

BBS

Behavioral & Brain Sciences

An International journal of current research and theory
with open peer commentary

Volume 33 | Issue 6 | December 2010 | ISSN: 0140-525X

CAMBRIDGE
UNIVERSITY PRESS

structures be right. Disorders of temporal processing at any level of this system, whether in the perception or the production of smiles, or in passing activation between brain structures, could disrupt this system and hence disrupt emotion understanding.

Consideration of the temporal dimension of such a model may lead to a better understanding of social deficits, such as those in autism spectrum disorders as well as those reported in association with attention deficit disorder. Indeed, Gepner and Feron (2009) describe a theory of temporal processing deficits that may underlie a range of deficits in autism. Is this theory at odds with the mirror neuron hypothesis (e.g., Williams et al. 2001), that a disruption of the motor neuron response to the perception of movement in others underlies social processing dysfunction in autism? Probably not. Both may be components of a larger emotion understanding system that involves multiple structures and their interactions in time. In support of this perspective, Oberman et al. (2009) showed that individuals with autism do indeed show spontaneous mimicry of facial expressions, but that the response is delayed.

Such models inform the development of interventions to help people with social dysfunction. The Niedenthal et al. model, together with theories such as the one proposed by Gepner and Feron (2009), suggests that social processing interventions should tap multiple processes, not individually, but together and at the right temporal intervals. Recent technology for automatically recognizing and responding to facial expression, head pose, and eye gaze in real-time opens up new possibilities for intervention systems that link perception and production on timescales related to social responding (Bartlett & Whitehill, in press; Cockburn et al. 2008). Such technology contributes not only to clinical research, but also to the study of learning and plasticity in perception and production systems, and to understanding the cognitive neuroscience of emotion.

“Smile down the phone”: Extending the effects of smiles to vocal social interactions

doi:10.1017/S0140525X10001469

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Abstract: The SIMS model offers an embodied perspective to cognition and behaviour that can be applied to organizational studies. This model enriches behavioural and brain research conducted by social scientists on *emotional work* (also known as *emotional labour*) by including the key role played by body-related aspects in interpersonal exchanges. Nevertheless, one could also study a more vocal aspect to smiling as illustrated by the development of “smile down the phone” strategies in organizations. We propose to gather face-to-face and voice-to-voice interactions in an embodied perspective taking into account Lakoff and Johnson’s (1980) theory of conceptual metaphors.

Emotional work (also known as *emotional labour*) has been originally defined by Hochschild (1979, p.561) as “the act of trying to change in degree or quality an emotion or a feeling.” It is noteworthy that research in that perspective started some thirty years ago, studying smiles of flight attendants, in a face-to-face social setting. But, following Hochschild’s early suggestion, one

should also consider how the effects of smiles can be effective during phone conversations, in a voice-to-voice setting when no visual information is shared (e.g., Sutton 1991).

Thanks to a substantial amount of field studies, data along that approach became available to support the presence of emotional work within organizations (Fineman 2000), whether for profit (e.g., between a sales representative and a customer; Ashforth & Humphrey 1993; Rafaeli 1989) or not (e.g., between a nurse and a patient; Froggatt 1998). By focusing on interactions and bodily cues such as facial expressions, eye contact, posture, and gestures, the SIMS model encapsulates the different aspects (and roles) a smile can play in all those contexts.

Nevertheless, the visual modality is not the only one through which smiles can be expressed. There is indeed a more vocal aspect to smiling as illustrated by the development of “smile down the phone” strategies in organizations (e.g., call centres). Because of the absence of face-to-face interactions during phone conversations, those “vocal smiles,” including the tone of voice, constitute one of the keys to understanding emotional work in call centres (Belt et al. 2002; Taylor & Bain 1999). These centres are the illustration of the marketing logic known as *Customer Relationship Management*, aiming at developing long-term relationships between companies and their customers (Gans et al. 2003).

This managerial framework clearly constitutes an expression of emotional work centered around smiles down the phone to create empathy between the client and the sales representative (Richardson & Howcroft 2006). It appears that this vocal aspect to smiling is not considered in Niedenthal et al.’s SIMS. For instance, they focus on face-to-face interactions and do not take into account, so far, how efficient smiles can be in voice-to-voice ones.

Previous studies on emotional work complement the perspective offered by SIMS, especially concerning affiliative smiles (see sects. 2.2 and 6.1.1 of the target article). Hence, we suggest gathering face-to-face and voice-to-voice interactions in an embodied perspective – that is, still in opposition to an “amodal” view of knowledge (Lakoff & Johnson 1999). In our view, Barsalou’s (1999) simulator would be enhanced by Lakoff and Johnson’s theory of conceptual metaphors for it would ground SIMS in natural language – although this theory is not limited to the study of words.

Emotional work sheds new light on the metaphors used by actors in organizations. According to Froggatt (1998, p.332), the metaphorical language employed by nurses (e.g., draining and burden) reflects the emotional aspect of their work. Along the same line, Rees et al. (2007) argue for the existence of metaphors in describing the relationship between patients and physicians. Some therefore consider the emotional work of the physician towards the patient as a “metaphoric framework of clinical empathy” (Larson & Yao 2005, p. 1104). Here too, the challenge of creating empathy with others can be satisfied by using metaphors given that empathic processes at stake are at the core of the emotional work of the physician (Larson & Yao 2005).

Hence, metaphors are a way to access the emotional work of the actors in that the expression of emotions is metaphorical by essence. In line with Lakoff and Johnson (1980), Hochschild (2005, p. 344) stresses how metaphors “guide feeling, and, of course, feelings also guide metaphors.” Similarly, when addressing emotional concepts, Lakoff (1987, p. 377) points that: “When we act on our emotions, we act not only on the basis of feeling but also on the basis of that understanding. Emotional concepts are thus very clear examples of concepts that are abstract and yet have an obvious basis in bodily experience.”

Overall, it is noteworthy in this context that the three key elements used in SIMS to decrypt what lies beneath smiling face-to-face (perceptual cues, experiential cues, and conceptual knowledge; see sect. 6) can be found in voice-to-voice contexts.

In our view, perceptual cues can be embedded in tone of voice (see, e.g., Morris & Keltner [2000] about aggressive behaviours in negotiation) and experiential ones in the words employed (e.g., Rafaeli & Sutton 1990). Despite the absence of eye contact, other components of emotional labour (greeting, thanking, and smiling; Sutton & Rafaeli 1988) are clearly observable in voice-to-voice interactions.

Conceptual metaphors being essential to express emotions (Kövecses 1990; 2008; Lakoff 1987; 1993), a conceptual knowledge of emotions is metaphorical. Of course, a conceptual metonymy such as FACE STANDS FOR FEELINGS (Yu 2008, p. 251; see also, Lakoff 1993, pp. 34–35) illustrates the importance of face-to-face interactions in emotions. But smiles participate to the bodily experience of emotional concepts (e.g., smile and happiness, Lakoff & Johnson 1980, p. 18; see also, Peña Cervel 2001, p. 258). To a larger extent, THE BODY IS A CONTAINER FOR THE EMOTIONS (Lakoff 1987, p. 383).

Conceptually, the link between the metaphorical approach to emotions and emotional work becomes tighter when one considers the role of relationship metaphors in voice-to-voice interactions. Although one has to be careful not to conclude that the emotion and the human relationship domains can be conflated, human relations are conceptually close to that of emotions (Kövecses 2008, p. 387).

Hence, regardless the modality (visual or vocal), the perception and the understanding of a smile remain embodied. Moreover, the emotional work perspective provides another way to identify “whether a smile is true or false” (sect. 6.2).

For if the issue of emotional work is to make the sales representative’s smile sincere to satisfy the consumer (Grandey et al. 2005), this smile is not always perceived as such. The employee is not necessarily experiencing the emotion conveyed by the expressed smile (Pugh 2001) as it sometimes seems insincere (and therefore false; sect. 2.1) in the customer’s eyes. Over the phone, an insincere tone of voice can even lead to a “phone rage” of the customers, i.e., “people losing their temper on the telephone” (see Deery & Kinnie 2002, p. 8, reporting a study conducted in 1997 by Reed Employment Services on more than 500 organizations in the United Kingdom).

In summary, emotional work permits one to introduce concepts like *sentimental work* (how people use their own emotions to influence someone else’s emotions; Zapf 2002) and *emotional dissonance* (how people experience the gap between emotions that are felt and those which are displayed in a given situation; Hochschild 1983, p. 90). Together with SIMS, emotional work therefore leads to a more complete approach to smiling that encapsulates the vocal modality.

Expressive smiles or leucosignals?

doi:10.1017/S0140525X10001627

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Abstract: The assumption that a complex and fuzzy notion like *smile* can be the basis of a scientific, rather than semantic, inquiry can only lead to confused and inconclusive results. It would be more productive to start with the well-defined and measurable patterns of the clearly visible contrasts that are produced on the human face by various muscular contractions around the white patches formed by the sclera and the teeth. These features are universal, whereas a common word, in whatever language, is necessarily ambiguous, culture-dependent, and historically rather than biologically determined.

To investigate facial signaling, the best strategy is to focus on the visual features that are obviously adaptive in a species in which territoriality and ranking are prominent. What is adaptive in

facial signaling is the correct reading of conspecifics’ intentions *at a safe distance*. The signals must be robust if they are to be adaptive for both the emitter and the receiver. One cannot afford to hesitate whether an approaching outsider or a group member is friend or foe. But jumping too fast to the defensive in the presence of ambiguity can be equally ill-adaptive in species depending on cooperation which must have evolved unambiguous peace-making signals. Natural selection has favored signals based on the chromatic opposition: white versus any color of the spectrum. White ensures optimal reflectance even in reduced luminosity; the color upon which white patterns are produced by muscular contractions can vary indefinitely under other evolutionary forces, from camouflage to ostentatious handicap. Chemical and acoustic signaling is efficient in some environments, but, for open space species, chromatic signaling is the medium of choice, as it covers at the speed of light the distance required for fight or flight decisions. Tigers sport tufts of white hairs on the back of their ears, which they twitch to produce white flashes toward approaching conspecifics to warn them of their alertness to the situation. Similar contrasts are exploited in the baring of teeth in canines and in the permanent status display of the tusks in elephants. The rich muscular system of the face in the primates makes it possible to vary the chromatic patterns, thus generating a range of *leucosignals* (from Greek *leukos* = brilliant white).

The human face makes constant use of the contrasts between the white patches of the sclera and the teeth, and the color of the facial skin (Bouissac 2001; 2005). These signals are well-defined, measurable, and subject to experimental manipulations. Muscular contractions create typical configurations of highly visible white patterns, which combine information pertaining to the gaze with information on the status of the jaws (relaxed vs. tense or clenched). The foldings of the skin can be relevant indicators, but can be only visible at a much closer range than the salient leucosignals and their well-defined morphologies. The range of data processed by Niedenthal et al. presupposes close range perception, while an inquiry into smiles as leucosignals is congruent with interaction at greater distances. The primate brain’s face detectors are fast processors that must lead to instant decisions based on unambiguous signals (Tsao & Livingstone 2008).

It can be predicted, as Niedenthal et al. show, that leucosignals involve the amygdala, since previous evidence indicates that its activation correlates with processing social signals such as facial fear-generating information, including threats linked to social ranking (Buchanan et al. 2009, pp. 289–318). Neurons in the amygdala are indeed responsive to faces, particularly in a hierarchic group (Leonard et al. 1985; Whalen et al. 2009), in which the white of the eyes and the teeth form distinct visual parameters (compare the ratio holding between sclera, iris, and eyelids in the fear face with the same ratio in the angry face). In all social species, the most dangerous enemies are conspecifics. Other predators of humans can be more easily manipulated or controlled, because their semiotic mismatch offers more windows of opportunity once it is deciphered. But in the human primates, peace-making is equally vital. It could thus also be predicted that the same neuronal systems would instantly switch from high alert to pleasure arousal or, at least, be processed by contiguous neuronal systems. Indeed, nothing is more threatening for a human than a new face on which intentions cannot be read. The production of friendly leucosignals may suddenly defuse the tense state of fight readiness and trigger the dopamine flow that stimulates the reward centers (Schultz 2007). All this is consistent with the data that are marshalled in Niedenthal et al.’s article without having to hypothetically construct the cognitive and emotional embodiment detailed by Niedenthal (2007). This is not to deny that such embodiment may occur as a secondary effect with some adaptive consequences, but simply to point out that it is too costly in time and energy to be the primary source of vital decisions such as to

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The Simulation of Smiles (SIMS) model: Embodied simulation and the meaning of facial expression

Paula M. Niedenthal, Martial Mermillod, Marcus Maringer, and Ursula Hess

To appear in Volume 34, Number 1 (2011)

The evolution and psychology of self-deception

William von Hippel, University of Queensland, and Robert Trivers, Rutgers University

We argue that self-deception evolved to facilitate deception of others. We first describe how self-deception serves this goal and then discuss the non-unitary nature of the mind and how different types of psychological dualism enable the same individual to be both deceiver and deceived. Next we describe varieties of self-deception, evidence for these different varieties, and what we can infer about the intended interpersonal versus intrapersonal goals of these self-deceptions. We then consider the question of the level of consciousness at which the self is deceived. Finally, we contrast our evolutionary approach to self-deception with current theories and debates in psychology and consider some of the costs associated with self-deception.

With commentary from A Bandura; ML Brooks & WB Swann; DM Buss; D Dunning; LC Egan; K Frankish; U Frey & E Volland; E Fridland; DC Funder; SW Gangestad; G Gorelik & TK Shackelford; S Harnad; SJ Heine; JY Huang & JA Bargh; N Humphrey; P Johansson, L Hall & P Gärdenfors; DT Kenrick & AE White; EL Khalil; P Kramer & P Bressan; R Kurzban; HJ Lu & L Chang; R McKay, D Mijović-Prelec & D Prelec; H Mercier; S Pinker; A Preti & P Miozzo; DL Smith; T Suddendorf; A Troisi; A Vrij

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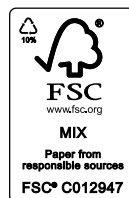
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