Short Communication

# Intimate imitation: Automatic motor imitation in romantic relationships

Lara Maister *, Manos Tsakiris

*Royal Holloway, University of London, UK*

## ARTICLE INFO

## ABSTRACT

Our relationships with romantic partners are often some of the closest and most important relationships that we experience in our adult lives. Interpersonal closeness in romantic relationships is characterised by an increased overlap between cognitive representations of oneself and one's partner. Importantly, this type of self-other overlap also occurs in the bodily domain, whereby we can represent another's embodied experiences in the same way as we represent our own. However, as yet this bodily self-other overlap has only been investigated in individuals unfamiliar to each other. Here, we investigate bodily self-other overlap between romantic partners, using automatic imitation as an example case of bodily overlap in the motor domain. We found that participants automatically imitated romantic partners significantly more than close others with whom they had a platonic relationship. Furthermore, imitation in these relationships was related to key aspects of relationship quality, as indicated by adult attachment style.

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## 1. Introduction

Our social lives revolve around the formation and maintenance of relationships with others. These relationships can be close and intimate, such as that between romantic partners, or they can be more distant, such as that between casual acquaintances or work colleagues. Therefore, the nature of each individual relationship can be characterised by the perceived distance between the self and the other. It is this distance between self and other that plays an important role in how we feel about an individual and how we behave towards that individual in social situations (Aron, Mashek, & Aron, 2004; Myers & Hodges, 2012). Importantly, in relationships that are very close, we act as if characteristics of the other individual are partially our own (Wright, Aron, & Tropp, 2002), reflecting an overlap between cognitive representations of self and close others (Aron, Aron, Tudor, & Nelson, 1991). This overlap leads to a diminished self/other distinction (Aron et al., 2004), and is positively correlated with feelings of love, commitment and intimacy (Agnew, Van Lange, Rusbult, & Langston, 1998).

Self-other overlap with one's romantic partner is also related to the quality of the relationship as defined by adult attachment theory (see Brennan, Clark, & Shaver, 1998). Just as with infants, adult attachment can be decomposed into two latent dimensions, termed anxiety and avoidance. The anxious subscale assesses feelings

of anxiety regarding abandonment, and the motivational desire for closeness. The avoidant subscale, in contrast, assesses partners' desire for autonomy and fear of intimacy (Brennan et al., 1998; Fraley, Waller, & Brennan, 2000). These two attachment styles represent working models of the self and of the other (Griffin & Bartholomew, 1994), with anxious attachment associated with a negative appraisal of the self, and avoidant attachment associated with negative appraisal of the other. Consistent with this, self-other overlap in the cognitive domain has been found to directly relate to attachment style (Mikulincer, Orbach, & Iavnieli, 1998), usually with anxious attachment predicting the desire for increased self-other overlap, and avoidant attachment predicting a desire for increased self-other distinction (e.g. Slotter & Gardner, 2012).

This cognitive overlap between self- and other-representations is a key focus in the study of personal relationships. However, overlap also exists in our representations of embodied experiences (Gallese & Sinigaglia, 2011). In these cases, when we observe the embodied experience of another person, we partially share that experience ourselves. For example, we wince when we see someone else in pain (Lamm, Porges, Cacioppo, & Decety, 2008), and when we observe another person moving, we often automatically imitate their actions (e.g. Chartrand & Bargh, 1999). This embodied self-other overlap can also be observed at the neural level, in 'mirror-like' brain regions that show vicarious activity to others' pain, tactile experiences and movements (see Keysers & Gazzola, 2009).

The overlap between embodied self- and other-representations appears in some ways analogous to the overlap between more conceptual self-other representations referred to by social

* Corresponding author at: Department of Psychology, Royal Holloway, University of London, Egham, Surrey TW20 0EX, UK.
*E-mail addresses:* lara.maister@rhul.ac.uk (L. Maister), manos.tsakiris@rhul.ac.uk (M. Tsakiris).

psychologists in the study of relationships. Therefore, social closeness between people may be reflected not only in the overlap in the conceptual domain (e.g. Pipp, Shaver, Jennings, Lamborn, & Fischer, 1985), but also in the bodily domain. It is surprising, however, that despite the recent emphasis on a second-person social neuroscience approach (Schilbach et al., 2013), the majority of the studies investigating the roles of bodily overlap have used individuals who are unfamiliar to each other. This is despite there being clear evidence for a relationship between positive social appraisal and bodily overlap. For example, bodily overlap is increased in the motor and sensory domains when positive attitudes are elicited towards an unfamiliar individual (e.g. Wang & Hamilton, 2012), and vice versa, when bodily overlap is experimentally elicited with an unfamiliar individual, there is an increase in liking, trust and attraction towards them (for review, see Maister & Tsakiris, 2015). Together, these results lend indirect support to the hypothesis that bodily overlap may be enhanced between individuals in romantic relationships. However, as far as we know, no direct investigation of bodily self-other overlap between romantic partners has yet been performed.

In the current study, we hypothesize that bodily overlap may be a special feature of close personal relationships, just like more conceptual forms of self-other overlap. We make two empirical predictions. First, we expect that the level of bodily overlap between self and other will be higher in romantic relationships than other, less intimate relationships. Second, given that social attitudes have a top-down modulatory effect on bodily overlap (e.g. Wang & Hamilton, 2012), we would predict that bodily overlap within romantic relationships will be influenced by adult attachment style, in a similar way to more cognitive forms of overlap (Slotter & Gardner, 2012).

To test these two hypotheses, we investigate one example of bodily overlap, automatic imitation, between individuals in romantic relationships. Automatic imitation is an important and prevalent example of shared body representations in everyday interactions, as it reflects a special matching between perception of another person's actions and the performance of one's own actions (Iacoboni et al., 1999). It also has a fascinating relationship with more affective aspects of social cognition; for example, we imitate individuals more if we hold positive social attitudes towards them, and being imitated increases our liking and trust of the individual imitating us. Furthermore, imitation can be unconsciously employed to achieve affiliation goals, such as when we have a desire for increased interpersonal closeness with another (Van Baaren, Janssen, Chartrand, & Dijksterhuis, 2009, for review).

Hitherto, the research into embodied processing within romantic relationships has been primarily restricted to emotional co-regulation (e.g. Butner, Diamond, & Hicks, 2007), entrainment of physiological states (e.g. cortisol levels, Saxbe & Repetti, 2010), or action understanding (Ortigue, Patel, Bianchi-Demicheli, & Grafton, 2010). So far, there has been no research investigating 'pure' motor imitation between partners, despite its clear importance to sociocognitive processing. The small number of studies that have focussed on motor imitation have not looked at the imitation of partners, but instead focussed on the interaction between relationship status and the imitation of strangers (e.g. Karremans & Verwijmeren, 2008). Therefore, the extent to which we imitate romantic partners, and what functions imitation serves within romantic relationships, are still unknown.

Here, we directly investigated the extent to which individuals automatically imitate their romantic partners, in comparison to platonic friends of the same gender as the partner, using a well-controlled stimulus-response compatibility paradigm to provide a precise measure of automatic imitation for both relationship types. We also measured participants' attachment style to both their partner and friend to investigate how imitation may be differentially influenced by relationship-specific attachment anxiety or avoidance.

## 2. Material and methods

### 2.1. Subjects

Twenty-one participants (11 females, $M$(age) = 20.4 years, 95% $CI$[19.8, 21.0]) were recruited via online advertisements from the undergraduate student community. Of these, 17 self-identified as White, 1 as Asian/Asian British, 1 as Mixed/Multiple Ethnic Groups, and 2 as of Other ethnic group. Participants were required to have been in a committed and exclusive romantic relationship for >6 months at the time of the study, and to nominate a close friend, of the same gender as their partner, who they had been in a platonic friendship with for roughly the same length of time ($M_{PARTNER}$ = 12.5 months, 95% $CI$[9.9, 15.2]; $M_{FRIEND}$ = 15.4, 95% $CI$ [11.7, 19.2], $t$(19) = 1.85, $p$ = 0.080). All participants who volunteered were heterosexual.

### 2.2. Tasks

#### 2.2.1. Attachment questionnaire

The 'Relationship Structures Questionnaire of the Experiences in Close Relationships-Revised (ECR-RS)' (Fraley, Heffernan, Vicary, & Brumbaugh, 2011) provides two scores, reflecting attachment anxiety and attachment avoidance. Participants completed the questionnaire items twice, in a random order; once referring to their partner, and once to their named friend.

#### 2.2.2. Imitation task

To assess imitation, we used a standard stimulus-response compatibility paradigm (Brass, Bekkering, Wohlschläger, & Prinz, 2000). In this widely-used paradigm, participants are required to perform a simple action, whilst watching another person performing either the same action (a 'congruent' trial) or the opposite action (an 'incongruent' trial). Observing another person performing an action can strongly influence one's own movement execution, as both motor execution and observation activate a common motor representation (see Iacoboni et al., 1999). Reaction times are typically slower on incongruent trials as compared to congruent trials, because in this case the activated motor representation conflicts with execution of the required action. This difference in reaction times between incongruent and congruent trials is taken as an index of automatic imitation.

Here, participants performed a variant of this paradigm, following that of Leighton and Heyes (2010). Trials began with a warning stimulus, showing the partner or friend's face in a 'neutral' (lips relaxed and parted) mouth position. Participants were instructed to adopt this same position at the start of each trial. The partner/ friend then performed either a single mouth-opening or mouth-closing action (the task-irrelevant movement stimulus). At the same moment, a signal (the 'imperative' stimulus, taking the form of a green or red dot) appeared in the mouth region, in response to which participants made their own mouth-opening or mouth-closing movement as quickly as possible (see Fig. 1).

The required movement was either congruent or incongruent with the movement they observed their partner or friend perform. Reaction times were measured using facial electromyography (EMG). The task had a simple 2 × 2 design, with the relationship with the featured face (romantic vs. platonic) and the congruence between the required and observed actions (congruent vs. incongruent) as within-subject factors. Participants completed 128 experimental trials, the order of which were randomised.