building our understanding of how people mirror one another physically and mentally. Our findings suggest a new side of how and when these mirrors work. We look forward to further research that can unpack the underlying mechanisms and tease out the interpersonal consequences.

Chapter 3

Lack of behavioral imitation in human interactions
enhances salivary cortisol levels

Abstract

As inherently social animals, humans are very sensitive to behavioral signals from other members of their group. Nonconscious imitation of conspecifics' behavior (also called social mirroring) is a common manner in which people express their sense of similarity and affiliation with others. This evolutionary important behavioral repertoire has been referred to as 'social glue' as it cultivates pro-social behaviors that foster one's acceptance by the group as well as sustain societal unity. Lack of behavior imitation therefore serves a subtle cue signaling rejection by others. Because being rejected is a stressful experience that is known to raise cortisol levels in humans and other primates such as baboons, we reasoned that not being imitated by another person during an interpersonal interaction may enhance cortisol levels as an acute physiological stress reaction to the behavioral rejection signal by their conspecifics. In the present study, female participants were unobtrusively imitated or not imitated by another person. None of the participants indicated awareness of (not) being imitated. The salivary cortisol concentrations of not imitated participants did not differ from those of the imitated participants on a baseline measurement, but they increased considerably after the interaction, whereas the cortisol level of imitated participants remained stationary. This stressful consequence of a lack of behavioral imitation was mediated by self-reported need to belong. These findings provide new insights into the impact of a lack of behavioral imitation on the receiver's hormonal secretion and its functionality in social interactions.

Key words: salivary cortisol, human imitation, nonverbal behavior, social rejection, need to belong

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Neuroendocrine functioning has important implications for our understanding of the dynamics of human social behavior. Recent research has identified the endocrine basis of both human affiliative behaviors and their counterpart – social rejection (Blackhart et al. 2007; Brown & Brown, 2006; Brown et al., 2009; Carter, 1998), in which certain hormones such as cortisol, oxytocin, vasopressin, prolactin, and endogenous opioids play a crucial role (e.g., Insel, 1992; Keverne et al., 1997).

Although behaviors related to bonding and rejection are mostly nonverbal and nonconscious, research on the endocrine consequences of acute social rejection often utilizes either an explicit induction of rejection (e.g., verbal rejection, social-evaluative threat, performance on cognitive tasks) or an individual differences approach (e.g., temperament, social competence, low self-esteem; for an overview see Dickerson & Kemeny, 2004). As a result, our understanding of human physiological reactions to naturally occurring behavioral stressors lags behind. The present research investigates the neuroendocrine correlates of the absence of nonconscious behavioral imitation as an acute psychosocial stressor in interpersonal interactions.

Human beings have a pervasive need to form and maintain positive and stable interpersonal relationships (Baumeister & Leary, 1995). A great deal of human behavior, emotion, and thought is affected by this fundamental need. Enduring inclusion in a social framework as well as affectively pleasant interactions with conspecifics satisfy this need (Baumeister & Leary, 1995). Interpersonal behavioral imitation facilitates the accomplishment of this need (Chartrand et al., 2002).

Automatic behavioral imitation is a common and naturally occurring nonverbal means of coordination in human interactions. It has been characterized as a “social glue” that subtly binds people together and increases empathy and mutual affiliation between interaction partners (for a review see Chartrand & Van Baaren, in press). Imitating our interaction partner’s behavior signals a sense of similarity and liking towards the imitated person (Ashton-James et al., 2007; Byrne, 1999, 2009; Mitchell et al., 2005). Whereas being imitated in interpersonal interactions signals social bonding, not being imitated by one’s peer may serve as a critical environmental signal of rejection.

When humans are rejected, and hence their fundamental drive to be socially included is not satisfied, several cognitive, socio-emotional and psychological consequences may ensue (Baumeister & Tice, 1990; Baumeister et al., 2002; Leary,

1990, 2001; Williams & Zadro, 2005; Twenge et al., 2003; Twenge et al., 2007). For example, rejection by others has been implicated in the development of depression throughout different age groups (Bell-Dolan et al., 1995; Kupersmidt & Patterson, 1991; Nezlek et al., 1997; Nolan et al., 2003; Slavich et al., 2006). Rejection threatens people's desire to be accepted more strongly than other types of unpleasant contact (Zadro et al., 2005) and can cause what is often called 'social pain' – a feeling that resembles physical pain (Eisenberger et al., 2003; MacDonald & Leary, 2005). In response to a vital belongingness need, humans have become sensitive to behavioral signals (including imitation) from their conspecifics which allows them to efficiently detect and interpret changes in others' behavior in terms of their current state of acceptance (Gardner et al., 2000; Pickett et al., 2004). If not being imitated indeed signals social rejection, one would expect a physiological stress reaction to non-imitation expressed in elevated cortisol release.

Several studies in humans and other mammals support this hypothesis. For example, Sapolsky et al. (1997) reported that socially subordinate and isolated wild baboons exhibited hypercortisolism, evidenced through basal hypersecretion of cortisol and glucocorticoid feedback resistance. Conversely, Johnson et al. (2006) found that repeated administration of corticosterone increased depressive-like symptoms in rats and disrupted normal HPA axis functioning. Similarly, abundant research on human stress reactions demonstrates a significant increase in salivary cortisol following social rejection, for example after a status loss or when rejection occurs over longer duration, such as when a person is ignored and excluded from conversation over time (Ford & Collins, 2006; Gunnar et al., 2003; Shively et al., 1997; Stroud et al., 2002). Also, nonverbal shame behaviors that result from a social-evaluative threat enhance cortisol release (Dickerson et al., 2004) and even just imagining social rejection increases physiological arousal (Craighead, Kimball, & Rehak, 1979). Importantly, acute social rejection by peers appears to be a significant predictor of immediate elevated cortisol release in the rejected individuals (Blackhart et al., 2007; Gruenewald et al., 2004).

However, it still remains unknown what the neuroendocrine consequences are of humans who are not being imitated in interpersonal interactions, a pervasive social phenomenon and a prime example of a subtle nonverbal regulator of social interactions among humans.

Considering this brief outline of previous research on the crucial role of imitation in human bonding as well as the detrimental effects of social rejection, we propose that not being imitated by peers in an interpersonal interaction signals rejection, triggers an acute belongingness need, and therefore enhances cortisol levels compared to being imitated by peers. As some people may be more sensitive to lack of imitation than others (e.g., because they may pick up the exclusion signal more readily or because belongingness threat simply has more impact on them than it has on others), we measure the variation in sensitivity to belongingness threat. We assume that elevated cortisol levels will be observed among participants to the extent that not being imitated enhances their need to belong.

Study 3.1

Method

Participants

Seventy-two female students from Radboud University Nijmegen (mean age 21.3 years) were screened according to physiological selection criteria such as medication, drug and contraceptive use, blood pressure levels, pregnancy and being awake at least 3 hours before the experiment. Additionally, all participants met the requirements of refraining from consuming alcohol or caffeine and from doing any strenuous physical exercise 24 hours prior to the experiment, as well as refraining from smoking, eating or drinking anything except water 2h prior to the start of the experiment. These restrictions were applied to reduce natural variance in cortisol levels across participants prior to the experiment. All participants were naïve with regard to the purpose of the experiment (Blackhart et. al, 2007; Kirschbaum & Hellhammer, 1994, 2000).

Design

Participants were randomly assigned to either a condition in which they were imitated ($n = 39$) or not imitated ($n = 33$). Hormone assessment (baseline, post-stressor, rest-period samples) was a within-subjects factor. The dependent measures were participants' post-interaction cortisol levels, controlled for pre-interaction baseline cortisol and the post-interaction scores on the reported level of belongingness need.

Cortisol collection and assay

Salivary measures provide a reliable, non-invasive way to assess unbound steroid hormones in humans (Riad-Fahmy et al., 1983). Three saliva samples were taken from each participant. A baseline saliva sample was collected 15 minutes after the experiment started. The post-stressor saliva sample was collected 25 min after cessation of the manipulation to allow time for the cortisol response to develop. Because it takes about 20 to 30 minutes for the reaction to the acute stressor to affect the corticoid levels and about 40 to 45 minutes to completely return to baseline cortisol levels (Ramsay & Lewis, 2003), the third saliva sample was taken 45 minutes after the cessation of the stressor. At each sampling point, saliva was collected in sterile Eppendorf tubes using the passive-drool method, in which participants directly expectorate into a tube (Shirtcliff et al., 2001). Immediately following the collection, the tubes were placed at -20°C for optimal safekeeping of the cortisol concentration until defrosted for analysis.

The saliva samples were processed at the Biochemisches Labor (Trier University, Fachbereich 1, Psychologie), following the procedures described in Dressendorfer et al. (1992). Specifically, after thawing, the saliva samples were centrifuged at 2000 g for 10 minutes, which resulted in a clear supernatant of low viscosity. 100µl of saliva were used for duplicate analysis. Cortisol levels were determined employing a competitive solid phase time-resolved fluorescence immunoassay with fluouromeric end point detection (DELFLIA). 96-well-Maxisorb microtiterplates were coated with polyclonal swine anti-rabbit immunoglobulin. After an incubation period of 48h at 4°C, plates were washed three times with washbuffer (pH=7,4). In the next step, the plates were coated with a rabbit anti-cortisol antibody and incubated for 48h at 4°C. Synthetic saliva mixed with cortisol in a range from 0-100 nmol/l served as standards. Standards, controls (saliva pools) and samples were given in duplicate wells. 50µl of biotin-conjugated cortisol was added and after 30 minutes of incubation the non-binding cortisol / biotin-conjugated cortisol was removed by washing (3x). 200µl Europium-Streptavidin (Perkin Elmer, Rodgau, Germany) was added to each well and after 30 minutes and 6 times of washing 200µl enhancement solution was added (Pharmacia, Freiburg, Germany). Within 15 min on a shaker, the enhancement solution induced the fluorescence that can be detected with a DELFLIA-Fluorometer (Perkin Elmer, Rodgau, Germany). With a computer-

controlled program, a standard curve was generated and the cortisol concentration of the samples was calculated. The intra-assay coefficient of variation was between 4.0% and 6.7%, and the corresponding inter-assay coefficients of variation were between 7.1% -9.0%. The assay sensitivity was 0.3 nmol/l.

Dyadic interaction

Participants interacted for 10 minutes with allegedly another participant (in fact, a confederate). Two female students of similar age as the participants took turns as confederates in the study. They were trained by means of instructions and practice with video feedback either to imitate participants' behavior or to refrain from imitation during an interaction. In the imitation condition, the confederate imitated participants' gestures and postures with a slight delay of approximately 2 seconds by taking over their body orientation (e.g., leaning forward), the position of their arms and legs, and behaviors like, e.g., playing with a pen. In the non-imitation condition the confederate subtly stayed out of sync with the participants' behavior during the interaction by moving independently from the participants but made sure she did not 'anti-imitate' (that is, she did not execute movements and postures that were opposite to what the participant was doing), and kept moving to the same extent as in the imitation condition. The confederate was trained to keep the rest of her behavior (e.g., amount of smiling, gazing at an interaction partner) similar across conditions.

The interaction took place in a separate room with a round table and two chairs placed at 90° so that the participants would have a peripheral view of the confederate. During the interaction, the participant and the confederate jointly completed a number of neutral tasks such as describing and comparing pictures, and naming animals. The content of the tasks was unrelated to other relevant measures. The task instructions and the materials were provided on the table. The interactions were videotaped by means of a hidden camera to ensure confederate's performance.

Manipulation check

Liking for the interaction partner (i.e., the confederate) serves as a check for the imitation vs. non-imitation manipulation (Chartrand & Bargh, 1999). Participants rated the confederate's likeability on a 7-point scale ranging from 1 (not at all) to 7 (very much) to test whether the imitation manipulation was successful.

Need to belong

The 10-item Need to Belong scale (Leary et al., 2007) taps into individuals' general desire to be accepted by other individuals and groups. Participants rated 10 questions presented in randomized order (e.g., 'I need to feel there are people I can turn to in times of need' and 'I try hard not to do things that will make other people avoid or reject me') on a 5 point scale (1 = not at all to 5 = very much). Exploratory factor analysis showed that two items had factor loadings $< .20$ on the first unrotated factor. Removing these items raised Cronbach's alpha from .77 to .79. The Need to Belong scale consisted of the average score on the remaining 8 items.

Procedure

All testing was conducted between 13 p.m. and 18 p.m.. in order to avoid cortisol enhancements being obscured by the cortisol surge associated with waking (Pruessner et al., 1997) as the higher cortisol levels during the morning could potentially mask any experimentally induced effect in cortisol rise. After providing informed consent, participants were led to a cubicle with a computer where they filled in background information and answered trivial questions ('What did you have for dinner last night?') for 15 minutes to reduce anxiety due to the start of the experimental procedure. After 15 minutes the baseline saliva sample was taken (T1).

Next, participants were brought to the interaction room and were seated. The experimenter then brought the confederate into the room, explained the procedure and left the room. After the interaction, the participants were brought back to their cubicle and completed various filler tasks (e.g., description of their daily routine, filling in questionnaires) for the next 25 minutes (which was timed individually). These tasks were unrelated to the experimental purpose, with the exception of the Need to belong scale and the rating of participants mood on a scale ranging from 1 (negative) to 7 (positive). After 25 minutes, the post-stressor saliva sample (T2) was taken. Hereafter participants continued with filler tasks (e.g., evaluating the new student service at the university, describing their plans for the next day) and completed the funneled debriefing procedure aimed at assessing participants' awareness of the experimental hypothesis (Bargh & Chartrand, 1999). After 20 minutes, the rest-period saliva sample (T3) was collected. Finally, participants were thanked, debriefed and received a chocolate bar as a token of appreciation for meeting the experimental pre-

requirements.

Results

There was no main effect of confederate on the cortisol measurements, nor were there any interactions ($F < 1$).

Manipulation Check

The imitated participants ($M = 4.86$, $SD = 1.14$) liked the confederate more than the not imitated participants did ($M = 4.06$, $SD = 1.08$), $F(1, 68) = 9.05$, $p = .004$, $\eta^2 = .12$). Liking of the confederate did not mediate the effect of imitation on cortisol ($M = .2$, $SE = .13$, a 95% confidence interval ranging from $-.02$ to $.47$).

Conditions did not differ in reported mood ($F < 1$).

Cortisol

The statistical analyses of cortisol data were computed using the mean of the duplicate measures. The mean baseline salivary cortisol level before the manipulation was $3.45 \text{ ng/ml} \pm 1.48$, well within the expected range of cortisol concentrations for afternoon testing (Pruessner et al., 1997).

Cortisol reactivity score was measured by the difference between the post-stressor sample (T2) and the base cortisol sample (T1). The analyses of the standardized residuals revealed that the cortisol values were not normally distributed, the cortisol data were therefore log 10-transformed prior to further analyses. For interpretation purposes we report raw means. Not imitated participants ($M = 1.4$, $SE = .05$) showed a higher cortisol reactivity than imitated participants did ($M = -.24$, $SE = .05$), $F(1, 70) = 9.14$, $p = .003$, $\eta^2 = .12$. The baseline cortisol levels of the not imitated participants ($3.39 \text{ ng/ml} \pm .26$) did not differ from those of the imitated participants ($3.51 \text{ ng/ml} \pm .24$), $F(1, 70) = .13$, $p = .72$, but the post-stressor measures did ($4.79 \text{ ng/ml} \pm .4$ and $3.27 \text{ ng/ml} \pm .36$ respectively), $F(1, 70) = 8.04$, $p = .006$, $\eta^2 = .1$. Simple effects showed an elevated cortisol concentration after the manipulation for not imitated participants, $t(1, 32) = 2.37$, $p = .024$, and a marginally significant decrease of cortisol concentration for the imitated participants, $t(1, 38) = -1.87$, $p = .07$.

Cortisol recovery expresses the degree to which the elevation (i.e., cortisol reactivity) persisted after the stressor has ended. It was measured by the difference between the rest period sample (T3) and the base cortisol (T1) as such difference score is more meaningful than the overall rest period comparison of conditions

(Albers et al., 2008; Linden et al., 1997). There was no difference between the not imitated participants ($M = 0.49$, $SE = .04$) on the recovery measure and the imitated participants ($M = -.03$, $SE = .04$), $F(1, 70) = 2.7$, $p = .11$, $\eta^2 = .04$). Table 3.1 reports raw means for the three measurements.

The participants' cortisol reactivity and recovery scores were positively correlated, $r(70) = .71$, $p = .001$; participants with high reactivity scores needed more time to recover (i.e., return to baseline levels) from the increase in cortisol than participants with low reactivity scores.

Table 3.1
Means (SDs) of all measures as a function of time and experimental condition.

	cortisol levels		
	before interaction (T1)	after interaction (T2)	rest period (T3)
imitated participants	3.50 (1.35) ng / ml	3.30 (1.66) ng / ml	3.51 (2.24) ng / ml
not imitated participants	3.39 (1.58) ng / ml	4.79 (2.84) ng / ml	3.88 (2.12) ng / ml

Table 3.1. Raw means of salivary cortisol concentrations on three measurements per condition.

Mediating role of need to belong

We assumed that the experienced belongingness need would predict the impact of (not) being imitated on the change in cortisol levels. The not imitated participants reported higher belongingness needs ($M = 4.11$, $SD = .09$) than the imitated participants ($M = 3.82$, $SD = .1$), $F(1,70) = 4.7$, $p = .034$, $\eta^2 = .06$. In all analyses, we centred imitation and belongingness need variables to avoid multicollinearity with their product terms (Aiken & West, 1991). Results from bootstrapping mediation analysis (Preacher & Hayes, 2004) yielded a significant mean indirect effect of imitation on cortisol reactivity through belongingness need ($M = .04$), within a 95% confidence interval ranging from .002 to .104. Belongingness need mediated the imitation-cortisol elevation relation (with 29% of variance being explained), as imitation had no longer an effect on cortisol elevation ($\beta = .21$, $SE = .07$, $p = .052$), with belongingness need being controlled for ($\beta = .34$, $SE = .07$, $p = .003$).

Probing the levels at which belongingness need serves as the mediator, (Preacher & Hayes, 2007), we found that belongingness need (overall $M = 3.97$, $SD =$

.6) influences the effect of imitation on cortisol level for participants with a higher belongingness need, starting from $M = 3.95$, as identified by the Johnston-Neyman significance region as the single significance point.

Further exploration per level of the condition revealed that the obtained mediation could be attributed to the larger impact of belongingness need on the not imitated participants ($Z = 1.9$, $SE = .07$, $p = .06$) than on the imitated participants ($Z = .5$, $SE = .02$, $p = .63$; for review of the moderated mediation analysis procedure, see Preacher, Rucker, & Hayes, 2007). This means that, as expected, being imitated did not negatively affect participants' perception of belonging, but thwarted belonging in the not imitated participants. Indeed, in terms of within-cell correlations belongingness need was positively related to cortisol reactivity in the non-imitation condition, $r(33) = .47$, $p = .01$, but was not related in the imitation condition, $r(39) = .17$, $p = .31$.

Discussion

Our results show that lack of behavioral imitation from others elevates cortisol levels in not imitated individuals. This cortisol increase reflects individuals' stress reaction to their thwarted belongingness need due to lacking imitation. In addition, as people differ in their sensitivity to social rejection signals, belongingness need appeared to influence cortisol only at a moderate-to high level.

In the view of the strong affiliative role that behavioral imitation plays in social interactions, its absence may disrupt or preclude the forming of interpersonal bonds. Given the human fundamental drive to form and maintain social connections, we reasoned that lack of imitation from an interaction partner thwarts one's belongingness because it operates as a subtle, yet stressful signal of rejection by that partner.

To our knowledge, these results are the first to demonstrate hormonal changes associated with an experimental manipulation of behavioral imitation. These results are also the first to link cortisol to the frustration of the belongingness need.

The present data also underscore the finding that enhanced need to belong is directly related to social rejection (Baumeister, 1991; Baumeister & Leary, 1995; Stillman et al., 2009; Williams, 1997, 2002). We showed that the belongingness need was higher after non-imitation than after imitation as well as that this increase in

belongingness need mediated the impact of the manipulation on cortisol levels after non-imitation and not after imitation.

If enhanced cortisol in the present study would cause a general arousal due to having to interact with a stranger, we would have also expected a cortisol increase compared to its baseline in the imitation condition. However, we found a marginally significant *decrease* of cortisol level in the imitated individuals compared to their baseline cortisol. These findings suggest that, if anything, imitation from an interaction partner reassures a sense of belonging in the imitated individuals. These findings are in line with a recent study showing reward-related brain activity after being imitated (Kuehne et al., under review). Interestingly, this pattern of results also corroborates the findings of Brown et al. (2009) who reported cortisol concentrations to remain unaffected (reported means showed a slight, although not reliable decrease) after closeness induction. In fact, cortisol levels of the participants in their study were unaffected after a neutral interpersonal task as well, which may point to the fact that only communicatively strong behaviors (such as behaviors that imply distancing oneself from others) are picked up by the corticoid system.

The present research advances the literature on hormonal changes by illustrating the intimate interplay between human's everyday behavioral repertoire and rapid hormonal responses to behavioral signals from others. It shows that a lack of behavioral imitation in interpersonal interactions may serve as a subtle, yet efficient manner to signal one's rejection of the interaction partner as expressed by the experienced increase of belongingness need in the rejected person. More importantly, we demonstrate that even an unobtrusive nonverbal signal may act as a psychological stressor by elevating cortisol levels in its receiver.

These findings underline the communicative value of nonverbal behavior with regard to the expression of social rejection and inclusion in humans. Moreover, the findings imply a more profound role played by lack of interpersonal imitation in human interactions, rather than merely signaling less liking (Byrne, 2009). The physiological consequences of acute stress are, thus, likely to be adaptive to an individual. Apparently, sensitivity to others' imitating behavior is informative of one's level of acceptance by peers. Susceptibility to such information cues is very adaptive as it may prompt one to act upon the counterparts' behavior to secure one's safe place in the group.

Chapter 4

A Stranger's Cold Shoulder Makes the Heart Grow

Fonder: Why Not Being Mimicked By a

Stranger Enhances Longstanding

Relationship Evaluations

Abstract

Lack of mimicry in interpersonal interactions may thwart an individual's sense of belonging. Non-mimicked individuals are hypothesized to compensate for this by upgrading their personal relationships. In line with this hypothesis, Study 4.1 showed that non-mimicked participants enhanced their evaluation of their current romantic relationship, compared to both mimicked participants and those who had no prior interaction. Study 4.2 showed the impact of non-mimicry on a variety of close relationship evaluations using a pre-post measure design. Mediation analyses further revealed that the link between mimicry and relationship evaluations is mediated by increased belongingness needs, specifically for the non-mimicked participants. These studies show that after an interaction even with a perfect stranger, non-mimicry may frustrate one's belongingness needs and therefore lead to strengthened bonds with one's close others. Implications for (non-)mimicry as a behavioral indicator of social exclusion and the presumed buffer function of close relationships are discussed.

Keywords: behavioral mimicry, close relationships, need to belong, social exclusion

This chapter is based on Kouzakova, M., Karremans, J.C., van Baaren, R., & van Knippenberg, A. (accepted). A Stranger's Cold Shoulder Makes the Heart Grow Fonder: Why Not Being Mimicked By a Stranger Enhances Longstanding Relationship Evaluations. *Social Psychological and Personality Science*.

Behavioral mimicry in an interaction between two people has a number of positive social consequences. For example, mimicry enhances rapport and closeness between interaction partners (Chartrand & Bargh, 1999). However, interpersonal interactions do not always run smoothly, and from time to time we may find ourselves in interactions in which mimicry is scarce or absent. Several moderators of mimicry have been identified, such as self-construal, cognitive style, affiliation goals, and self-monitoring (for a review see Chartrand & Van Baaren, 2009), which suggests that in a substantial number of interactions our behavior will not be matched by the behavior of the other person, or to a lesser extent than usual. In the literature on mimicry, there is an imbalance between research on mimicry and non-mimicry. Whereas both mimicry and non-mimicry are an integral part of human social life, almost all research has focused on the consequences of mimicry, leaving the consequences of non-mimicry still somewhat in the dark.

According to current theorizing, mimicry in dyads often is the default and *not* being imitated may be unexpected, unpleasant and most likely has consequences for intra- and inter-individual processes. The goal of this paper is to gain more insight into the processes involved in non-mimicry: How does it affect us and how do we cope with the hypothesized negative consequences? Specifically, we propose that not being mimicked in an interpersonal interaction triggers an enhanced need to belong and this in turn will lead people to seek connection to others.

Research suggests that mimicry serves as a social glue which binds people together (Chartrand, Maddux, & Lakin, 2005; Lakin, Jefferis, Cheng, & Chartrand, 2003). Mimicry within dyads fosters understanding and empathy between the interaction partners, promotes pro-social behaviors beyond dyads, enhances perceived similarity, increases one's persuasiveness and one's social orientation, and helps reaching one's affiliation goals (Ashton-James, van Baaren, Chartrand, Decety, & Karremans, 2007; Lakin & Chartrand, 2003; Maddux, Mullen, & Galinsky, 2008; Van Baaren, Holland, Kawakami, & van Knippenberg, 2004). These effects seem to indicate that mimicry serves to satisfy one's need to belong, which is of vital value for humans (Baumeister & Leary, 1995; Williams, 2001).

As mimicry serves the formation and maintenance of bonds between interaction partners, by the same token the lack of mimicry may undermine these bonds or preclude their formation (for an overview, see Lakin et al, 2003). Indeed,

participants who are not mimicked report less rapport with their interaction partner and find the interaction more awkward than mimicked participants (Chartrand & Bargh, 1999). Kouzakova, van Baaren and van Knippenberg (2009) showed that not being mimicked in social interactions leads to decreased implicit self-esteem, which is tightly related to an individual's sense of belonging (Leary & Baumeister, 2000). Moreover, although people are not aware of its impact on others, interaction partners may use the unconscious reduction of mimicry to regulate closeness to the other. For instance, Karremans and Verwijmeren (2008) showed that romantically involved people (compared to singles) unconsciously mimicked an attractive opposite-sex interaction partner less to protect their current romantic relationship. Together, these findings support the notion that lack of mimicry from one's interaction partner serves as a subtle cue for social exclusion.

When the need for social inclusion is thwarted, people turn to other sources of acceptance to compensate for it. For example, DeWall, Maner and Rouby (2008) found that their experimentally excluded participants attended more to smiling faces than included participants did. Maner, DeWall, Baumeister and Schaller (2007) reported that individuals experienced an increased drive to build new social bonds after being excluded, or after a reminder of a previously experienced instance of exclusion. Also, Karremans, Heslenfeld, van Dillen and van Lange (2009) showed that turning to familiar sources of acceptance shield one from the negative effects of being rejected. They report reduced stress-related brain activation after reminding the socially excluded participants about an attachment figure in their lives. Finally, increasing our own mimicry may be efficient in recovery after social exclusion. Lakin, Chartrand and Arkin (2008) showed that participants who were excluded in an online ball-tossing game mimicked another person in a subsequent task to a greater extent, presumably as a way to reconnect by creating rapport with the new interaction partner. Together, these findings suggest that belongingness threats motivate people to reconnect to other sources of acceptance. Furthermore, they suggest that such compensatory sources of acceptance need not to be physically present.

The present research.

Based on the notion that the lack of mimicry from one's interaction partner may serve as an implicit cue for social exclusion, the current study tested the prediction that not being mimicked in an interaction enhances people's desire for acceptance by their

loved ones (e.g., friends, romantic partners) to re-establish their sense of inclusion. This means that the present research has to establish three things: First, does non-mimicry function as a sign of exclusion and thus affect our need to belong? Second, do non-mimicked participants compensate for this exclusion by feeling closer to significant others? Third, is this relationship evaluation mediated by the need to belong? In Study 4.1, we expect participants who had not been mimicked during a short interaction with a stranger (compared to those who had been mimicked and to those who had no interaction at all) to feel closer to their romantic relationship partner. In Study 4.2 we broadened the scope of significant others by giving participants the opportunity to choose a specific important person themselves as well as included a measure of relationship evaluation prior to the interaction, to control for possible unintended pre-existing differences between conditions. Furthermore, in Study 4.2 we tested the mediating role of need to belong as the proposed underlying process.

Study 4.1

Method

Participants and design. Sixty-nine undergraduates (50 women, 19 men) from Radboud University Nijmegen, all involved in a romantic relationship, were randomly assigned to one of the three conditions in a single factor (Behavior: mimicry, non-mimicry, no interaction) between-subjects design with relationship evaluation as a dependent measure. Initial analyses revealed no effects of gender (both in Study 4.1 and 4.2), hence gender is not included in all further analyses.

Procedure. Participants performed several mundane tasks such as describing pictures and naming depicted animals during a 5 minute interaction with an alleged other participant (i.e., a confederate). The male confederate was extensively trained to mimic and to not mimic bodily postures and gestures of others. In both interaction conditions, participants were seated in such way that they half-faced the confederate's chair, after which the 'other participant' was brought into the room. In the mimicry condition, the confederate mimicked participants' gestures and postures by taking over their body orientation (e.g., leaning forward), the position of their arms and legs, and behaviors like, e.g., playing with a pen. In the non-mimicry condition the

confederate subtly stayed out of sync with the participants' behavior during the interaction by moving independently from the participants but made sure he did not 'anti-mimic' (that is, he did not execute movements and postures that were opposite to what the participant was doing), and kept moving to the same extent as in the mimicry condition. The confederate was trained to keep the rest of his behavior (e.g., amount of smiling, gazing at an interaction partner) similar across conditions. In the no interaction condition participants spent 5 minutes in a waiting room.

Next, participants answered a number of questions in a separate cubicle. Among these "filler" questions there were two critical ones: 'How close do you feel towards your romantic partner at this moment?' and 'How confident are you that you and your partner will stay close in the next three years?' Both questions were answered on a 7-point scale, ranging from 'not at all' (1) to 'very much' (7).

Then, participants in the interaction conditions rated the confederate's likeability on a 7-point scale to test whether the mimicry manipulation was successful (Chartrand & Bargh, 1999). Further they rated the extent to which the confederate appeared distant as a proxy for perceived rejection by the confederate, also on a 7-point scale. Next, they filled in the funneled debriefing procedure (Chartrand and Bargh, 1996), answering increasingly specific questions about the aim of the experiment and the "other participant's" behavior. Finally, participants were thanked, paid and debriefed. None of the participants accurately guessed the purpose of the experiment or reported (not) having been mimicked.

Results and discussion

The mean score of the two relationship evaluation questions ($r = .67$) was subjected to a single factor (Behavior: mimicry, non-mimicry and no-interaction) ANOVA. As predicted, the main effect of mimicry was significant, $F(2, 66) = 6.42$, $p = .003$, $\eta^2 = .16$. Participants who had not been mimicked in the previous interaction evaluated their romantic relationship more positively ($M = 6.07$, $SD = 0.80$) than both mimicked participants ($M = 5.22$, $SD = 1.10$) and participants who did not interact with the confederate at all ($M = 5.16$, $SD = 0.92$). Simple contrasts showed no difference between the mimicry and the no interaction condition, $F(1, 66) < 1$, ns. However, as predicted, romantic relationships were evaluated significantly higher in

the non-mimicry condition compared to both the mimicry condition, $F(1, 66) = 8.90$, $p = .004$ and the no interaction condition, $F(1, 66) = 10.36$, $p = .002$, see Figure 4.1.

Manipulation check. Liking for the interaction partner (i.e., the confederate) serves as a check for the mimicry vs. non-mimicry manipulation (Chartrand & Bargh, 1999). In line with expectations, non-mimicked participants evaluated their interaction partner as less likeable ($M = 3.43$, $SD = 0.81$) than mimicked participants did ($M = 3.91$, $SD = 0.60$), $F(1, 42) = 5.16$, $p = .028$, $\eta^2 = .11$. The likeability ratings of the confederate did not mediate the effect of mimicry on the participants' relationship evaluations (Sobel's $Z = .90$, $SE = .12$, $p = .37$).

Perceived distance of the confederate. Non-mimicked participants perceived the confederate as more distant ($M = 3.91$, $SD = 0.99$) than mimicked participants ($M = 3.35$, $SD = 0.78$), $F(1, 42) = 4.33$, $p = .044$, $\eta^2 = .09$. Supporting our expectations, perceiving the confederate as distant was positively related to relationship evaluation in the non-mimicry condition, $r(21) = .74$, $p = .001$, but was not related to relationship evaluation in the mimicry condition, $r(23) = .10$, $p = .67$.¹

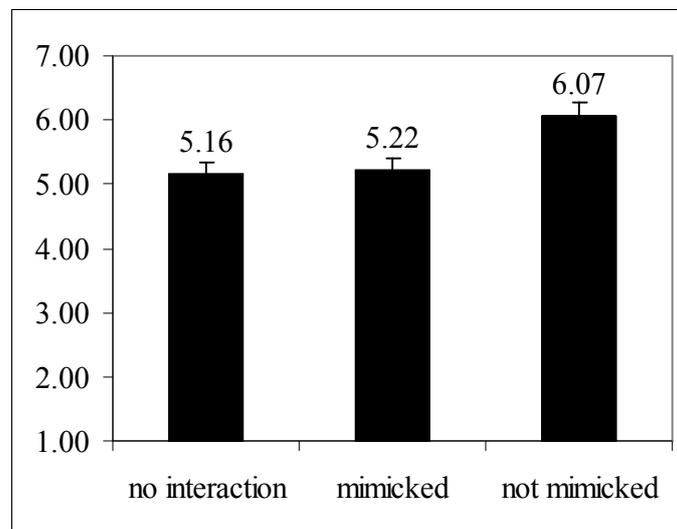


Figure 4.1. Mean evaluations of romantic relationship by mimicked participants, non-mimicked participants, and participants who had no interaction before the relationship evaluation in Experiment 1. The higher the score, the more positive the relationship evaluation, on a scale from 1 to 7.

¹ The mediation test of the effect of mimicry on the relationship evaluation by perceived distance of the confederate failed to reach the significance level ($\beta = -.28$, $SE = .53$, $p = .55$; $M = .20$, $SE = .14$, ranging from -0.04 to 0.52 within the 95% confidence interval as indicated by the bootstrapping analysis).

The results of Study 4.1 confirmed the prediction that not being mimicked in an interaction enhances the evaluation of one's romantic relationship. Importantly, because relationship evaluations did not differ between the mimicry condition and the control condition (in which participants had no social interaction prior to their relationship evaluation), we may conclude that enhanced relationship evaluations in the non-mimicry condition were responsible for the obtained effect.

To generalize these results to a wider spectrum of relationships, in Study 4.2 we asked participants who had no romantic relationship to answer the evaluation questions with respect to a specific important person in their life, such as a parent, a friend or a sibling. Secondly, we added a pre-measure of the relationship evaluation to establish explicitly that mimicry versus non-mimicry affects relationship evaluations. Thirdly, we included a post-interaction measure of the need to belong to test the presumed underlying mediation process.

Importantly, we assume that being mimicked in an interpersonal interaction constitutes the default condition (i.e., ecologically prevalent condition). Therefore, if one conceives of being socially included as a chronic goal that is activated whenever one is interacting with another person, the expected occurrence of mimicry satisfies this chronic goal. If however the interaction is devoid of mimicry, then one's inclusion goal is thwarted, which is assumed to trigger elevated levels of need to belong. This temporarily enhanced need to belong is, in turn, hypothesized to elicit compensation processes such as, for instance, enhanced evaluations of longstanding relations. Thus, because lack of mimicry serves as a social exclusion signal, we expect participants' need to belong to be higher after non-mimicry than after mimicry. Furthermore, within the non-mimicry condition post-interaction relationship evaluations should be positively related to need to belong, while in the mimicry condition this relationship will be weaker or absent.

Study 4.2

Method

Participants and design. Forty university undergraduates were randomly assigned to the conditions of a 2 (Behavior: mimicry vs. non-mimicry) \times 2

(Relationship Evaluation: pre-measure vs. post-measure) mixed design with relationship evaluation as a within-subjects factor.

Procedure. Among the filler questions, we measured participants' relationship evaluations on the same two questions as administered in Study 4.1, except that for participants who had indicated that they did not have a romantic partner, the term "romantic partner" was substituted by "a specific important person in your life (for example a parent, a friend or a sibling)". Next, all participants followed the same procedure as in Study 4.1 with a different male confederate. During the post-measure of relationship evaluation, participants in both conditions evaluated their relationship with regard to the same specific person as on the pre-measure. On both occasions they specified the relationship their evaluation pertained to. Additionally, the 10-item Need to Belong scale (Leary, Kelly, Cottrell, & Schreindorfer, 2007) was administered. Next, as in Study 4.1, all participants rated the confederate's likeability and how distant he seemed on a 7 point scale, ranging from 1 (not at all) to 7 (very much). Finally, participants were probed for suspicion using the same funneled debriefing procedure as in Study 4.1. None of the participants accurately guessed the hypothesis or indicated awareness of (not) having been mimicked.

Results and discussion

A 2 (Behavior: mimicry vs. non-mimicry) \times 2 (Relationship Evaluation: pre- vs. post-measure) analysis of variance with repeated measures on the second factor examined the effect of mimicry on relationship evaluation. The analysis showed a tendentially significant main effect of mimicry, $F(1, 38) = 2.72, p = .11, \eta^2 = .07$, which was qualified by the expected Behavior \times Relationship Evaluation interaction, $F(1, 38) = 16.66, p = .001, \eta^2 = .31$. Simple effects analyses show that non-mimicked participants evaluated their relationship more positively after the interaction than before ($M_{\text{pre-measure}} = 4.81, SD = 0.64; M_{\text{post-measure}} = 5.43, SD = 0.68$), $F(1, 20) = 24.95, p < .001, \eta^2 = .56$, while participants who had been mimicked ($M_{\text{pre-measure}} = 4.87, SD = 0.52; M_{\text{post-measure}} = 4.79, SD = 0.61$) showed no shift in their evaluations $F(1, 18) = .46, p = .51, \eta^2 = .03$, see Figure 2. The relationship evaluation pre-measure did not differ between conditions, $F(1, 38) = 0.10, p = .75, \eta^2 = .00$, but the post-measure did, $F(1, 38) = 9.80, p = .003, \eta^2 = .21$.

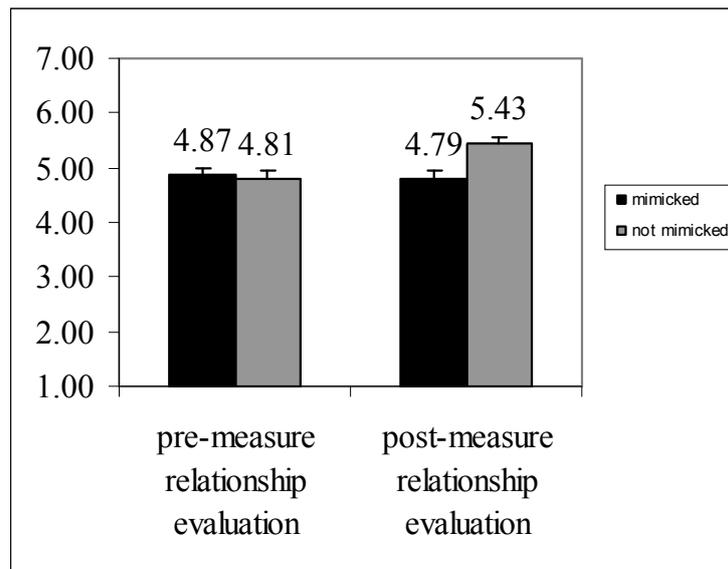


Figure 4.2. Mean evaluations of relationships with a significant other by mimicked and non-mimicked participants before and after the interaction in Experiment 2. The higher the score, the more positive the relationship evaluation, on a scale from 1 to 7.

Manipulation check. Again, non-mimicked participants reported less liking of the confederate ($M = 4.81$, $SD = 0.87$) than mimicked participants did ($M = 5.42$, $SD = 0.84$), $F(1, 38) = 5.09$, $p = .028$, $\eta^2 = .12$. Liking for the confederate did not mediate the effect of mimicry on the participants' relationship evaluations (Sobel's $Z = .03$, $SE = .08$, $p = .98$).

Perceived distance of the confederate. Non-mimicked participants perceived the confederate as more distant ($M = 3.19$, $SD = 1.50$) than mimicked participants ($M = 2.16$, $SD = 1.12$), $F(1, 38) = 5.96$, $p = .019$, $\eta^2 = .14^2$.

Mediation by need to belong. Our hypothesis is that need to belong will mediate the effect of mimicry on the relationship evaluation. To measure need to belong, we used the 10-item Need to Belong scale (Leary et. al, 2007). Preliminary factor analysis showed that two items had a factor loading $< .20$ on the first unrotated factor (50.7% explained variance). Removing these 2 items raised Cronbach's alpha from .81 to .85. The need to belong scale consisted of the average score on the

² Again, the mediation test of the effect of mimicry on the relationship evaluation by perceived distance of the confederate failed to reach the significance level ($\beta = .10$, $SE = .28$, $p = .86$; $M = .16$, $SE = .10$, ranging from -0.01 to 0.38 within the 95% confidence interval as indicated by the bootstrapping analysis), nor did perceived distance to the confederate mediate the effect of mimicry on need to belong ($\beta = .25$, $SE = .07$, $p = .11$; $M = .12$, $SE = .11$, ranging from -0.06 to 0.38 within the 95% confidence interval as indicated by the bootstrapping analysis).

remaining 8 items.³ Need to belong was higher after non-mimicry ($M = 3.73$, $SD = 0.52$) than after mimicry ($M = 3.19$, $SD = 0.62$), $F(1,38) = 9.10$, $p = .005$, $\eta^2 = .19$.

We hypothesized that need to belong will not be activated (i.e., not enhanced) in the mimicry condition and, hence, low-to-moderate levels of need to belong are expected in the mimicry condition. Because lack of mimicry is assumed to be an exclusion signal, we expect need to belong to become enhanced to moderate-to-high levels in the non-mimicry condition. Thus, we expect no (or only a weak) correlation between need to belong and post-interaction relationship evaluation at low-to-moderate levels of need to belong. Only at the moderate-to-high levels of need to belong (that participants are expected to report after not having been mimicked by their interaction partner) the relationship between need to belong and relationship evaluation becomes significant. This is a special form of moderated mediation in which the mediator need to belong interacts with the independent variable to moderate the relationship.

First, we tested for the presence of mediation. As mentioned above, mimicry had a significant impact on relationship evaluation, $b = 0.32$, $t(38) = 3.13$, $p = .003$, and on need to belong, $b = 0.27$, $t(38) = 3.02$, $p = .005$. In line with our hypothesis of a mediation model, when we included both mimicry and state need to belong in the model, mimicry no longer predicted relationship evaluation, $b = 0.20$, $t(37) = 1.91$, $p = .064$, but need to belong remained a significant predictor of our post-measure of relationship evaluation, $b = 0.42$, $t(37) = 2.47$, $p = .018$. Results from Sobel test yielded a marginally significant indirect effect of mimicry on relationship evaluation through need to belong, $Z = 1.85$, $SE = .13$, $p = .06$.

To probe for the presence of moderated mediation, we examined whether there was a differential effect of need to belong on relationship evaluation after non-mimicry versus mimicry by adding a mimicry * need to belong interaction term to the prediction model. In line with our moderated mediation hypothesis, adding this

³ Using the original 10 item version of the need to belong scale yielded a similar pattern of results as reported here, but some crucial tests failed to reach significance. The non-mimicked participants reported higher belongingness need ($M = 3.35$, $SD = 0.32$) compared to the mimicked participants ($M = 3.11$, $SD = 0.40$), $F(1,38) = 4.67$, $p = .037$, $\eta^2 = .11$. The full version of the need to belong scale also significantly predicted relationship evaluation ($\beta = .37$, $SE = .27$, $p = .013$). However, the mediation of the relationship evaluation effects by the full need to belong scale failed to show a significant direct effect of mimicry on relationship evaluation after controlling for the effect of need to belong ($\beta = .33$, $SE = .20$, $p = .027$; Sobel's $Z = 1.59$, $SE = .11$, $p = .11$). It thus seems that the need to belong scale has an underlying multifactor structure from which only the main factor is susceptible to social exclusion effects as currently investigated.

interaction term as a third predictor to our model significantly enhanced the explanatory power of the model, $b = 0.51$, $t(36) = 3.36$, $p = .002$. Follow-up analyses using simple slope analysis confirmed that state need to belong was a strong predictor of relationship evaluation after non-mimicry, $b = 1.00$, $t(36) = 4.37$, $p < .001$, whereas no such relation emerged after mimicry, $b = -0.03$, $t(36) = -0.13$, *ns.*

General Discussion

This research extends previous work by showing that not being mimicked in social interactions may thwart one's belongingness needs which in turn leads to an enhanced evaluation of one's close relationships. By doing so, we gained more insight in the *processes* involved in the consequences of non-mimicry in social interactions. Specifically, in Study 4.1 we found that participants who had not been mimicked during a brief interaction with a stranger felt closer to their romantic partner compared to those who had been mimicked and to those who had no prior interaction. In Study 4.2, we broadened the range of significant others (participants were free to choose a specific close relationship they wished to evaluate) and added a relationship evaluation pre-measure. The results revealed that non-mimicked participants indeed felt closer to their significant others than mimicked participants did, irrespective of whether it was one's romantic partner, a friend or a relative.

On the basis of the outcomes of both studies we may conclude that the observed effect of mimicry on the evaluation of longstanding relationships is due to more positive relationship evaluations in the non-mimicry condition. In Study 4.1 the relationship evaluations in the mimicry condition and in the no interaction control condition did not differ, while relationship evaluations were significantly higher in the non-mimicry condition. The non-mimicry condition in Study 4.2 also stands out as the only one in which participants reported more positive relationship ratings on the post-measure compared to the pre-measure, while there was no difference between the pre- and post-measure in the mimicry condition.

Furthermore, we established in Study 4.2 that enhanced need to belong constitutes the underlying process of the effect that lack of behavioral mimicry has on the evaluation of one's longstanding relationships. Two findings are in our view crucial. First, in the non-mimicry condition the level of need to belong was

substantially raised compared to the mimicry condition. Secondly, in the non-mimicry condition there was a strong correlation between need to belong and relationship evaluation, while this correlation was completely absent in the mimicry condition. These findings support our notion of mimicry as a typically common or default phenomenon in social interactions, whereas a lack of it activates one's belongingness need, which in turn triggers processes of restoring one's sense of social inclusion (in this case, by upgrading one's longstanding relationship). This conclusion is in line with previous findings by Lakin et. al (2008) about the affiliative function of mimicry after social exclusion. However, whereas Lakin et al. focused on mimicry as a dependent variable, that is, the amount of mimicry that the participants displayed themselves after being socially excluded, the present research extends these findings by showing that being mimicked versus not being mimicked, as an independent variable, by itself may convey the level of acceptance by one's interaction partner.

It could be argued that we should have looked at enhanced relationship evaluation after non-mimicry as a way to compensate for the subtle social exclusion signaled by non-mimicry, that is, we should have used the post-measure minus pre-measure difference score, rather than the final post-measure of relationship evaluation. However, it is important to note that compensation is not typically achieved by a mere upward shift in relationship evaluation, e.g., by upgrading a very poor long-term relationship quality to average or by raising the quality of a very good relationship to excellent. Compensation essentially requires the assessment that you have a good long-term relationship irrespective of the quality of that relationship before this particular interaction with a stranger. In other words, the stranger's cold shoulder makes you seek warmth, either by turning to an already warm longstanding relationship or by believing that your long-term relationship is warmer than you did before the interaction. Thus, compensation for lack of mimicry is obtained by high levels of post-interaction relationship evaluation and not just by enhancing a long-term relationship. Hence, the post-measure of relationship evaluation is the appropriate index of social reconnection in the present context.

It's worth noting that, although the interaction partner who did not mimic was rated as less likeable than the interaction partner who did, this explicit likeability rating was unrelated to the upgrading of one's close other ($r = .03$, in Study 4.1; $r = -.09$, in Study 4.2; both ns). This lack of mediation by the interaction partner's

likeability suggests that the enhanced long-term relationship evaluation following lack of mimicry does not reflect an explicit compensation process. That is, an interaction with a dislikeable person as such does not trigger one's enhanced fondness for significant others. Instead, the rejection cue inherent in lack of mimicry seems to affect one's sense of being socially included at a deeper level – as reflected in increased need to belong – which in turn triggers compensation processes such as high evaluation of one's long-term relationships. Importantly, the rating of the interaction partner as more 'distant' in the non-mimicry condition compared to the mimicry condition, supports our argument. Perceiving the confederate (i.e., the interaction partner) as 'distant' may indicate perceived rejection (although the latter was not explicitly measured). Furthermore, perceiving the confederate as distant was positively related to enhanced need to belong in the non-mimicry condition, while such a correlation was absent in the mimicry condition. Taken together, our findings suggest that, as hypothesized, non-mimicry functions as an exclusion cue, which triggers enhanced belongingness need. The latter, in turn, appears to instigate compensation processes such as the enhanced evaluation of longstanding relationships.

The current studies have several interesting implications. First of all, the findings suggest that mimicry can play a role in the early detection of possible social exclusion. As it generally operates on a non-conscious level, behavioral mimicry may function as an efficient, low-cost tool to monitor one's level of social inclusion. The effect sizes obtained in both studies ($\eta^2 = .16$, in Study 4.1; $\eta^2 = .40$, in Study 4.2) indicate a strong relationship between lack of mimicry in social interactions and enhanced evaluation of one's close other, which suggests that non-mimicry is a powerful mechanism to implicitly signal the extent of one's inclusion by the present company. Thus, in a more informal setting such as a party, the lack of mimicry on the part of a conversation partner might serve as a cue to disengage from the present interaction partner and to turn to another person for a more congenial interaction. Secondly, our findings suggest that people seem to be able to buffer themselves against subtle signs of rejection by enhancing the evaluations of their longstanding relationships. This is a very adaptive mechanism, as otherwise any threat of rejection, including false alarms, might have detrimental effects (Sporer & Williams, 2007).

Related to this point, it is important to establish what one exactly gains by upgrading one's longstanding relationships after experiencing not being mimicked in an interaction with a stranger? From the perspective of sociometer theory (Leary & Baumeister, 2000), the rejection signaled by non-mimicry may threaten one's implicit self-esteem. Then, upgrading one's longstanding relationship could serve as a symbolic means to reaffirm one's social inclusion which would help to restore one's implicit positive self-associations. A somewhat similar mechanism was proposed in terror management research (cf., Dechesne, Pyszczynski, Arndt, Ransom, Sheldon, van Knippenberg & Jansen, 2003), which entailed that endorsing cultural values and emphasizing social bonds help to overcome the negative effects of mortality salience on self-esteem. The negative implications of lack of mimicry for implicit self-esteem have already been shown by Kouzakova et al. (2009). In our view, future research on this issue should focus on the role of enhanced relationship evaluation in restoring positive self-esteem.

The present findings suggest intriguing further questions. If people can buffer themselves against signs of rejection from a stranger by upgrading their long term relationships, one intriguing question then is how people are able to deal with subtle exclusion cues from their loved ones. For example, what if one is not being mimicked by one's romantic partner? Would one turn to others in one's social network to deal with the rejection threat? Alternatively, would a subtle 'non-mimicry' rejection from a romantic partner motivate a person to exhibit pro-relationship behavior towards this significant other? This issue is especially intriguing in light of previous findings showing that non-mimicry from one's interaction partner generally results in less pro-social behavior towards others (Van Baaren et al., 2004) or the recent findings showing that social exclusion decreases pro-social tendencies (Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007).

To conclude, it seems unavoidable that, every once in a while, people may find themselves in awkward interactions with others. Unbeknownst to them, a lack of mimicry by the interaction partner may be responsible for this. Although one may not consciously feel rejected, these interactions may temporarily and implicitly threaten one's sense of belongingness. The present findings suggest that, fortunately, people can deal with these occasional "social drawbacks" by psychologically turning to their close relationships. Indeed, the stranger's cold shoulder makes the heart grow fonder.

Chapter 5

The Regulation of Implicit Self-Esteem After an
Interaction Devoid of Mimicry

Abstract

Lack of behavioral mimicry in social interactions is hypothesized to decrease implicit self-esteem of non-mimicked individuals. This effect of non-mimicry on implicit self-esteem is proposed to be mediated by a rise in state need to belong. Additionally, individual differences in trait need to belong are assumed to moderate the rise in state need to belong. Furthermore, decreased implicit self-esteem is hypothesized to be restored by symbolically reaffirming one's bond with close others. The present research tested a process model based on these propositions. Study 5.1 showed that non-mimicry from an interaction partner indeed reduced participants' implicit self-esteem, but not their explicit self-esteem, compared to both mimicked participants and participants who had no prior interaction. Study 5.2 replicated this effect of mimicry and further showed that the impact of non-mimicry on self-esteem was, as predicted, mediated by temporarily enhanced state need to belong. Study 5.2 also demonstrated, in line with the model's predictions, that trait need to belong (as assessed in a pre-interaction measure) moderated the indirect effect of non-mimicry on reduced implicit self-esteem. Study 5.3 confirmed the second part of the model entailing that non-mimicked individuals whose implicit self-esteem had been reduced indicated enhanced evaluation of their close relationships, which mediated the subsequent recovery of their implicit self-esteem to normal levels (i.e., to the level of mimicked participants). Thus, across three studies, the results supported our process model concerning the conditional negative effect of non-mimicry on implicit self-esteem and its subsequent recovery by upgrading one's close relationship.

Keywords: behavioral mimicry, self-esteem, need to belong, social exclusion, reconnection seeking

This chapter is based on Kouzakova, M., van Baaren, R., & van Knippenberg, A. (2009b). *The Regulation of Implicit Self-Esteem After an Interaction Devoid of Mimicry*. Manuscript submitted for publication.

Behavioral mimicry plays an important role in the regulation of interpersonal closeness and in the formation of positive interpersonal relationships. When we are unobtrusively mimicked in an interaction, we feel connected to others (Ashton-James, van Baaren, Chartrand, Decety, & Karremans, 2007) and happy (van Baaren, Fockenberg, Holland, & van Knippenberg, 2006), whereas we experience not being mimicked as unpleasant (for a review see Chartrand & Van Baaren, 2009).

Recently, Kouzakova, Karremans, van Baaren and van Knippenberg (in press) showed that participants who had not been mimicked in an interpersonal interaction reported enhanced need to belong and subsequently indicated higher evaluations of their close relationships compared to both participants who had been mimicked in an interaction and participants in a no-interaction control condition. Importantly, the effect of non-mimicry versus mimicry on enhanced close relationship evaluations was fully mediated by enhanced need to belong. On the basis of these results, Kouzakova et al. concluded that lack of mimicry by an interaction partner functions as a subtle and unconscious exclusion cue, triggering enhanced levels of need to belong. They further argued that participants compensated for the experienced exclusion by upgrading their longstanding close relationship. The question that remains is, however, precisely what purpose the observed compensation serves. While thwarted need to belong may trigger attempts to restore one's inclusionary status (Sporer & Williams, 2007), the motivation to maintain positive self-esteem is assumed to be the underlying process (Leary & Baumeister, 2000). In line with the latter assumption, the present study aims to show that lack of mimicry from an interaction partner reduces the participants' state self-esteem. Furthermore, we aim to show that subsequent compensation through higher evaluations of non-mimicked individuals' longstanding relationships serves to restore their state self-esteem.

Self-esteem may be conceived of as (among other things) an ongoing monitor of our relationship status with others. According to sociometer theory (Leary, Tambor, Terdal, & Downs, 1995; Leary & Baumeister, 2000) high self-esteem is indicative of sufficient-to-high acceptance by peers, whereas low self-esteem indicates insufficient social acceptance, which may constitute a source of concern and requires mending (Baumeister & Leary, 1995). The exclusion signal inherent in non-mimicry may lead to reduced self-esteem, at least for participants who are sensitive to this subtle exclusion signal, and these participants will then be motivated to restore

their self-esteem by, for example, enhanced evaluations of their relations with significant others (cf., Baumeister & Leary, 1995). This summarizes, in a nutshell, the self-esteem regulation process that the present study aims to address.

Although being socially included has survival value for humans (Baumeister & Leary, 1995), some individuals are more concerned with their social connectedness than others who, for example, may be more concerned with personal achievements than with being included. The self-esteem of the latter individuals may be more susceptible to variations in performance (cf., Koole, Smeets, van Knippenberg, & Dijksterhuis, 1999), while the former are typically more attuned to cues from their social environment (Pickett, Gardner, & Knowles, 2004) and may therefore be more susceptible to subtle rejection signals. Specifically, we propose that individuals with relatively high *trait* need to belong are more sensitive to subtle exclusion signals (for example, as conveyed by lack of mimicry in an interaction) than individuals with relatively low *trait* need to belong. Therefore, we hypothesize that individuals' trait need to belong moderates the effect of lack of mimicry in an interpersonal interaction, such that for individuals with relatively high trait need to belong the exclusion signal implicitly conveyed by non-mimicry leads to reduced self-esteem, whereas individuals with low trait need to belong remain relatively unaffected by non-mimicry.

The hypothesis that not being mimicked in an interpersonal interaction leads to reduced self-esteem follows from sociometer theory in a straightforward manner, assuming that non-mimicry functions as a (subtle but effective) exclusion signal. Kouzakova et al. (in press) suggested that non-mimicry served as a subtle exclusion signal because they found that non-mimicry in an interaction enhanced participants' need to belong. We interpret this temporary increase in need to belong induced by non-mimicry as reflecting the participants' enhanced *state* need to belong. In the Kouzakova et al. (in press) study, this enhanced state need to belong mediated the effect of non-mimicry on the participants' subsequent reconnection attempts (i.e., non-mimicked participants subsequently increased their evaluation of their longstanding close relationship, presumably to compensate for the subtle social exclusion experienced in the preceding interaction). In line with these findings, we assume that the proposed reduction of self-esteem due to non-mimicry is mediated by temporarily enhanced state need to belong, precisely because enhanced state need to

belong is indicative of the subtle exclusion signals that are hypothesized to cause reduced self-esteem after non-mimicry. Because in the previous paragraph we argued that trait need to belong is a moderator of the effect of non-mimicry on self-esteem, it may be useful for the sake of clarity to use quite distinctive labels for trait and state need to belong in the remainder of this article. Abbreviating need to belong as NtB, we will further indicate the chronic individual difference variable trait need to belong as *trait NtB* and the fluctuating situation-dependent variable state need to belong as *state NtB*.

To summarize, trait NtB is a between-subjects moderator variable that is hypothesized to predict whether or not non-mimicry in an interpersonal interaction triggers a temporary increase in state NtB. Specifically, we hypothesize that individuals with high trait NtB show a substantial increase of their state NtB after not being mimicked while individuals with low trait NtB do not. State NtB is subsequently assumed to mediate the relationship between non-mimicry and reduced self-esteem.

The complexity of the above argument justifies a somewhat more formal articulation of the presumed process of self-esteem regulation after non-mimicry in terms of a process model, called the Behavioral Asynchrony Induced Keeping Away Loneliness (BAIKAL) model of self-esteem regulation. The model is represented in the diagram in Figure 5.1. Within the causal chain proposed in the model, we distinguish two phases. In the first phase, the model proposes that non-mimicry (as opposed to mimicry) leads to reduced self-esteem via enhanced state NtB, but only for high trait NtB participants, and not for low trait NtB participants. Thus, trait NtB is a moderator of the indirect effect of non-mimicry on reduced self-esteem. The latter effect is indirect, because it is mediated by state NtB. In the second phase of the model, it is proposed that reduced self-esteem is restored by re-establishing connectedness with others (on a real or symbolic level, for example, by enhancing evaluations of one's longstanding relationships).

Participants in interactions are probably unaware of the occurrence of mimicry, or the lack of it, and therefore we assume that the hypothesized effect of non-mimicry on self-esteem occurs fully or mainly at an implicit level. We assume that implicit self-associations as measured, for instance, by an Implicit Association Test (IAT; Greenwald & Farnham, 2000), with self versus non-self and positive and

negative valence as attributes, may tap into these effects rather than explicit self-esteem measures such as the Rosenberg Self Esteem Scale (Rosenberg, 1965).

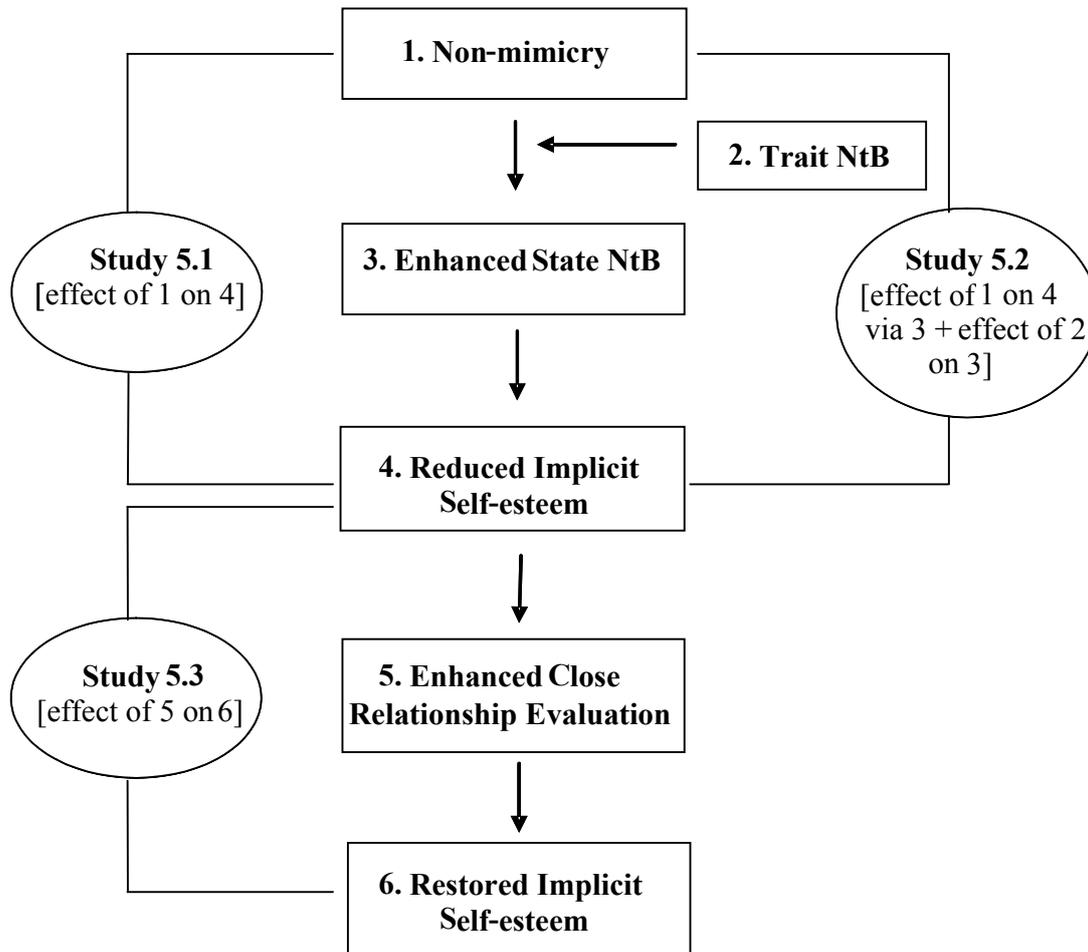


Figure 5.1. A paths diagram of the BAIKAL model of self-regulation of implicit self-esteem after not being mimicked in interpersonal interactions.

The present research

Study 5.1 tested the hypothesis that non-mimicry from an interaction partner reduces participants' implicit self-esteem, but not their explicit self-esteem, compared to both mimicked participants and participants who had no prior interaction. The aim of Study 5.2 was threefold. First, we aimed to replicate the effect of non-mimicry on implicit self-esteem. Secondly, we expected this impact of non-mimicry on self-esteem to be mediated by state NtB. Thirdly, we aimed to show that the pre-interaction assessment of trait NtB moderates the predicted enhancement of state NtB after non-mimicry. That is, trait NtB is hypothesized to moderate the mediation of state NtB of the effect of non-mimicry on reduced implicit self-esteem. Thus, Study

5.2 aims to test the first phase of the BAIKAL model as described above.

Study 5.3 tested the second phase of the BAIKAL model entailing that non-mimicked individuals whose self-esteem has been reduced are motivated to reconnect to others (i.e., show enhanced evaluation of their close relationships), which will normalize their self-esteem.

We thus propose to test a comprehensive model of the regulation of self-esteem after non-mimicry that comprises two distinct processes, viz. (1) the effects of non-mimicry on self-esteem as moderated by trait NtB and mediated by state NtB and (2) the subsequent restoration of self-esteem by seeking reconnection via the enhancement of longstanding relationship evaluations (see Figure 5.1).

Study 5.1

Method

Participants and Design

Seventy-six undergraduate students (59 females) from the Radboud University Nijmegen participated for credits in an experiment with a single factor (condition: mimicked, not mimicked, control) between-subjects design with implicit and explicit self-esteem measures as dependent variables.

Materials

Implicit self-esteem. Implicit self-esteem was assessed using an Implicit Association Test (IAT; Bosson, Swann, & Pennebaker, 2000; Greenwald & Farnham, 2000). The self-esteem IAT is a computerized categorization task that measures automatic associations of self-related words with positive and negative words. We used an adapted version, the self-esteem Single Target IAT (ST-IAT; Bluemke & Friese, 2007; De Liver, Wigboldus, & van der Pligt, 2007; Holland, Wennekers, Bijlstra, Jongenelen, & van Knippenberg, 2009) that measures association between one category and two attributes (to assess how strongly participants associated self-related words with affectively positive and affectively negative words). Participants were asked to classify self-related words (me, myself) and positive and negative words (e.g., love, peace, hatred, pain) with two response keys in a congruent and an incongruent block. Pairings of self-related with positive words constituted the congruent block, whereas pairing of self-related with negative words constituted the

incongruent block. Better performance in terms of shorter response latencies on the congruent block than on the incongruent block was assumed to indicate stronger positive than negative associations with the self (Greenwald, McGhee, & Schwartz, 1998).

Explicit self-esteem. Explicit self-esteem was measured using Rosenberg Self-Esteem scale (RSES; Rosenberg, 1965). RSES is a 10-item scale that measures people's feelings of global self-worth and was modified here to measure state self-esteem by asking the respondents to reflect on their current feelings. Scores were obtained from 10 items, each measured on a 4-point scale ranging from 1 (strongly disagree) to 4 (strongly agree). Example items include 'At this moment I feel that I have a number of good qualities' and 'At this moment I think I am no good at all.' After appropriate recoding, we averaged these items to form the RSES ($\alpha = .71$), on which high scores reflected higher state self-esteem.

Manipulation check. Liking for the interaction partner (i.e., the confederate) serves as a check for the mimicry vs. non-mimicry manipulation (Chartrand & Bargh, 1999). Participants evaluated the likeability of their interaction partner on a 7-point scale (1 = not at all to 7 = very much).

Rejection sensitivity. In order to control for individual differences, participants' rejection sensitivity was measured using the Rejection Sensitivity scale (RSS; Downey & Feldman, 1996). The scale taps into individual sensitivity to interpersonal rejection by evaluating 18 hypothetical scenarios in which an individual makes a request to others that makes him/her vulnerable to rejection (e.g., asking someone out on a date). Participants' ratings of the likelihood of being rejected is measured on a 5-point scale (1 = not at all to 5 = very likely).

Mood. As being mimicked may result in a more positive mood, we assessed participants' current mood by ratings of how happy, sad, angry, satisfied and relaxed they felt on a 7-point scale (1 = not at all to 7 = very much). They also rated the likelihood of a Chinese ideograph meaning 'happy' or 'sad' on a 7-point scale (1 = very unlikely to 7 = very likely), which is used as an implicit mood measure (Zajonc, 2001).

Procedure and manipulation

Participants were told that they would work on a number of tasks together with

another participant during a 10 minutes interaction. They were led into an interaction room and were seated at a round table in such a way that they would half-face the confederate's chair. Subsequently, the experimenter brought a male confederate into the room, introduced him as another participant in the study and seated him in the remaining chair. After instructing the interaction partners about the tasks, the experimenter left the room. During the interaction, the interaction partners completed a set of pen-and-paper tasks (adapted after Lakin, Chartrand, & Arkin, 2008) which were unrelated to their self-concepts and involved description of pictures, looking for objects and differences in pictures, drawing a map, naming animals. The tasks required physical movements (e.g., drawing, pointing to or circling objects) that expanded the range of behaviors to be mimicked or not mimicked by the confederate. In the mimicry condition, the confederate mimicked participants' nonverbal behavior such as their upper body postures and gestures. In the non-mimicry condition the confederate subtly stayed out of sync with the participants' behavior during the interaction by moving independently from the participants but made sure he did not 'anti-mimic' (that is, he did not execute movements and postures that were opposite to what the participant was doing), and kept moving to the same extent as in the mimicry condition. With the exception of the behavioral mimicry, the confederate was trained to keep the rest of his behavior (e.g., amount of smiling, gazing at the participants, etc.) the same across conditions¹. The confederate was unaware of the hypothesis. In the control condition, participants watched a 10 minutes video of a male person performing similar tasks. After the interaction, the experimenter took participants back to their cubicles, where participants' implicit self-esteem was assessed. Next, participants reported their explicit self-esteem using the RSES. The order of the two self-esteem measurements was counterbalanced. Subsequently, participants filled in the RSS, rated their current mood well as the likeability of the interaction partner. On completion, participants filled in the funneled debriefing aiming to assess experimental demand and participants' awareness of (non-)mimicry (for procedure see Chartrand & Bargh, 1996). Finally, participants were thanked, paid and debriefed.

¹ We followed Kouzakova, van Baaren, Ames and van Knippenberg (under revision) with regard to the confederate's training and the instructions during mimicry and non-mimicry. Kouzakova et. al. (under review) assessed the validity of the confederates' performance in the mimicry and the non-mimicry conditions by having confederate's behavior rated by naïve observers. The observers reported no differences between the confederate's behavior in the mimicry condition compared to the non-mimicry condition.

None of the participants accurately guessed the purpose of the experiment or became aware of (not) being mimicked.

Results

Manipulation check

Mimicked participants liked the confederate better ($M = 5.67$, $SE = 0.17$) than non-mimicked participants ($M = 5.04$, $SE = 0.16$; $F(1, 49) = 7.64$, $p = .01$, $\eta^2 = .14$). However, liking did not mediate the effect of mimicry on implicit self-esteem (Sobel's $Z = -.39$, $SE = 0.03$, $p = .71$).

Implicit self-esteem

Following Greenwald et al. (1998), scores on the ST-IAT task were calculated by recoding response latencies that fall below 300 ms as 300 ms, and those that fall above 3000 ms as 3000 ms. Next, natural log transformations were performed on the raw reaction-time data, and mean log transformed response latencies were calculated separately for the two blocks. Finally, the mean log transformed response latency for the 'me-positive' block was subtracted from the mean log transformed response latency for the 'me-negative' block. This difference score constituted participants' ST-IAT score. Thus, the ST-IAT score reflects the ease with which participants associate positive versus negative words with the self. To facilitate the interpretation we report untransformed means in milliseconds throughout the experiments.

The data were subjected to an ANOVA with condition (mimicked vs. not mimicked vs. no interaction) as the between-subjects factor and the ST-IAT score as the dependent variable. The not mimicked participants showed lower implicit self-esteem ($M = -72$ ms., $SE = .05$) than the mimicked ($M = 67$ ms., $SE = .05$) and the control participants ($M = 96$ ms., $SE = .05$), $F(2, 73) = 7.31$, $p < .01$, $\eta^2 = .17$. Simple contrast analyses showed that the non-mimicry condition differed both from the mimicry, $t(73) = 2.99$, $p < .01$, and the control conditions $t(73) = 3.51$, $p < .01$. The mimicry and the control conditions did not differ on the ST-IAT score, $t(73) = .47$, $p = .64$.

Separate MANOVAs per congruent and incongruent block revealed that the conditions did not differ on the mean response latencies for the congruent block ($F(2, 73) = 1.31$, $p = .28$, $\eta^2 = .04$), but did so on the incongruent block ($F(2, 73) = 5.55$, p

$< .01$, $\eta^2 = .13$), see Figure 5.2. Simple contrast analyses of the mean response latencies of the incongruent block showed that the non-mimicry condition ($M = 668$ ms., $SE = .05$) differed from the mimicry condition ($M = 765$ ms., $SE = .05$), $t(73) = 2.65$, $p = .01$. The non-mimicry condition also differed from the control condition ($M = 779$ ms., $SE = .05$), $t(73) = 3.04$, $p < .01$. The mimicry and the control conditions did not differ on the ST-IAT score, $t(73) = .36$, $p = .72$.

In line with the pattern of the means of the difference scores reported above, paired-samples t-tests showed significantly faster responses on the congruent block ($M = 698$ ms., $SE = .04$) than on the incongruent block ($M = 765$ ms., $SE = .03$) within the mimicry condition, $t(23) = 2.21$, $p = .04$. Participants in the control condition also reacted faster on the congruent block ($M = 683$ ms., $SE = .03$) than the incongruent block ($M = 779$ ms., $SE = .03$), $t(24) = 2.35$, $p = .03$. However, within the non-mimicry condition responses on the congruent block were significantly slower ($M = 740$ ms., $SE = .03$) than on the incongruent block ($M = 668$ ms., $SE = .03$), $t(26) = -2.49$, $p = .02$. Apparently, non-mimicry specifically strengthens negative self-associations (leaving positive self-associations unaffected) which results in a negative ST-IAT score.

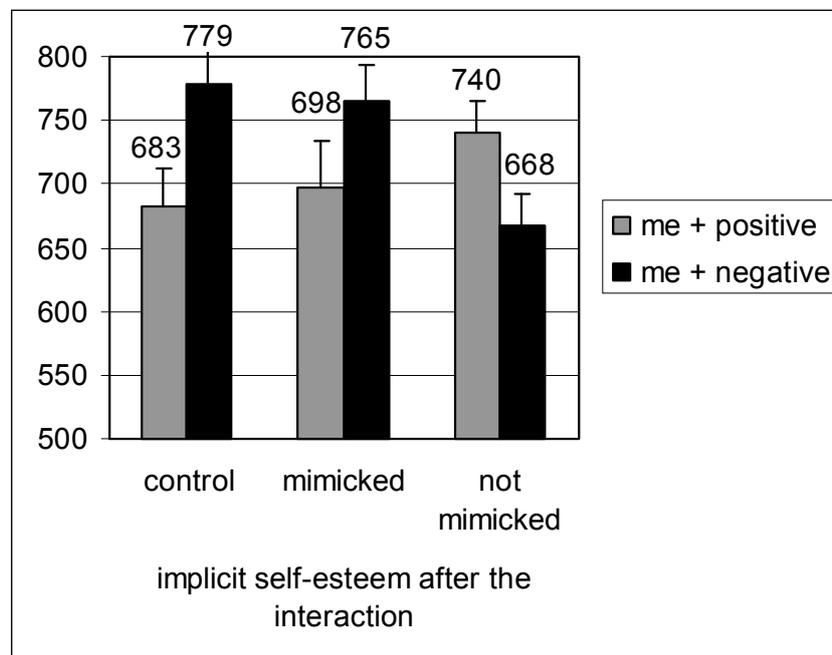


Figure 5.2. Mean responses in milliseconds with correspondent standard errors for the congruent and the incongruent blocks on the post-interaction self-esteem Single Target IAT per condition in Study 5.1.

Explicit self-esteem

Non-mimicked participants reported an equally positive self-esteem ($M = 2.72$, $SE = 0.05$) as the mimicked ($M = 2.81$, $SE = 0.06$) and the control participants ($M = 2.75$, $SE = 0.05$), $F(2, 73) = 0.73$, $p = .49$, $\eta^2 = .02$. As expected from previous research (Gailliot & Schmeichel, 2006; Spalding & Harding, 1999; Pelham & Hetts, 1999), implicit self-esteem and explicit self-esteem were uncorrelated across participants, $r(76) = .12$, $p > .32$.

Rejection Sensitivity and mood measures

Follow-up analyses found no significant effects for the RSS. RSS correlated positively with the explicit measure of self-esteem, $r(51) = .43$, $p < .01$. Furthermore, no effects were found of order of the two self-esteem measurements or participants' gender either as main effect or in interaction with experimental condition. The experimental manipulation had no effect on the explicit mood measures (either as aggregate score or individual items) and the implicit mood measure. The RSS, RSES and the mood scales were therefore not included in subsequent studies.

Discussion

As expected, not being mimicked reduced participants' implicit self-esteem. Non-mimicked participants showed lower implicit self-esteem than the mimicked and the control participants. The fact that the mimicked and control participants displayed the same level of (relatively positive) self-associations in the ST-IAT, while the non-mimicry condition deviated by showing lower (and even relatively negative) self-associations, strongly suggest that lack of mimicry in an interpersonal interaction reduces implicit self-esteem, rather than that being mimicked enhances it. Notably, non-mimicked participants reacted quicker to self-related words when they were paired with negative attributes compared to the mimicked participants and the participants who did not interact, but did not differ in their reaction latencies to self-related words paired with positive attributes. This pattern of results suggests that non-mimicry specifically affects self-negative associations.

Furthermore, the Rejection Sensitivity scale and the Rosenberg Self-esteem scale were positively related, highlighting the function of self-esteem as the monitor mechanism of one's current inclusionary status. However, the absence of the effect of

mimicry on both explicit measures suggests that participants were unable to consciously detect (or integrate) the subtle behavioral rejection cues conveyed by non-mimicry, which is corroborated by the reported participants' lack of awareness of mimicry (of lack thereof) during the interaction. This outcome suggests that non-mimicry does not affect conscious fluctuations in rejection sensitivity and explicit self-esteem.

Study 5.2 differs from Study 1 in a number of ways. First, we aimed to test the first part of the BAIKAL model, which posits that activated NtB (state NtB) mediates the effect of non-mimicry on self-esteem. For this purpose, we added a pre- and post-interaction measure of NtB (Leary, Kelly, Cottrell, & Schreindorfer, 2005). We used the same 10-item Need to Belong scale (Leary et al., 2005) to assess both trait and state NtB, reasoning that the pre-tested NtB reflects participants' chronic (and thus relatively stable) levels of NtB, whereas its enhancement due to the experimental manipulation taps into a more flexible aspect of NtB. This aspect of NtB reflects contextual fluctuations in participants' NtB levels and may be referred to as state NtB. Thus, we expected that NtB would be enhanced for non-mimicked but not for mimicked participants. Furthermore, we expect this state NtB to mediate the effect of non-mimicry on reduced self-esteem. Note that Study 5.2 did not include a no-interaction control condition.

Finally, in Study 5.2 we examined whether the pre-interaction assessment of trait NtB moderates the predicted enhancement of state NtB after non-mimicry. Specifically, we predict that individual differences in trait NtB moderate the mediation by enhanced state NtB of the effect of non-mimicry on self-esteem. We reasoned that participants with high trait NtB are more sensitive to behavioral cues from their interaction partner than participants with low trait NtB. Therefore, participants with high trait NtB will be more affected by non-mimicry and will show a larger enhancement of the state NtB after the interaction than participants with low trait NtB. Thus, Study 5.2 aimed to test the first part of the BAIKAL model of the regulation of implicit self-esteem after an interaction devoid of mimicry by testing whether 1) non-mimicry reduces participants' implicit self-esteem via enhanced NtB, and whether 2) this mediation is stronger for participants with high trait NtB than for participants with low trait NtB.

Study 5.2

Method

Participants and Design

Seventy female undergraduates from the Radboud University Nijmegen participated for credits in an experiment with a single factor design (condition: mimicked vs. not mimicked) with implicit self-esteem as the dependent variable. Trait NtB was measured prior to the interaction using the Need to Belong scale. The same scale was used after the interaction to measure any changes in need to belong. The post-pre difference score was used as a measure of enhanced state NtB after the interaction.

Materials

Implicit self-esteem. Participants' implicit self-esteem was assessed using the same ST-IAT as in Study 5.1.

Trait NtB. The 10-item Need to Belong scale (Leary et al., 2007) taps into individuals' general desire to be accepted by other individuals and groups. Prior to the interaction participants rated 10 questions presented in randomized order (e.g., 'I need to feel there are people I can turn to in times of need' and 'I try hard not to do things that will make other people avoid or reject me') on a 5-point scale (1 = not at all to 5 = very much). Exploratory factor analysis showed that two items had factor loadings < .20 on the first unrotated factor. Removing these items raised Cronbach's alpha from .77 to .79. The Need to Belong scale consisted of the average score on the remaining 8 items.

State NtB. After the interaction participants reported their current NtB using the same scale as before the interaction. The NtB of non-mimicked participants was hypothesized to become enhanced, whereas the mimicked participants' NtB would remain unaffected. Thus, the enhancement of NtB after the manipulation constitutes the participants' state NtB. To measure the enhancement of NtB, we calculated the difference score between the post-interaction and the pre-interaction NtB measures (post-test minus pre-test). This difference score served as the measure of state NtB.

Procedure

First, participants rated (among filler questions) their trait NtB. Subsequently, participants interacted with a different male confederate than in Study 5.1, who either mimicked or not mimicked participants' behavior. The confederate was trained in the same way and the interaction proceeded in similar fashion as in Study 5.1. After the interaction, participants rated their current NtB. Afterwards, participants' implicit self-esteem was assessed, following their ratings of the confederate's likeability. On completion, participants were probed for suspicion using the same funneled debriefing as in Study 5.1, were thanked, paid and debriefed. Again, none of the participants accurately guessed the purpose of the experiment or became aware of (not) being mimicked.

Results

Manipulation check

As expected, the mimicked participants ($M = 5.21$, $SE = .18$) liked the confederate better than the non-mimicked participants did ($M = 4.53$, $SE = .17$), $F(1, 68) = 5.90$, $p = .02$, $\eta^2 = .08$. Liking of the confederate did not mediate the effect of mimicry on self-esteem, $Z = -.32$, $SE = .01$, $p = .80$.

Implicit self-esteem

As in Study 5.1, the data were subjected to ANOVA with condition (mimicked vs. not mimicked) as the between-subjects factor and the ST-IAT score as the dependent variable. The non-mimicked participants showed lower implicit self-esteem ($M = -34$ ms., $SE = .02$) than the mimicked participants did ($M = 63$ ms., $SE = .02$), $F(1, 68) = 5.62$, $p = .021$, $\eta^2 = .08$.

Separate ANOVAs per congruent and incongruent block revealed that, unlike Study 5.1, the conditions marginally differed on the mean response latencies for the congruent blocks, $F(1, 68) = 3.20$, $p = .08$, $\eta^2 = .05$, but they did not differ on the incongruent blocks, $F(1, 68) = 1.57$, $p = .22$, $\eta^2 = .02$, see Figure 5.3. In line with the pattern of means reported above, paired-samples t-tests showed that the mimicked participants reacted faster on the congruent block ($M = 623$ ms., $SE = .02$) than on the incongruent block ($M = 686$ ms., $SE = .02$), $t(35) = -4.09$, $p < .01$. The non-mimicked participants reacted slower on the congruent block ($M = 723$ ms., $SE = .02$)

than on the incongruent block ($M = 689$ ms., $SE = .04$), $t(33) = -2.12$, $p = .042$.

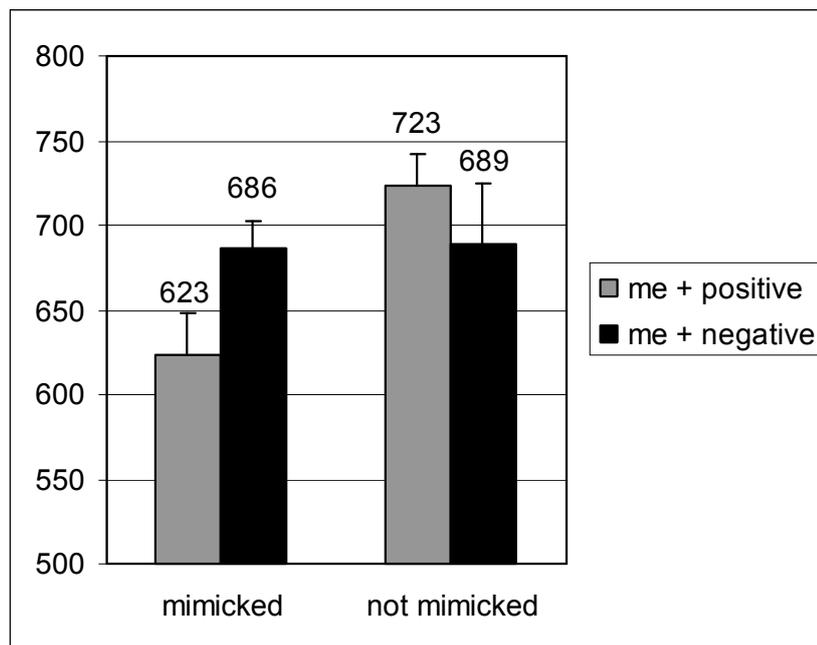


Figure 5.3. Mean responses in milliseconds with correspondent standard errors for the congruent and the incongruent blocks on the post-interaction self-esteem Single Target IAT per condition in Study 5.2.

State NtB

The not mimicked participants showed a higher state NtB ($M = .69$, $SE = .16$) than mimicked participants ($M = .16$, $SE = .16$), $F(1, 68) = 5.26$, $p = .03$, $\eta^2 = .07$. The conditions did not differ in NtB before the interaction ($M_{\text{mimicry}} = 3.2$, $SE = .10$; $M_{\text{non-mimicry}} = 3.3$, $SE = .11$), $F(1, 68) = .44$, $p = .51$, whereas after the interaction the not mimicked participants reported a higher NtB ($M = 4.0$, $SE = .10$) than the mimicked participants ($M = 3.4$, $SE = .1$), $F(1,68) = 18.72$, $p < .01$, $\eta^2 = .22$. For the mediation analysis below, we use state NtB as mediator, which is indicated as the difference score of the post-interaction NtB measure minus the pre-interaction NtB measure.

Mediation by state NtB

We assumed an increase in state NtB to be the process underlying the decrease of implicit self-esteem after lack of mimicry in the interaction. For the mediation analysis, we centred all predictor variables to avoid multicollinearity with their

product terms (Aiken & West, 1991). As expected, state NtB mediated the effect of condition on self-esteem since the effect of condition on self-esteem ($\beta = -.28$, $SE = .03$; $p = .02$) disappeared after we controlled for state NtB ($\beta = -.14$, $SE = .03$; $p = .12$). Condition (non-mimicry vs. mimicry) predicted state NtB ($\beta = .27$, $SE = .23$; $p = .025$) and state NtB predicted self-esteem ($\beta = -.27$, $SE = .02$; $p = .024$). Results from the Sobel test (Preacher & Hayes, 2004) yielded a marginally significant mean indirect effect of state NtB on the effect of mimicry on self-esteem, $Z = -1.76$, $SE = .02$, $p = .07$.

We further tested whether the mediation by state NtB occurred due to its enhancement after non-mimicry, but not after mimicry by adding a condition * state NtB interaction term to the prediction model (cf., Preacher, Rucker, & Hayes, 2007). The condition * state NtB interaction predicted the self-esteem reduction ($\beta = -.31$, $SE = .04$; $p = .01$), with 27% of the behavioral variance being explained, $F(3, 66) = 7.97$, $p < .01$. As expected, state NtB predicted self-esteem reduction in the non-mimicry condition, $Z = -1.94$, $SE = .03$, $p = .05$, but not in the mimicry condition, $Z = -1.01$, $SE = .01$, $p = .30$. In terms of within-cell correlations, state NtB was negatively related to self-esteem in the non-mimicry condition, $r(34) = -.56$, $p < .01$, but was not related to self-esteem in the mimicry condition, $r(36) = -.02$, $p = .24$.

Moderated mediation

We tested whether trait NtB (as assessed in the pre-test) moderated the mediation of state NtB. Following Preacher, Rucker and Hayes (2007, model 2), we subjected our data to a moderated mediation analysis. In agreement with the proposed model, trait NtB moderated the effect of condition on state NtB ($\beta = -.42$, $SE = .04$; $p = .02$) without directly affecting the relationship between the mediator and self-esteem ($\beta = .02$, $SE = .03$, $p = .89$). This full model² explained 32 % of the variance in self-esteem, $F(5, 64) = 6.10$, $p < .01$.

Probing the levels of moderation by trait NtB. We expected that only participants with a high trait NtB would be affected by lack of mimicry. To assess at which value of trait NtB it served as the moderator (Hayes & Matthes, 2009), we found that the moderation of trait NtB occurred for its moderate-to-high levels and not for its low-to moderate levels. To assess the point at which trait NtB starts to exert its

² Predictors in the model are: condition (mimicry vs. non-mimicry), trait NtB, state NtB, condition * trait NtB interaction, condition * state NtB interaction, and trait NtB * state NtB interaction.

influence on the relationship between condition and state NtB, we added the mean score on trait NtB in the moderation analysis with a Johnston-Neyman significance regions identification technique (Preacher & Hayes, 2007). This technique tested the moderation at each value of trait NtB in order to identify the exact region of values of trait NtB at which trait NtB significantly influences the relationship between the independent variable (condition in the present test) and the dependent variable (state NtB in the present test). The results showed that trait NtB exerted its influence on the relationship between condition and state NtB between the values of $M = 2.90$ and $M = 4.63$. The grand mean of trait NtB across both conditions was $M = 3.28$ ($SD = .61$) ranging from $M = 2.00$ to $M = 4.63$. Therefore we conclude that enhancement of state NtB indeed occurred only for participants with high trait NtB.

Discussion

The results of Study 5.2 suggest that non-mimicry enhances NtB, which in turn leads to a decrease in self-esteem. These results support the first part the BAIKAL model, which proposes that state NtB mediates the effect of non-mimicry on self-esteem. This mediation is moderated by individual differences in NtB such that only for participants with high trait NtB non-mimicry triggers enhanced state NtB and attendant decreases of self-esteem, while this non-mimicry-induced chain of events does not take place for participants with low trait NtB.

Study 5.3 examines the second part of the model, which pertains to the self-esteem recovery process following behavioral rejection during a social interaction. We predict that non-mimicked individuals whose self-esteem has been reduced are motivated to reconnect to others in order to restore their self-esteem. It has previously been shown that rejected individuals turn to other sources of acceptance to compensate for the experienced rejection (DeWall, Maner, & Rouby, 2008; Karremans, Heslenfeld, van Dillen, & van Lange, 2009; Lakin et. al, 2008; Maner, DeWall, Baumeister, & Schaller, 2007). Building on these ideas, Kouzakova et al. (in press) showed more specifically that non-mimicked individuals psychologically turn to their close others to compensate for lack of mimicry in interpersonal interactions. In line with this argument, we expect in Study 5.3 that non-mimicked participants will upgrade their pre-existing close relationships to a larger extent than mimicked

participants. Furthermore, we expect the enhanced relationship evaluation to mediate the recovery of self-esteem, eventually resulting in similar levels of implicit self-esteem of non-mimicked individuals and mimicked participants.

Study 5.3

Method

Participants and Design

Fifty-four undergraduates (42 females) from the Radboud University Nijmegen participated for credits in single factor experiment (condition: mimicked vs. not mimicked). Enhancement of relationship evaluation was assessed by measuring it once prior to the interaction and once directly after the first implicit self-esteem measure. Two separate measures of implicit self-esteem (one directly after the interaction and one after the final relationship evaluation) constituted the dependent variables.

Materials

Implicit self-esteem. Participants' implicit self-esteem was assessed using the same ST-IAT as in the previous studies.

Relationship evaluation and reconnection measure. To assess participants' relationship evaluation, we asked participants to identify a specific important person in their life, such as a parent, a friend or a sibling and to report: 1) how close they felt towards this person at that moment and 2) how confident they were that they and this person would stay close in the next three years. Both questions were answered on a 7-point scale, ranging from 'not at all' (1) to 'very much' (7). The mean score of the two questions ($r(54) = .32, p = .02$ on the post-test) represented participants' relationship evaluation.

These questions were asked twice, once before the interaction and once (post-interaction) directly after the first implicit self-esteem measure. The enhancement of the relationship evaluation after the interaction represented participants' motivation to reconnect with close others to recover their implicit self-esteem. The difference score between the post-test and the pre-test (pre-test subtracted from the post-test) served as the measure of motivation to reconnect.

Self-esteem recovery measure. To assess the extent to which participants' self-esteem increased after they evaluated their close relationships, we subtracted the participants' ST-IAT score before the relationship evaluation from their ST-IAT after the final relationship evaluation. The difference score served as a measure of participants' self-esteem recovery.

Procedure

First, participants evaluated (among filler questions) their relationship with a specific person with whom they reported to have a close relationship. Next, participants interacted with a female confederate who either mimicked or did not mimic them and who was trained in the same way as the confederates in the previous studies. The interaction proceeded in a similar fashion as in the previous studies. Afterwards, participants' implicit self-esteem was assessed. Directly after the IAT, participants re-evaluated the same close relationship as on the pre-test, followed by the second assessment of their implicit self-esteem (ST-IAT). On completion, participants rated the confederate's likeability, filled in a funneled debriefing as in the previous studies, were thanked, paid and debriefed. Again, none of the participants accurately guessed the purpose of the experiment or became aware of (not) being mimicked.

Results

Mimicry manipulation check

The mimicked participants reported a marginally greater liking of the confederate ($M = 5.5$, $SE = 0.20$) compared to the non-mimicked participants ($M = 4.9$, $SE = 0.20$; $F(1, 52) = 3.20$, $p = .08$, $\eta^2 = .06$), but liking did not mediate the effect of mimicry on implicit self-esteem ($Z = -.83$, $SE = .01$, $p = .40$).

Implicit self-esteem after the interaction

The data were subjected to ANOVA with condition (mimicked vs. not mimicked) as the between-subjects factor and the ST-IAT score as the dependent variable. The non-mimicked participants showed lower implicit self-esteem ($M = -77$ ms., $SE = .03$) than the mimicked participants did ($M = 88$ ms., $SE = .03$), $F(1, 52) = 7.24$, $p = .01$, $\eta^2 = .12$.

Separate ANOVAs per congruent and incongruent block revealed that, as in Study 5.1, the conditions did not differ on the mean response latencies for the congruent blocks, $F(1, 52) = 1.98, p = .17$, but they did on the incongruent blocks, $F(1, 52) = 5.54, p = .02, \eta^2 = .10$, see Figure 5.4. Paired-samples *t*-tests showed that the mimicked participants reacted faster on the congruent block ($M = 681$ ms., $SE = .03$) than on the incongruent block ($M = 769$ ms., $SE = .04$), $t(30) = 2.28, p = .03$. However, within the non-mimicry condition responses on the congruent block ($M = 729$ ms., $SE = .03$) were slower than on the incongruent block ($M = 651$ ms., $SE = .02$), $t(24) = -4.60, p < .01$.

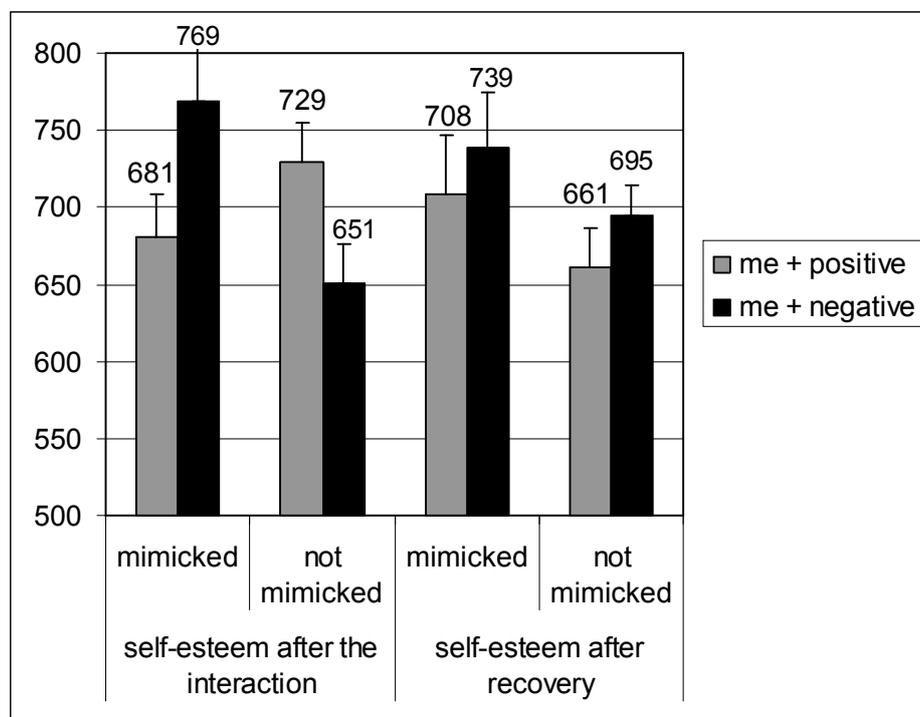


Figure 5.4. Mean responses in milliseconds with correspondent standard errors for the congruent and the incongruent blocks on the post-interaction self-esteem Single Target IAT and on the post-recovery Single Target IAT per condition in Study 5.3.

Reconnection measure

In the second part of our model, we proposed that non-mimicked participants would be more motivated to repair their implicit self-esteem by enhancing their relationship evaluation. The data were subjected to an ANOVA with condition as the between-subjects factor and the reconnection measure as the dependent variable. The

non-mimicked participants showed a larger shift in the relationship evaluations ($M = .92$, $SE = .25$) than the mimicked participants did ($M = -.18$, $SE = .22$), $F(1, 52) = 11.18$, $p < .01$, $\eta^2 = .18$. On the pre-test, the relationship evaluation of the non-mimicked participants ($M = 5.23$, $SE = .23$) did not differ from that of the mimicked participants ($M = 5.00$, $SE = .20$), $F(1, 52) = .57$, $p = .46$, whereas after the interaction the non-mimicked participants evaluated close relationship more positively ($M = 6.15$, $SE = .20$) than the mimicked participants did ($M = 4.82$, $SE = .18$), $F(1, 52) = 25.00$, $p < .01$, $\eta^2 = .33$. Simple effects demonstrated that the mimicked participants did not shift in their relationship evaluations of close relationship after the interaction compared to the pre-test, $F(1, 29) = .80$, $p = .38$, whereas the non-mimicked participants shifted towards a more positive relationship evaluation after the interaction compared to the pre-test, $F(1, 23) = 12.10$, $p < .02$, $\eta^2 = .35$.

Self-esteem after reconnection

The results from a MANOVA showed that the conditions did not differ on the final post-measure of the self-esteem, $F(1, 52) = .12$, $p = .74$ (see Figure 5.4 for means), nor did they differ on the mean response latencies for the congruent or incongruent blocks ($F_s < 1$). Paired-samples t-tests showed that the mean responses on the two blocks differed significantly both within the mimicry condition, $t(30) = 1.97$, $p = .06$, and within the non-mimicry condition, $t(24) = 2.36$, $p = .03$. These results suggest that the originally non-mimicked participants normalized their implicit self-esteem after the reconnection attempt.

Self-esteem recovery. A univariate ANOVA with condition as the between-subjects factor and the self-esteem recovery measure as the dependent variable showed that the non-mimicked participants ($M = 154$ ms., $SE = .04$) showed a greater increase in implicit self-esteem after evaluating their close relationship for the second time compared to the mimicked participants ($M = 35$ ms., $SE = .03$), $F(1, 52) = 6.42$, $p = .02$, $\eta^2 = .11$. Simple effects showed that the increase in self-esteem occurred in the non-mimicry condition, $F(1, 23) = 15.45$, $p < .01$, $\eta^2 = .40$, whereas there was no self-esteem increase in the mimicry condition, $F(1, 29) = 1.58$, $p = .22$, $\eta^2 = .05$.

Mediation of self-esteem recovery by upgrading relationship

We predicted that the reconnection measure mediates the influence of

condition on self-esteem recovery. Condition predicted the reconnection measure ($\beta = .42$, $SE = .33$; $p < .01$), which, in turn, predicted the self-esteem recovery ($\beta = .52$, $SE = .02$; $p < .01$). The reconnection measure mediated the mimicry - self-esteem recovery relationship, as the effect of condition on self-esteem recovery ($\beta = .33$, $SE = .05$; $p = .02$) disappeared after controlling for reconnection ($\beta = .14$, $SE = .05$; $p = .30$). Results from the Sobel test (Preacher & Hayes, 2004) yielded a significant mean indirect effect of relationship evaluation on the effect of mimicry on self-esteem, $Z = 2.39$, $SE = .03$, $p = .02$. The bootstrapping analysis (Preacher & Hayes, 2004) yielded similar results ($M = .07$, $SE = .02$) within the 95% confidence interval ranging from .023 to .112.

Discussion

Study 5.3 replicated the negative effect of non-mimicry on implicit self-esteem. Furthermore, the results provided support for the second phase in the BAIKAL model, which entails the prediction that the enhancement of relationship evaluation mediates the recovery of self-esteem. Indeed, upgrading the relationship with close others resulted in increased implicit self-esteem in non-mimicked participants. These results suggest that psychological compensation processes through upgrading one's close relationships is an effective manner to re-establish one's implicit sense of self-worth.

Interestingly, after having filled in the final relationship evaluation measure the non-mimicked participants showed the same typical ST-IAT effect as the mimicked participants did by reacting faster to the self-related words when they were paired with positive attributes than when they were paired with negative attributes. This shift towards a more positive implicit self-esteem suggests that turning psychologically to one's loved ones suffices to counter the negative self-associations induced by non-mimicry. Note that positive self-associations remained unaffected throughout the process.

General Discussion

By investigating the regulation of self-esteem after an interaction devoid of mimicry, the present studies extend previous research that showed that non-mimicry functions as a subtle exclusion cue which gives rise to enhanced NtB (cf., Kouzakova

et al., in press). Specifically, we demonstrated that non-mimicry lowers implicit self-esteem, which in turn instigates a psychological compensation process characterized by seeking reconnection to significant others. The present research contributes four new insights to our knowledge concerning the consequences of non-mimicry for self-regulation. First, after an interaction without mimicry, people may suffer decreased implicit self-esteem (particularly as a result of strengthened negative self-associations). Second, an enhancement of NtB mediates this reduction in self-esteem, suggesting that the lack of mimicry in an interaction functions as subtle social exclusion signal (see for a demonstration of the same effect, Kouzakova et al., in press). Third, people vary in sensitivity to non-mimicry as exclusion signal, which is indicated by trait NtB. Fourth, decreased self-esteem resulting from lack of mimicry may be effectively restored by enhanced evaluations of one's longstanding relationships. Apparently, compensation at a symbolic level suffices to redress the negative self-esteem consequences of subtle exclusion signals in an interaction.

The role of trait- versus state NtB

First, we found that the enhancement of state NtB (assessed by the difference between the reported NtB before and after the manipulation) is fully accountable for the influence of mimicry on self-esteem. These findings support our hypothesis of lowered self-esteem as a result of a behavioral rejection signal. However, by measuring trait NtB prior to the manipulation, we were able to separately test the specific influences of the two aspects of NtB: (1) individual differences in trait NtB and (2) the extent of the acute activation of enhanced state NtB as the consequence of non-mimicry. The activation of enhanced state NtB suggests that our manipulation was successful in thwarting participants' sense of belongingness, indicating an exclusion process. Importantly, we identified a moderator that predicts whether or not the lack of mimicry does activate acute NtB. It was shown that individual differences in trait NtB moderated the extent to which the activated enhanced state NtB mediated the impact of mimicry on self-esteem. Thus, individual variations in trait NtB moderate the indirect effect of non-mimicry on self-esteem in a sense that only for people high in trait NtB the mediation process occurs. For those with low trait NtB, there is no indirect effect of non-mimicry on self-esteem. Basically, our results suggest that lack of mimicry from an interaction partner hits those high in trait need to

belong harder than those low in trait need to belong. Further research on both individual differences in sensitivity to belongingness threat and its relation to the consequences of non-mimicry may provide a deeper insight in the specific process underlying social exclusion manipulations.

The effect of reconnection on self-esteem

After demonstrating the effect of non-mimicry on implicit self-esteem, we examined the self-esteem recovery process by offering participants an opportunity to regain a sense belonging by upgrading their longstanding close relationship (Study 5.3). As expected, non-mimicked participants raised their implicit self-esteem to similar level as that of the mimicked participants after psychologically turning to their longstanding relationships. The fact that a mere psychological assessment of the quality of one's relationship restores one's self-esteem underlines the flexibility and efficiency with which people are able to re-establish themselves. It also highlights the immediate necessity of belongingness imbalance to be restored.

Issues for future research

The present findings suggest intriguing further questions. For instance, in their model of ostracism, Spoor and Williams (2007) posited NtB and positive self-esteem as two independent basic needs. In our analyses, enhanced state NtB predicted non-mimicry-induced fluctuations in self-esteem. Importantly, the reverse direction of this relationship was not significant: the differences in implicit self-esteem did not predict enhanced state NtB. This suggests that the concepts state NtB and self-esteem are in a specific way interdependent. Speculating, it could be the case that self-esteem is directly affected by enhanced state NtB. Alternatively, it could be that enhanced state NtB merely indicates threatened self-esteem for those individuals who are vulnerable to (subtle) social exclusion signals. Finally, it is quite conceivable (and compatible with the preceding considerations) that only the social aspects of self-esteem are affected by the belongingness threat induced by non-mimicry, whereas more personal facets of self-esteem (e.g., related to achievement of specific goals) could remain unaffected. It would be interesting to further study the relationship between state NtB and different aspects of self-esteem.

The differential effect of mimicry on implicit and explicit self-esteem obtained

in the present research suggests another interesting issue. We did not find any effects of non-mimicry on self-reported (i.e., explicit) self-esteem (Study 5.1). On the one hand, this is in line with much evidence for low correspondence between implicit and explicit self-esteem (Bosson et. al, 2000). On the other hand, it contradicts the often reported impact of social exclusion on explicit self-esteem (Stillman et. al., 2009). Speculating on this, we could explain the absence of an effect on explicit self-esteem by the fact that participants were unaware of the exclusion signal conveyed by non-mimicry. Alternatively, we could speculate that the Single Target IAT as an implicit self-esteem measure is (particularly) sensitive to negative self-associations (as suggested by the results of Study 5.1 and 5.3), whereas the Rosenberg Self-Esteem scale as an explicit self-esteem measure mainly reflects the strength of participant's positive self-associations. In a preliminary examination of this proposition we can draw on the data from the present research. Across the two studies (Study 5.1 and Study 5.3), we found that the experience of social exclusion, elicited through non-mimicry during an interaction impacted only the negative self-associations. Non-mimicked participants were quicker on 'me + negative' word pairs than on 'me + positive' word pairs both within the non-mimicry condition as well as compared to the mimicked participants. Although the presently obtained pattern of findings could be exclusively related to non-mimicry as a social exclusion signal, it is subject to future research to investigate the precise influence of various forms of social exclusion on implicit and explicit self-esteem. Note however that in Study 5.2 this pattern was reversed: the non-mimicked participants appeared to react slower on 'me + negative' word pairs than on 'me + positive' word pairs both within the non-mimicry condition as well as compared to the mimicked participants. Future research should provide further insights regarding the exact consequences of non-mimicry on positive and negative self-associations.

Conclusions

The present studies underscore the importance of mimicry in human social interactions and the regulation of self-esteem. When we find ourselves "at sync" with others, our intrinsic drive to connect is satisfied. In contrast, when we experience an interaction devoid of mimicry, we implicitly feel bad about ourselves and we need other means to feel good again. Humans are fundamentally social animals who need

to bond and bind. Of course, there is always the risk that our enthusiastic attempts to connect are not reciprocated. Fortunately, we have psychological buffers that prevent us from feeling bad for too long. We have friends and loved one's that may help us out, even when they are not physically present. The symbolic re-affirmation of our bond with a significant other may suffice to feel better about ourselves again.

The BAIKAL process model that we have explicated in the present study seems to constitute an important and functional regulatory mechanism. In everyday interactions, once in a while people may come across situations that threaten their sense of inclusion and self-worth. Some people may be less vulnerable because, due to a chronically low level of trait NtB, they seem to suffer less from an occasional subtle exclusion signal in interpersonal interactions. Fortunately, those who *are* affected by it, may have means to restore the balance. By psychologically turning to their loved ones, they can undo the harmful effects of non-mimicry on their self-esteem. The compensation provided by a symbolic act like indicating enhanced relationship evaluation, suggests that there are functional homeostatic processes at work that serve to protect positive self-esteem in the course of everyday interactions. Thus, despite the occasional threats that social interactions may pose to our sense of self-worth, most people manage to keep it in balance.

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Summary in Dutch

Samenvatting

Subtiele tekens van buitensluiting

Hoe het ontbreken van gedragsimitatie de perceptie van zelf en anderen beïnvloedt.

De sociale aard van de mens vindt zijn uitdrukking in de behoefte om zich met de soortgenoten verbonden te voelen. Mensen zijn daarom gevoelig voor non-verbale signalen uit hun sociale omgeving die mogelijke buitensluiting kunnen betekenen. Het onderzoek in dit proefschrift richt zich op de vraag of het ontbreken van gedragsimitatie door een interactiepartner een teken van buitensluiting naar de niet geïmiteerde persoon communiceert.

Het imiteren van het non-verbaal gedrag van een interactiepartner, zoals diens gebaren, lichaamshoudingen en manieren van doen, is een veel voorkomend en automatisch gedrag tijdens sociale interacties. Wederzijdse imitatie door interactiepartners bevordert de onderlinge afstemming van hun gedrag, versoepelt de interactie en signaleert begrip, gevoel van gelijkens en waardering door de imiterende interactiepartners. Gedragsimitatie versterkt de sociale banden en daarmee ook het gevoel van ‘erbij horen’ bij de geïmiteerde persoon. Ondanks het feit dat gedragsimitatie in sociale situaties het normale ‘default’ gedrag is, zijn er vele interactiesituaties waarin er relatief weinig of zelfs niet wordt geïmiteerd. Het overkoepelende doel van dit proefschrift is te onderzoeken welke communicatieve functie het ontbreken van imitatie door de interactiepartner dient, evenals welke gevolgen dit heeft voor de perceptie van de ander en de zelfperceptie van de niet geïmiteerde persoon.

Met betrekking tot de perceptie van de ander laten de resultaten zien dat een persoon die niet wordt geïmiteerd, de niet-imiterende interactiepartner als minder gelijk aan hemzelf of haarzelf ziet. Als gevolg hiervan beoordelen de niet-geïmiteerde personen - vergeleken met wel geïmiteerde personen - de persoons eigenschappen en attitudes van hun interactiepartner als verschillend van hun eigen persoonlijkheid en attitudes (Hoofdstuk 2). Theoretisch wordt verondersteld dat de perceptie van (eigenschappen en attitudes van) anderen normaal gesproken gebaseerd is op de projectie van eigenschappen en attitudes van de waarnemer op de waargenomen persoon. Het niet-geïmiteerd worden door de ander in een interactie doorbreekt vermoedelijk dit basale patroon van ander-perceptie. In dat geval zal de perceptie van de ander minder op basis van zelfkennis geschieden, en meer op basis van andere

informatie (bijvoorbeeld sociale stereotypen).

Het niet worden geïmiteerd door de ander beïnvloedt ook de zelfperceptie van de niet-geïmiteerde persoon. In verschillende experimenten (zie hoofdstuk 3, 4 en 5) worden aanwijzingen gevonden dat niet-imitatie als teken van sociale uitsluiting kan worden opgevat. De resultaten laten zien dat het niet worden geïmiteerd het stressniveau verhoogt, zoals blijkt uit een verhoogd niveau van het ‘stresshormoon’ cortisol, na een interactie waarin men niet geïmiteerd is (Hoofdstuk 3). De niet-geïmiteerde personen rapporteren een verhoogde “need to belong”, de behoefte om ‘erbij te horen’ (Hoofdstuk 4 en 5). Tenslotte verlaagt het gebrek aan gedragsimitatie de impliciete zelfwaardering van de niet geïmiteerde personen en met name van personen die het ‘erbij horen’ bijzonder belangrijk vinden (Hoofdstuk 5).

In deze studies wordt aangetoond dat een interactie waarin men niet geïmiteerd wordt door de ander leidt tot verlaagde impliciete zelfwaardering, doordat de niet-imitatie - bij mensen die daar gevoelig voor zijn - een verhoogde “need to belong” activeert, de behoefte om “erbij te horen”. Dat is echter maar één fase in het proces. De verlaging van het impliciete zelfwaardering zet een zelfregulerend mechanisme in werking, dat de niet- geïmiteerde individuen motiveert om hun sociale relaties te versterken (Hoofdstuk 4 en 5). Verlaagde zelfwaardering leidt ertoe dat de betreffende personen hun lange-termijn relatie (intieme relatie, relaties met significante andere) hoger gaan waarderen, waardoor de zelfwaardering weer wordt hersteld tot het niveau van voor de interactie. De symbolische opwaardering van de significante ander fungeert dan als compensatiemechanisme voor de ervaren uitsluiting in de interactie. Deze opeenvolging van gebeurtenissen - niet-imitatie, verhoogd belang van erbij willen horen, verlaagde zelfwaardering bij personen die gevoelig zijn voor de niet-imitatie, en het herstel van de zelfwaardering door het opwaarderen van de relatie met significante anderen - wordt samengevat in een procesmodel, het BAIKAL-model (Behavioral Asynchrony Induced Keeping Away Lonliness model). In hoofdstuk 5 van het proefschrift wordt dit procesmodel getoetst. Beide fases van het model - dus zowel de fase waarin het ontbreken van imitatie de zelfwaardering ondermijnt, als de fase waarin de opwaardering van lange termijn relatie de zelfwaardering herstelt - worden in hoofdstuk 5 door de data ondersteund.

Samengevat, biedt deze dissertatie empirische evidentie voor het idee dat het

gebrek aan gedragsimitatie in sociale interacties een belangrijke rol speelt bij het communiceren van de sociale uitsluiting en het tot stand brengen van zelfregulerende mechanisme om voor het door de niet-imitatie teweeg gebrachte tekort aan verbondenheid te compenseren.

Marina's vitae

*M*arina Kouzakova was born on a spring Friday morning into the family of a physicist and a chemist (no wonder she became a psychologist). Growing up as the only child was bliss. From the first year on she was brought up by four sweet, caring people (three of which worked fulltime leaving granny as the home base). Fully in line with the educational system of the USSR, from the age of three until seven, Marina went to a kindergarten, followed by secondary education at School №65 (yes, all schools are still called by their district numbers). At the same time and in good old Russian tradition, she spent her afternoons at music school (solfege, choir, piano class) for about seven years. When Marina turned fifteen, her country, as she knew it, ceased to exist. In this spirit of change, Marina switched to a Lyceum with Literature and Language as a major. After graduating from the Lyceum in 1993, she enrolled herself at the Faculty of Philology and Journalism at the Irkutsk State University. However, her inspired plan to lead an exhilarating life as a journalist was interrupted by her parents moving across the world in pursuit of her father's academic career, as well as his good intentions to advance his daughter's future. Hence, Marina left the glorious shores of Baikal lake to settle 6177 km further away, in Amsterdam, where she has lived ever since. She received the Dutch as a Second language (NT2) certificate a year later. Despite a ridiculous number of meaningful career moves, such as a Guest Relations representative in a Turkish hotel for three months, an au pair, an assistant in the Publications Department at Oxford University Press for a half a year and as a business interpreter, in 2003 Marina obtained her masters at the Department of Social Cognition, Emotion and Identity and at the Department of Validity of Empirical Research in Psychology, both at the University of Amsterdam. In November of the same year, and (still) amazed that she was getting paid for something she would have done, if asked, anyway, she started her Ph.D. project at the Radboud University Nijmegen, the results of which you are holding in your hands. Starting January 2010, Marina will join the Department of Social and Organisational Psychology at the Leiden University as a post-doctoral researcher.

Acknowledgements

“I would like to thank the Academy...”

No, completing a dissertation does not feel like winning an Oscar at all. All the support and the confidence that I have been granted, on the other hand, does. When I sat out to write acknowledgements, I intended to keep it concise. Then I realized that this one spot in the book is probably the best opportunity to finally explicate my feelings towards the people who have contributed to my growing as a researcher in general and to the emergence of this work in particular.

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As I was putting in writing my gratitude to the members of my department, I realized that I wrote an expression ‘thank you for sharing your endless enthusiasm for science’ pretty much as many times as the number of people at the 9th floor at any given moment. I think this says a lot about the intellectual atmosphere I have been privileged to breath in the past years. So I will quit saying this each time, but you all have my deepest thanks for keeping up my passion for research and for the novel ways of thinking revived after each lab meeting, discussion, presentation, or writing week.

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Pultusk, a trip to New York, the beach and watching soccer championship in Opatija... Besides inspiring conference talks, the memorable adventures that we've shared will stay with me for a long time. Thanks to my colleagues, I always came home from such work trips fully charged with energy and new ideas. As there are so many people I am thankful to have met – some of you have become true friends - expressing my gratitude to each of you in this acknowledgement would make another whole chapter of it. So I rather do it personally over a round of beer in the nearest future.

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Marina,
October, 2009

SOME DISSERTATION HAIKU'S

Seeking uncharted,
years in the dungeon of lab.
Significance rules.

Lang zijn de jaren
van zwoegen, kort is de rij
bij de receptie.

Tackling p-level.
Hurry, write up your paper.
Cortisol rises.

Grateful to the bone
for the years of excitement.
I mimic y'all!

(in anticipation)
Exhilaration!
'Hora est' is proclaimed.
Off to the party!

