In sum, motor mimicry, while a contributor to a fully embodied form of emotion recognition, may not be an essential component when interpreting rich facial expressions in naturalistic contexts, but rather may primarily serve social functions such as indicating sympathy and understanding.

No mirrors for the powerful: Why dominant smiles are not processed using embodied simulation

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Abstract: A complete model of smile interpretation needs to incorporate its social context. We argue that embodied simulation is an unlikely route for understanding dominance smiles, which typically occur in the context of power. We support this argument by discussing the lack of eye contact with dominant faces and the facial and postural complementarity, rather than mimicry, that pervades hierarchical relationships.

Not all smiles are equal. As indicated by Niedenthal et al., some smiles express joy and affiliation, whereas others express dominance. A complete model of smile interpretation needs to examine the different aspects of social relationships that each type of smile facilitates. Armed with this understanding, one can determine how likely it is that embodied simulation would occur in any given context. This commentary proposes that dominance smiles are categorically different from enjoyment and affiliative smiles in terms of their social contexts and implications and are therefore less likely to be processed through embodied simulation.

Social relations vary in both the "horizontal" and "vertical" dimensions (Fiske 1992). The "horizontal" dimension describes the affective or socioemotional dimension, encompassing the valence of feelings and emotional closeness of interpersonal relations (Berger 1994; Osgood et al. 1957). Enjoyment and affiliative smiles, which communicate positive emotions and cooperative social motives, tend to occur when social relations are characterized horizontally.

The "vertical" dimension, in contrast, describes the fact that interpersonal relations can be organized along a low-to-high continuum of dominance, power, status, or hierarchy (Hall et al. 2005). Dominance smiles, which express status and control, facilitate social relations that take place in the vertical dimension of sociality. In this dimension, individuals seek to identify and/or establish their rank in a hierarchy rather than to build social bonds. As a result, eye contact tends to be suppressed, and complementarity of facial and postural expressions between dominant and non-dominant individuals is prevalent. These processes should render embodied simulation a less frequently used method for understanding a dominance smile.

With regard to eye contact, Niedenthal et al. argue that it is a key trigger for embodied simulation. Eye contact is a nonverbal behavior made possible only when two people are gazing into each other's eyes. However, there is significant difference in the frequency of eye contact within vertical and horizontal relationships. Horizontal relationships between mutually dependent individuals facilitate eye contact, which helps communicate positive emotions, seek reconciliation, solicit positive attitudes, and establish intimacy (Edinger & Patterson 1983; Mehrabian 1969). On the other hand, because dominant individuals are less dependent, they tend not to reciprocate the gaze, making it less possible for eye contact to occur.

Niedenthal et al. also suggest that risk or aversiveness is one of the reasons individuals may suppress eye contact. Numerous findings suggest that exchanging eye contact with individuals who display dominance smiles may be deemed too risky and that subordinate individuals may avert their gaze to prevent inappropriately challenging their dominant counterparts. Dominance faces are more similar to threatening or angry faces than they are to happy or sad faces (Lipp et al. 2009; Öhman et al. 2001). Because individuals avoid eye contact with those who display aggression (Ellsworth & Carlsmith 1973), they would presumably avoid eye contact with those who display dominance as well. Similarly, a variety of primate species respond to threat from dominant animals by averting eye contact and even the face all together (Bertrand 1969; de Waal 1989; Van Hooff 1967). Avoiding eye contact removes the threatening stimulation, creating a "cut-off" to reduce tension in the recipient of the threat while sending out a submissive signal (Chance 1962; Redican 1975). Thus, both the individuals producing dominance smiles and the perceivers of those smiles tend to avoid eye contact.

With regard to mimicry and complementarity, we propose that when individuals do smile in response to a dominance smile, they are likely to produce a knowledge-based "complimentary or submissive" smile, instead of an "exact replica" of the dominance smile. Niedenthal et al. state that embodied simulation may still occur when eye contact is suppressed. They argue that individuals can use conceptual knowledge to create facial mimicry, which then activates an off-line simulation, or an as-if loop.

However, there is ample reason to believe that facial mimicry does not typically occur in the presence of a dominance smile. Our argument is bolstered by the frequently observed complementarity, as opposed to mirroring, of bodily expressions in vertical relationships between humans or primates. Humans use smiles not only to express enjoyment, affiliation, or dominance, but also to express submissiveness (Whalen & Kleck 2008). Submissive smiles appease and show deference. Darwin misinterpreted this expression as a true smile, but it is arguably the "descendant" of fear grimace seen in monkeys – subordinate monkeys offer grimace toward dominant monkeys as a signal of submission. Similar findings are found in humans with regard to posture – dominance postures tend to induce submissive postures in others, a process called *dominance complementarity* (Tiedens & Fragale 2003). This research suggests that, when individuals smile in response to a dominance smile, they will produce a submissive smile. To the extent that the entire embodied simulation process relies on facial mimicry, a lack of facial mimicry suggests the absence or partial absence of embodied simulation. The absence of facial mimicry in vertical relationships implies that dominance smiles are less likely to be processed through embodied simulation

We do, however, acknowledge that in certain contexts, presumably what Niedenthal et al. have called *high-uncertainty situations*, dominance smiles may be processed through embodied simulation. When the perceiver is competing for a higher rank, instead of adhering to an established social hierarchy, eye contact and facial mimicry may be observed, and embodied simulation of dominance smiles may occur.

In conclusion, embodied simulation is less likely to be used to process dominance smiles because they typically occur in a social context where eye contact and motor mimicry are minimal. Future research should explore the precise processes used to understand dominance smiles. More broadly, future research on the SIMS model should investigate the role of social context in the use of embodied simulation. It should also discuss whether social contexts affect the types of smiles perceivers produce. Given that hierarchy is the dominant form of social organization (Leavitt 2005; Magee & Galinsky 2008), considering this context will not only help expand an understanding of when embodied simulation is used to understand facial expressions, but will also produce a more complete taxonomy of smiles.