

emotion (Magnee et al. 2007). A recent study showed that giving ASD participants a task of recognizing expressions (rather than just “watching them”) led to a comparable level of mimicry as the typical group, even though ASD mimicry was slower (Oberman et al. 2009). In short, it appears that “task engagement” is necessary to trigger mimicry in ASD individuals.

But what is “task engagement”? What factors turn on and off embodied simulation? This is not simply the question of attention and general motivation. After all, all studies ensured that individuals stay “on task.” One idea is that factors like “allocentric versus egocentric perspective,” “family versus stranger,” and “emotion identification versus observation” work similarly to “eye gaze,” discussed in the target article. Specifically, all these factors switch the processing strategy from the disembodied, “pattern-matching” strategy, to one that presumably requires access to the underlying states of the individuals modeling the expressions or actions.

Of course, this idea needs to be tested directly. Here is one possibility. It is known that in perceiving expressions, ASD individuals rely more heavily on a “cold” rule-based strategy (Rutherford & McIntosh 2007). As a result, they are more likely than controls to accept as realistic the exaggerated images of expressions (smiles that are stronger than real smiles), presumably because those expressions represent “best fits” to the rule. However, this “rule-based” processing should diminish when they are dealing with faces that smile and look “at them” and are produced by family members, rather than total strangers. Importantly, the task needs to be realistically challenging – it cannot be easily solvable by a simple pattern-matching strategy (e.g., recognizing a distinct expression containing pure happiness, or a simple emoticon, like the Walmart’s smiley). Under such conditions, the embodiment (mimicry) should contribute to emotion recognition. This is critical, because as Niedenthal et al. note, mimicry contributes to performance of typical participants only when the perceptual task is hard, the participant cares, and the subjective emotional response is a useful signal for the recognition task (Oberman et al. 2007).

I hope that this exchange inspires fruitful research that will benefit not only theoretical understanding of emotion processing, but also better research on atypical social functioning (see Winkelmann et al. [2009] for further discussion).

## Authors’ Response

### The future of SIMS: Who embodies which smile and when?

doi:10.1017/S0140525X10002748

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**Abstract:** The set of 30 stimulating commentaries on our target article helps to define the areas of our initial position that should

be reiterated or else made clearer and, more importantly, the ways in which moderators of and extensions to the SIMS can be imagined. In our response, we divide the areas of discussion into (1) a clarification of our meaning of “functional,” (2) a consideration of our proposed categories of smiles, (3) a reminder about the role of top-down processes in the interpretation of smile meaning in SIMS, (4) an evaluation of the role of eye contact in the interpretation of facial expression of emotion, and (5) an assessment of the possible moderators of the core SIMS model. We end with an appreciation of the proposed extensions to the model, and note that the future of research on the problem of the smile appears to us to be assured.

### R1. Introduction

One of the problems with researching smiles in humans is that humans use language that communicates their complex causal attributions for smile behavior, and thus for its meaning. This fact, we believe, has strongly influenced the history of the scientific study of the smile in social psychology. This fact has also led us astray in some ways. The prime example of a complex attributional judgment is that a smile is “false” (versus “true”). The spontaneous use of these labels by observers has strongly influenced the course of social psychological research on the smile. Yet, even though researchers can create stimuli in the laboratory that have the properties of smiles that are labeled, perhaps even quite universally in laboratory experiments, as “true” versus “false,” (or more or less genuine) it is probable that these are not the expressions occurring in daily life that are judged “true” and “false.” Hence, we agree strongly with **Fernández-Dols & Carrera** that the “true” versus “false” distinction is not the best way to carve up the smile landscape (see also Hess & Kleck 1990). **Bouissac** clearly agrees with this point.

Indeed, when Ekman and Friesen first studied the importance of the Duchenne marker (e.g., Ekman & Friesen 1982), they defined as “false” smiles the expressions made by individuals who were effortfully trying to deceive. Specifically, the individuals whose smiles were ultimately the subject of study were trying to cover up distress in response to an anxiety-producing film or situation, with the goal of convincing perceivers that they were actually experiencing positive affect. When individuals were engaged in this deception, there was little evidence of the Duchenne marker. Ekman et al. (1990) further showed that EEG recordings of individuals who expressed non-Duchenne smiles revealed evidence of negative affect or of conflict (Wacker et al. 2010). In any event, the conclusion was that smiles called “false” were sometimes associated with the subjective experience of negative affect in the smiler.

But there would probably be no agreement about the attributed causes of “true” and “false” universally. In recently collected cross-cultural data, one of our North American female respondents reported that even if she is having a bad day when at her job, she wants people to feel good, and so she smiles. Is this a false smile or a true smile? It is false in so far as it does not reflect how she “feels in general today,” and so perhaps some individuals or cultures would call her smile “false.” But it is true in that she has a positive social motivation. She thinks those smiles are “true.”

Lurking under the “true” and “false” distinction are therefore three plausible categories of attribution upon

which the judgment relies: the feeling state of the smiler (positive, neutral, negative), the intended outcome of the smile interaction for the smiler (positive, neutral, negative<sup>1</sup>) and the intended outcome of the smile interaction for the perceiver of the smile (positive, neutral, negative). The relative weight of each of these dimensions in determining the judgment that a smile is “false” versus “true” probably varies across culture. Our instinct, based on responses to some of our open-ended questions, is that in North American culture the attribution that the smiler intends harm to the perceiver of the smile is the dominant information that drives the “false” judgment. However, in other cultures, perhaps in Europe, attributions based on other dimensions are also likely to be equal grounds for the judgment of “false.”

So, all we really know about the terms “true” and “false” as regards smiles, is that they are used. We also know that we can construct smiles that look more or less true and false, and receive those of meaning judgments judgments. But we do not know more than that, and perhaps that is not the best way to go. Indeed, the SIMS was not developed to distinguish between the type of person or culture that would judge a smile to be “true” or “false.” That is what our own cross-cultural data collection is about. The SIMS model is an attempt to define the behavior and brain processes that support certain general classes about smiles. As regards the judgment that a smile is “false” in the core model, we argued that dominance smiles are not likely smiles of positive affect; and so, depending upon the culture, the simulation of a dominance smile may usually support a judgment of “false” (i.e., in particular, when the judgment scale that is used is a scale of “authenticity” or “genuineness”). But any attention we paid to the “true” and “false” distinction was meant to lend coherence to the literature. As stated, we believe that a different approach to carving up the smiles space is more useful, and that is why we promote a functional account of smiles. A parallel semantic analysis would yield the most convincing knowledge base, of course (as suggested by **Bouissac**).

## R2. Functional arguments

Our ethologist commentators such as **Mehu & N’Diaye**, **Ohala**, as well as **Sauter & Levinson** and **Centorrino, Djemai, Hopfensitz, Milinski, & Seabright (Centorrino et al.)**, contest in different ways our use of “functional” language in defining the three major smile types of interest to the SIMS. They also bemoan our lack of data (so do we, but we are working on it). It is therefore our burden, first, to define “functional” in our account. Further discussion of our typology follows in section R3.

For ethologists, functional is synonymous with “adaptive.” But it is also the case that the discussion of the relationship between function and form, among ethologists and evolutionary theorists, is not settled or consensual. The debate is, in fact, a quite lively one (e.g., **Allen & Bekoff 1995**; **Owren & Rendall 2001**). We are aware that it is reckless to make functional (i.e., adaptive) arguments about any species that is living in a habitat in which it did not evolve, such as human beings living in suburban environments (**Moffatt & Nelson, 1992**). Hence, we have been most influenced by emotion researchers who

use the language of functionalism in a way that is relevant to humans and was initially motivated by responses to the idea that emotions disrupt reason and are generally harmful psychological events (**Niedenthal et al. 2006**). These researchers include **Frijda**, **Scherer**, **Oatley**, **Fischer**, **Haidt**, **Tracy**, and **Keltner**, among many other modern emotions researchers.

These researchers’ definition of function with regard to emotion and emotional expression is consistent with **Keltner and Gross (1999)** or **Scherer (1987)**, who hold that emotions are solutions to problems and opportunities related to physical and social survival. Those authors further state “Functional ascriptions, therefore, refer to the history of a behavior, trait, or system, as well as its regular consequences that benefit the organism, or more specifically, the system in which the trait, behavior, or system is contained” (**Keltner & Gross 1999**, p. 469).

Social functionalist accounts propose specifically that two very important challenges for human survival include (1) attachment to caretakers and potential mates, and (2) integration into groups. Another important challenge is the establishment and maintenance of social hierarchies. The assumptions are that human survival depends upon group membership and that long-term group functioning requires effective leadership (**Keltner & Haidt 1999**). The importance of the smile as a foundational social glue used in the solution of these problems is made even more precisely by some of our own commentators. For example, as **Swain & Ho** note, the baby’s smile is a highly physiologically rewarding stimulus to a parent. It helps the parent hang in there. Additional research, reported by **Swain and colleagues (e.g., Lenzi et al. 2009; Strathearn et al. 2009; Swain 2008)**, provides even more information about the circuits by which the brain supports responding to attachment objects in particular.

A social functional account does not shun comparative psychology or ethology, however, and we rely on it for our account of the landscape of the human smile. Indeed, as **de Waal (2003)** has suggested, Darwin was on to something when he focused on facial expression of emotion as a good candidate test of his evolutionary theory. Along with **de Waal**, we consider the primate and comparative psychology literatures to be useful for motivating our distinction among smiles as conforming to enjoyment smiles, affiliative smiles, and dominance smiles (noting that these are names for expressions that yield classes of human attributional judgments that can be summarized as reflecting enjoyment, affiliation, and dominance).

## R3. Our smile typology

But there are a number of conceptual problems to be resolved, especially about the proposed category of dominance smiles. Some of those issues require collaboration with ethologists. One question has to do with the evolution of displays of teeth in primates and the role of teeth display in human smiles. There has been confusion in this regard because of the initial reliance on the study of rhesus macaques, which have a strong linear, hierarchical societal structure. Referring to Darwin, **de Waal (2003)** writes:

For example, he noted that the bared-teeth expression . . . by a black Sulawesi macaque, occurs when the animal is pleased to

be caressed. Retraction of the lips to expose both rows of teeth is indeed a relaxed, friendly expression in this species as opposed to the same expression in most other macaques, in which it signifies submission. How do we know this? Quantitative analysis of natural social interaction sequences among Sulawesi macaque demonstrates that the bared-teeth display predicts the onset of affiliative contact between sender and addressee, hence that it likely is associated with a positive social attitude. In these macaques, teeth-baring often occurs mutually between individuals. In the better known rhesus macaque, in contrast, teeth-baring is given exclusively by subordinate to dominant individuals – hence never mutually – and is a common response to threats and intimidations . . . The colloquial term “fear grimace” for all teeth-baring expressions derives from the familiarity of researchers with the rhesus monkey – the most common laboratory primate in the West – rather than from a comprehensive look at the primate order, in which this expression has a variety of meanings. (de Waal 2003, p. 10)

One of the important points and reasons for quoting this passage at length is to note that the use of teeth in a gesture such as the smile, and therefore the meaning(s) of the smile, varies even within closely related primates and depends upon the type of social structure in which they live. We can be motivated by this comparison, noting that the showing of teeth in the gesture called the smile is very complex. This variation exists even across human cultures. For instance, some Asian cultures teach the covering of the teeth during smiling and laughing, whereas other cultures do not.

The possibility that the same expression, such as the smile or the laugh, can have different meanings across and within cultures is further expressed by this quote:

The laughing expression of apes is clearly homologous with that of our own species: the laugh derives from a widespread mammalian play expression. As we have seen, however, homology does not necessarily imply that the expression functions in the same way in all hominoids (i.e., humans and apes). In bonobos and chimpanzees laughing is closely tied to play, whereas in our own species it occurs under a much wider range of circumstances. Playful interaction is obviously included and can be considered the original laughing context, but we use the same expression also in bonding (i.e., “laughing with”) and, sometimes, as a hostile signal (i.e., “laughing at”) (de Waal 2003, p. 17).

These three categories of laughter conform to our own typology for the smile. Furthermore, we suggest that the relationship between laughing and smiling in humans may be a closer one than it is for other primates. Indeed, there may be a relationship between the human smile and the show of teeth as in threat, as suggested by **Ohala**; however, it seems likely, as we think may be implied by the previous quote, that the different human smiles have their basis in laughter (which also shows teeth). This does not deny the possibility, discussed by **Liu, Ge, Luo, & Luo (Liu et al.)**, that some cultures hide the teeth possibly to avoid miscommunication of threat or else a violation of an undesired association to animals.

Among the many ways of validating this smile typology, we have recently begun a reanalysis of data collected for other theoretical purposes (Deborah Prentice, personal communication). The experiments in which the data were collected involved the presentation of norm-conforming and norm non-conforming oral statements by individuals who were ostensibly peers (students at the

same university) of the participants. As the participants listened to the norm conforming and non-conforming statements, their faces were recorded by video, and four facial muscles were recorded with electromyography techniques. In addition to measures of the face, measures of the participants’ moods and their reactions to the peers whose comments they were listening to were also taken. One of the most striking things is that when listening to both conforming and non-conforming statements, participants smiled. The difference was that their perceptions of the non-conforming peers were negative. Their smiles were smiles of derision, not affiliation. We can test this impression by relating the use of specific muscles to the feelings and the judgments of the participants to ask whether individuals smile both out of affiliation and superiority and whether those smiles have different properties. Maybe different muscles are employed, and maybe the body is used differently (which we can code from the videos).

Evaluating the characteristics of smiles associated with judgments of enjoyment, affiliation, and dominance, will force us to push the SIMS to be more specific in its statements of the brain systems that ground smile meaning, of course. In their commentary, **Mann & Choe** argue that, although SIMS holds that the meaning of smiles can be grounded in embodied simulation, it is not specific enough about which sensory-motor systems ground the meanings of smiles (a related argument is presented by **Chang & Vermeulen**). Mann & Choe propose that, although some meaning can be captured by the facial sensory-motor system, important aspects of smile meaning cannot be captured without grounding smiles with respect to high-level actions making up the behavioral context.

**Mann & Choe** indeed suggest an interesting way to ground the meaning of smiles in higher-level actions of the perceiver of the smile. They propose that when a perceiver sees an enjoyment smile, the objective is to maintain the enjoyment smile (maintain sensory invariance), for instance, by telling a joke. The meaning of a smile can then be grounded in the (higher-level) actions of the perceiver, which maintain the smile in the sender. In our target article, we focused mainly on the affective feedback of the facial sensory-motor system as a consequence of facial simulation. In that case, the meaning of the smile is grounded in the affective output of the simulation. In addition, we argue that the meaning of a smile can be grounded in the social and behavioral context in which a smile occurs. For example, a smile shown by a salesclerk who tries to sell a pair of shoes is seen as less genuine compared to a smile that is shown by a person who just sold a pair of shoes (Maringer et al., in press). Hence, similar to what Mann & Choe propose, we do argue that the meaning of smiles can be grounded in high-level actions of the sender (rather than the perceiver). Sensory invariance in this case might relate to the different contexts and behaviors that are likely to be accompanied by similar facial expressions. In this way, the commentary by Mann & Choe has extended our link between meaning of smiles and behavioral context of the sender to the link between meaning of smiles and the behavioral context of the perceiver. We believe that both behaviors (perceiver’s and sender’s behaviors) can be used to ground meaning of facial expressions.

Along with refining and validating the smile typology, it will be pertinent to specify the nature and role of

facial mimicry in classification, recognition, and interpretation of these facial expressions. Although we do believe that the existing data suggest a role for mimicry in these processes, along with **Hamon-Hill & Barresi** we feel that the role is far from clear. In addition to the problems raised by their commentary, even the question of the potential roles of motor efference versus reafference is still an open one.

#### R4. Top-down processes in smile interpretation

Commentators **Evers, Noens, Steyaert, & Wagemans** (**Evers et al.**); **Lakens & Ruys**; **Lobmaier & Fischer**; and **Morsella, Montemayor, Hubbard, & Zarolia** (**Morsella et al.**) worry in different ways about integrating top-down processes and individual differences in SIMS. Fortunately, the former is an important element of the model, and we have already advanced some ideas about the latter, which we elaborate upon in the section 4.

Top-down processes include the application of beliefs, stereotypes, expectations, and motivated biases. We have noted that such processes can provide important input into the interpretation of smile meaning. For example, **Maringer et al.** (in press) have shown that when people believe smiles are not genuine read-outs of positive feeling, these beliefs influence judgments of how genuine a given smile is (in a particular culture) when mimicry is inhibited. In fact, **Hess et al.** (1998) found that just evoking the notion that expressions may not be genuine, by asking participants to rate their genuineness, eliminated mimicry to the same expressions that were mimicked when participants rated the emotion expressed. Further, **Halberstadt et al.** (2009) have shown that when individuals believe that an ambiguous facial expression is actually communicative of a specific emotion, they later mimic the ambiguous expression in terms of that specific emotion.

Granted that top-down processes affect the lower-level perceptual and motor processes involved in encoding facial expression and deducing meaning, in our view the problem is how top-down and bottom-up processes communicate. Our solution was to suggest that both concepts and emotions can be grounded in states of sensory-motor systems and that interactions between these procedures arise naturally from this account. As we noted in section 5, paragraph 4,

the embodied account provides a natural way to link conceptual knowledge about smiles and the related social situation to the actual perception of smiles. Rather than assuming that a smile activates an amodal knowledge structure to represent its meaning, the embodied simulation account proposes instead that a smile triggers a simulation of a smile experience that includes emotion, motor activity, and somatosensory experience [...]. Once this simulation becomes active, it provides a conceptual interpretation of the perceived smile, going beyond the information given to place it in a context.

Of course, when an individual is not behaviorally interacting with a smile (eye contact and mimicry are inhibited), it is certainly possible that conceptual knowledge represented in language does all of the work (**Boroditsky & Prinz** 2008). For example, if one believes that **Tony Blair's** smile is a smile of dominance, then without paying any attention to the smile whatsoever, one is

quite capable of applying that concept as expressed in language.

In fact, as we note in discussing the SIMS model, there are a number of different ways that can be used to decode the meaning of expressions, and situational knowledge, or the knowledge about the emotionality of members of a group (see **Hess & Kirouac** 2000; **Hess et al.** 2009b), can replace simulation in situations where gaze contact is inhibited. Yet, even in such cases, simulation may still play a role. For example, **Houde et al.** (2009) have demonstrated that providing observers with verbal labels describing the emotional state of a person who shows a neutral expression, elicits emotion congruent facial expressions – in essence, mimicry – in the observer.

This issue is also addressed in research on disorders such as autism and of culture, where it is pertinent to establish which of the critical behaviors – eye contact and facial mimicry – is present or absent for those populations, and what beliefs are held, ready to be applied instead of or together with an embodied simulation. Note also that eye contact was proposed as a sufficient and developmentally primary trigger to embodied simulation of the smile. Research on individual differences will also need to determine other sufficient triggers of embodiment (such as motivation; see **Mondillon et al.** 2007). This is particularly true if it turns out to be the case that perceivers of dominance smiles tend not to make eye contact (even if ever so fleetingly) with those who display such expressions, as is asserted by **Huang & Galinsky**.

**Winkielman**, who focuses specifically on research on autism, rightfully points out that we are a long way from understanding the conditions that tend to favor an embodied simulation strategy for processing facial expression of emotion. We agree that the importance of successful communication, as sometimes determined by the significance of the relationship between the expresser and the perceiver, is a factor that determines the type of processing that grounds judgments of smile meaning. Individuals may devote more resources to understanding those with whom they have an intimate or interdependent relationship (e.g., **Zajonc et al.** 1988). But a rigorous and theoretically concise account of why that is so will be required. One avenue is to integrate some of the insights from the commentary by **Vigil & Coulombe**, particularly as regards the role of attachment in these processes. We do note that according to **Vigil & Coulombe** our central claim is that “simulative sensitivities modulate the auto-etic representation or epistemic ‘meaning’ of other people’s facial expressions”; however, we would not articulate the central claim of our target article in that way as the statement only addresses a small part of the model. Furthermore, like **Winkielman**, we do believe that the role of mimicry in interpreting the meaning of facial expression has received some impressive supportive evidence (e.g., from **Maringer et al.**, in press; discussed earlier and in the target article).

#### R5. What is it about eye contact?

Aside from our proposed functional categorization of smiles and its links to social-attributional judgments, the idea that eye contact has developed as a developmentally

basic and subsequently sufficient trigger of embodied simulation gave rise to the most energetic discussion. There is much to work on here.

**Senju & Johnson**, for instance, have suggested that the SIMS model be integrated with their fast-track modulator (FTM) model. The FTM model holds that eye contact is mediated by a subcortical face detection pathway hypothesized to involve the superior colliculus, pulvinar, and amygdala (Senju & Johnson 2009). The root of this subcortical pathway is assumed to be constituted of alpha ganglion cells, at the origin of magnocellular layers and LSF subsequent cortical pathways, which are very fast but provide only low spatial frequency (LSF) visual information. This subcortical pathway has been confirmed for auditory information (Campeau & Davis 1995; Doron & Ledoux 1999) and visual information (Doron & Ledoux 1999; Linke et al. 1999; Shi & Davis 2001) in rats.

Concerning humans, different studies suggest the existence of a preferential link between LSF information and the emotional system, particularly threat detection. This plausible preferential link was obtained on the basis of neuroimaging (Morris et al. 1999; Pourtois et al. 2005; Vuilleumier et al. 2003), neural-network modeling (Mermillod, in press a; Mermillod et al. 2009), and behavioral experiments (Bocanegra & Zeelenberg, 2009; Holmes et al. 2005; Mermillod et al., in press b). However, whereas these studies hint at a preferential link between LSF visual information and emotional processes, possibly occurring at the level of the amygdala, they do not constitute formal evidence for the subcortical pathway assumed in Ledoux's (1996) model. Therefore, it is speculative to incorporate this pathway in the SIMS model at this time.

However, this is obviously a very interesting way to develop the SIMS model and, more specifically, the complementarities between fast and automatic processes of relevant emotional stimuli in the environment, potentially operating at the level of subcortical structures and more complex associative processes occurring at the level of cortical areas. The interesting contribution of the FTM model is that it specifies the relationship between early visual processes and subsequent emotional processes related to eye contact. This link between perception and emotions should therefore be investigated.

Similarly, the question of automatic and unconscious response to eye gaze was raised by **Chatelle, Laureys, Majerus, & Schnakers (Chantelle et al.)** with regard to severely brain-injured patients. These commentators propose that minimally conscious state (MCS) patients could be differentiated from vegetative state (VS) patients based on eye gaze. They propose that intentionality and different level of consciousness could be assessed through eye gaze. For our model, this raises the question of the consciousness of different level of processing. In relationship with the previous comment proposed by **Senju & Johnson**, we suggest the possibility of a direct, automatic, but also unconscious subcortical pathway for eye gaze orientation. This hypothesis can be supported by research on emotional blindsight (de Gelder et al. 1999; Pegna et al. 2004), showing that hemianopic patients might be able to detect emotions presented in their blind visual field above chance (de Gelder et al. 1999). An important point is that these patients are not conscious of this blind perception and feel that they respond at chance level. In other words, this subcortical pathway (if it exists) seems to

operate beyond the scope of consciousness. Combining this finding with the FTM model (Senju & Johnson 2009), we can assume that automatic but uncontrolled eye gaze direction could be directed by subcortical structures like the superior colliculus, the pulvinar, and possibly the amygdala for automatic responses to environmental stimuli in VS patients, whereas MCS patients might be able to use more neural resources involving cortical and other subcortical structures. As suggested by Chatelle et al., we believe that investigation of the neural underpinnings of directed versus automatic eye gaze in VS versus MCS patients could be a very interesting way to investigate the neural basis of consciousness.

Finally, as highlighted by **Chakrabarti's** comments, a model of smile perception involving the question of eye contact necessarily raises the question of parsimony. More than 30 emotional states can be associated with smiles (Golan & Baron-Cohen 2006), and it would be rather implausible to associate one neural module per type of emotional feeling. The goal of the SIMS model, however, was to propose general principles, associated with different neural pathways, to account for the emotional processing of smiles. We hope that this parsimonious approach, based on scientific evidence in support of our new theoretical framework, will be able to account for the larger set of empirical data relating to smiles. Among them, and as proposed by Chakrabarti, we will have to determine whether not only does eye contact act as a trigger for subsequent amygdala activity, but, conversely, amygdala activity can boost the search for relevant social cues and, therefore, eye contact. Chakrabarti also raises the question of determining whether embodied simulation processes are emotion specific. The SIMS model focuses on smiles, but as noted in the target article, we assume that similar processes are likely to occur in the recognition of other emotional expressions.

## R6. Moderators and individual differences

The SIMS model was developed with the goal of defining general processes by which individuals attribute meaning to a smile. In particular, the model highlights the role of eye contact, mimicry, and the induction of specific brain states. However, along with our commentators, we encourage discussion of the potential impact of individual differences. Foremost amongst these are the differences of gender and culture, as emphasized by several commentators (**Bouissac; Caldara; Conty, Grézes, & Sander (Conty et al.); Liu et al.; and Simpson & Frigaszy**).

The current development of the SIMS model does not discuss those influences in detail, even though we specifically note that "it is essential to note that cultural differences may modulate our account." Clearly, we agree with the notion that individual differences have a role to play and can be expected to moderate some of the processes we discuss. As **Covas-Smith, Fine, Glenberg, Keylor, Li, Marsh, Osborne, Soliman, & Yee (Covas-Smith et al.)** note, cultural differences in eye contact preferences should entrain differential predictions based on the SIMS model. The question then arises – do we know enough about these differences to accurately predict their effect? And here the issue becomes rather

more complex. **Caldara** provides evidence that members of collectivist cultures fixate faces around the nose area – that is, do not actually seek full eye contact. By contrast, Yuki et al. (2007) note that Japanese participants weigh eye information more heavily than mouth information, and similar data are reported by **Liu et al.** as being under review. Just this short summary of data presented in the commentaries shows that at this point we may not be able to predict the impact of culture on eye gaze and, consequently, on its role for smile interpretation. What is needed are intercultural studies focusing not only on emotion decoding accuracy but also more precisely on the process of interpreting facial expressions. The SIMS model provides a framework for such research.

For example, Hess and Kirouac (2000) have proposed that when individuals do not know each other, they tend to resort to stereotype knowledge about social group members when decoding facial expressions. We have already considered whether this is a general rule or whether this fact indeed varies across culture; and how this fits with the SIMS. One of our major cultural hypotheses relates to the processing of in-group versus out-group facial expressions (e.g., Niedenthal & Maringer 2009). The foundational history of some societies – sometimes called “settler societies” where the focus is on the fact that a land occupied by an indigenous peoples was taken over and settled by people from other cultures and nationalities – may strongly influence the key behaviors of SIMS.

The other individual difference highlighted by commentators is that of gender differences (**Simpson & Frigaszy**). Should we expect embodiment to play a different role for men and women? Simpson & Fragaszy point out that there are differences between men and women in emotion recognition accuracy in some studies and these are positively correlated with looks to the eye (Hall et al. 2010). They also note that women who have been given testosterone show reduced mimicry (Hermans et al. 2006). In fact, a number of top-down processes, such as motivation and the observers’ own beliefs and values, are likely to modulate behaviors linked to mimicry and contagion (Hess & Fischer, under review). In this context it is also interesting to note that men and women differ in their capacity for interoception (e.g., Harver et al. 1993); and it has been suggested that women are more likely to base at least the perception of their own emotions on social context cues than men are (Pennebaker & Roberts 1992). This opens the door to the possibility that women may also use social context cues and emotion knowledge to a larger extent when considering the meaning of smiles. These issues are certainly important and should be investigated in the framework of the SIMS model. Yet, the factors discussed above only affect quantitative aspects of the process and do not require the addition of new processes into the SIMS model.

## R7. Extensions

Some of our commentators have suggested ways to push SIMS as we engage in the process of testing and refining the model (**Alibali & Hostetter; Bartlett; Basso & Oullier; Briñol, DeMarree, & Smith [Briñol et al.]; Kiverstein & Zamuner**).

For instance, **Bartlett** argues for the need to consider time. By “time,” she means that part of the development of a complex model that integrates behaviors and multiple brain circuits involves a specification of the timing of these interactions and the neural activations. Silvan S. Tomkins was an early advocate of the notion that emotions are defined in part in terms of the timing of their onset and their duration (Tomkins 1962; 1963). These temporal components constitute the very form of the emotion. We agree that timing principles will be an important part of the model and that timing gone awry will be at the basis of dysfunction in emotional information processing.

Another extension is proposed by **Alibali & Hostetter**, and also by **Basso & Oullier**, who point to the fact that emotions are also expressed in gesture and in the voice. Embodied simulation of these parts of emotional experience will also play a role in emotional information processing per se and will interact with the simulation, and therefore, the understanding of facial expression. Different weights and roles of the many cues to emotion can in part be determined by examining the cases of mismatch between one (facial expression) and the other (emotional gesture). Another important question will be why emotion is communicated often in more than one expressive channel. Why do we have emotional gesture and prosody if we already have the exquisitely nuanced face? We feel that the SIMS model presents a valuable framework for the study of these and other pertinent processes.

## NOTE

**1.** An intended negative outcome for the smiler would be unusual and probably related to a non-typical state, as one smiles before committing an act that one knows will be punished or will lead to self-harm.

## References

[The letters “a” and “r” before author’s initials stand for target article and response references, respectively.]

- Abe, J. A., Beetham, M. & Izard, C. (2002) What do smiles mean? An analysis in terms of differential emotions theory. In: *An empirical reflection on the smile*, ed. M. H. Abel, pp. 83–110. Edwin Mellen Press. [aPMN]
- Abel, M. H. (2002) The elusive nature of smiling. In: *An empirical reflection on the smile*, ed. M. H. Abel, pp. 1–13. Edwin Mellen Press. [aPMN]
- Achaïbou, A., Pourtois, G., Schwartz, S. & Vuilleumier, P. (2008) Simultaneous recording of EEG and facial muscle reactions during spontaneous emotional mimicry. *Neuropsychologia* 46:1104–13. [aPMN]
- Adams, R. B., Jr., Gordon, H. L., Baird, A. A., Ambady, N. & Kleck, R. E. (2003) Effects of gaze on amygdala sensitivity to anger and fear faces. *Science* 300(5625):1536. [JSL, aPMN]
- Adams, R. B., Jr. & Kleck, R. E. (2003) Perceived gaze direction and the processing of facial displays of emotion. *Psychological Science* 14(6):644–47. [BChan, LC]
- Adams, R. B., Jr. & Kleck, R. E. (2005) Effects of direct and averted gaze on the perception of facially communicated emotion. *Emotion* 5(1):3–11. [BChan, LC]
- Adams, R. B., Pauker, K. & Weisbuch, M. (2010) Looking the other way: The role of gaze direction in the cross-race memory effect. *Journal of Experimental Social Psychology* 46(2):478–81. [LC]
- Adolphs, R. (2002) Recognizing emotion from facial expressions: Psychological and neurological mechanisms. *Behavioral and Cognitive Neuroscience Reviews* 1:21–62. [aPMN]
- Adolphs, R. (2003) Cognitive neuroscience of human behavior. *National Review of Neuroscience* 4:165–78. [aPMN]
- Adolphs, R. (2006) Perception and emotion. *Current Directions in Cognitive Science* 15:222–26. [aPMN]
- Adolphs, R. (2008) Fear, faces, and the human amygdala. *Current Opinion in Neurobiology* 18(2):166–72. [aPMN]

- Adolphs, R., Damasio, H., Tranel, D., Cooper, C. & Damasio, A. R. (2000) A role for somatosensory cortices in the visual recognition of emotion as revealed by 3-D lesion mapping. *Journal of Neuroscience* 20:2683–90. [aPMN]
- Adolphs, R., Damasio, H., Tranel, D. & Damasio, A. R. (1996) Cortical systems for the recognition of emotion in facial expressions. *Journal of Neuroscience* 16:7678–87. [aPMN]
- Adolphs, R., Gosselin, F., Buchanan, T. W., Tranel, D., Schyns, P. & Damasio, A. R. (2005) A mechanism for impaired fear recognition after amygdala damage. *Nature* 433(7021):68–72. [CL, aPMN]
- Adolphs, R., Gosselin, F., Buchanan, T., Tranel, D., Schyns, P. & Damasio, A. (2005) A mechanism for impaired fear recognition after amygdala damage. *Nature* 433:68–72. [aPMN]
- Adolphs, R. & Tranel, D., eds. (2000) *The amygdala. A functional analysis*. Oxford University Press. [CL]
- Adolphs, R., Tranel, D., Damasio, H. & Damasio, A. R. (1994) Impaired recognition of emotion in facial expressions following bilateral damage to the human amygdala. *Nature* 372(6507):669–72. [CL, aPMN]
- Allen, C. & Bekoff, M. (1995) Function, natural design, and animal behavior: Philosophical and ethological considerations. *Perspectives on Ethology* 11:1–46. [rPMN]
- Amaral, D. G., Schumann, C. M. & Nordahl, C. W. (2008) Neuroanatomy of autism. *Trends in Neurosciences* 31:137–45. [KE]
- Ambadar, Z., Cohn, J. F. & Reed, L. I. (2009) All Smiles are not created equal: Morphology and timing of smiles perceived as amused, polite, and embarrassed/nervous. *Journal of Nonverbal Behavior* 33(1):17–34. [DAS]
- Ambadar, Z., Schooler, J. W. & Cohn, J. F. (2005) Deciphering the enigmatic face: The importance of facial dynamics in interpreting subtle facial expressions. *Psychological Science* 16:403–10. [CH-H]
- Anderson, J. R., Qin, Y., Sohn, M.-H., Stenger, V. A. & Carter, C. S. (2003) An information-processing model of the BOLD response in symbol manipulation tasks. *Psychonomic Bulletin and Review* 10:241–61. [aPMN]
- Andrew, R. J. (1963) The origin and evolution of the calls and facial expressions of the primates. *Behaviour* 20:1–109. [JJO]
- Argyle, M. (1972) *The psychology of interpersonal behavior*. Penguin Books. [aPMN]
- Argyle, M. & Cook, M. (1976) *Gaze and mutual gaze*. Cambridge University Press. [BChan, CMC-S]
- Ashforth, B. E. & Humphrey, R. H. (1993) Emotional labor in service roles: The influence of identity. *The Academy of Management Review* 18(1):88–115. [FB]
- Atkinson, A. (2007) *Face processing and empathy. Empathy in mental illness*, pp. 360–85. Cambridge University Press. [aPMN]
- Aviezer, H., Hassin, R. R., Ryan, J., Grady, C., Susskind, J., Anderson, A., Moscovitch, M. & Bentin, S. (2008) Angry, disgusted, or afraid? *Psychological Science* 19(7):724. [BChak]
- Bach, P., Peatfield, N. A. & Tipper, S. P. (2007) Focusing on body sites: The role of spatial attention in action perception. *Experimental Brain Research* 178(4):509–17. [BChak]
- Bailey, A. J., Braeutigam, S., Jousmaki, V. & Swithey, S. J. (2005) Abnormal activation of face processing systems at early and intermediate latency in individuals with autism spectrum disorder: A magnetoencephalographic study. *European Journal of Neuroscience* 21:2575–85. [AS]
- Barresi, J. & Moore, C. (1996) Intentional relations and social understanding. *Behavioral and Brain Sciences* 19(1):107–22. [CH-H]
- Barresi, J. & Moore, C. (2008) The neuroscience of social understanding. In: *The shared mind: Perspectives on intersubjectivity*, ed. J. Zlatev, T. Racine, C. Sinha & E. Itkonen, pp. 39–66. John Benjamins. [CH-H]
- Barrett, K. C. (2002) Smiling in children: Displays and their meanings. In: *An empirical reflection on the smile*, ed. M. H. Abel, pp. 137–54. Edwin Mellen Press. [aPMN]
- Barrett, L. F. (2006) Are emotions natural kinds? *Perspectives on Psychological Science* 1:28–58. [J-MF-D]
- Barsalou, L. W. (1999) Perceptual symbol systems. *Behavioral and Brain Sciences* 22(4):577–660. [MWA, FB, EM, aPMN]
- Barsalou, L. W. (2005) Situated conceptualization. In: *Handbook of categorization in cognitive science*, ed. H. Cohen & C. Lefebvre, pp. 619–50. Elsevier. [aPMN]
- Barsalou, L. W. (2008) Grounded cognition. *Annual Review of Psychology* 59:617–45. [JSL, aPMN]
- Barsalou, L. W., Niedenthal, P. M., Barbey, A. & Ruppert, J. (2003) Social embodiment. In: *The psychology of learning and motivation, vol. 43*, ed. B. Ross, pp. 43–92. Academic Press. [aPMN]
- Barsalou, L. W., Santos, A., Simmons, W. K. & Wilson, C. D. (2008) Language and simulation in conceptual processing. In: *Symbols, embodiment, and meaning*, ed. M. De Vega, A. M. Glenberg & A. C. Graesser, pp. 245–83. Oxford University Press. [aPMN]
- Bartlett, M. & Whitehill, J. (in press) Automated facial expression measurement: Recent applications to basic research in human behavior, learning, and education. In: *Handbook of face perception*, ed. A. Calder, G. Rhodes, J. V. Haxby & M. H. Johnson. Oxford University Press. [MSB]
- Bastiaansen, J. A. C. J., Thiox, M. & Keyers, C. (2009) Evidence for mirror systems in emotions. *Philosophical Transactions of the Royal Society* 364:2391–404. [aPMN]
- Bavelas, J., Black, A., Lemery, C. R. & Mullett, J. (1986) “I show how you feel”: Motor mimicry as a communicative act. *Journal of Personality and Social Psychology* 50:322–29. [aPMN]
- Becker, D. V., Kenrick, D. T., Neuberg, S. L., Blackwell, K. C. & Smith, D. M. (2007) The confounded nature of angry men and happy women. *Journal of Personality and Social Psychology* 92:179–90. [ES]
- Belt, V., Richardson, R. & Webster, J. (2002) Women, social skills, and interactive service work in telephone call centres. *New Technology, Work and Employment* 17(1):20–34. [FB]
- Berger, C. R. (1994) Power, dominance, and social interaction. In: *Handbook of interpersonal communication*, 2nd edition, ed. M. L. Knapp & G. R. Miller, pp. 450–507. Sage. [LH]
- Bernstein, M. J., Young, S. G., Brown, C. M., Sacco, D. F. & Claypool, H. M. (2008) Adaptive responses to social exclusion: Social rejection improves detection of real and fake smiles. *Psychological Science* 19(10):981–83. [CL, aPMN]
- Bertrand, M. (1969) The behavioural repertoire of the stump-tail macaque: A descriptive and comparative study. *Bibliotheca Primatologica* 11:1–273. [LH]
- Biele, C. & Grabowska, A. (2006) Sex differences in perception of emotion intensity in dynamic and static facial expressions. *Experimental Brain Research* 171:1–6. [ES]
- Bindemann, M., Burton, A. M. & Langton, S. R. H. (2008) How do eye gaze and facial expression interact? *Visual Cognition* 16(6):708. [MM]
- Blairy, S., Herrera, P. & Hess, U. (1999) Mimicry and the judgment of emotional facial expressions. *Journal of Nonverbal Behavior* 23(1):5–41. [CL, CH-H, aPMN]
- Blais, C., Jack, R. E., Scheepers, C., Fiset, D. & Caldara, R. (2008) Culture shapes how we look at faces. *PLoS ONE* 3(8):e3022. [doi:10.1371/journal.pone.0003022] [RC, CMC-S]
- Blass, E. M. & Camp, C. A. (2001) The ontogeny of face recognition: Eye contact and sweet taste induce face preference in 9- and 12-week-old human infants. *Developmental Psychology* 37:762–74. [aPMN]
- Bocanegra, B. R. & Zeelenberg, R. (2009) Emotion improves and impairs early vision. *Psychological Science* 20:707–13. [rPMN]
- Bogart, K. R. & Matsumoto, D. (2010) Facial mimicry is not necessary to recognize emotion: Facial expression recognition by people with Moebius syndrome. *Social Neuroscience* 5:241–51. [EM]
- Bohm, I., Carbon, C. C. & Hutzler, F. (2010) Mona Lisa’s smile – Perception or deception? *Psychological Science* 21:378–80. [J-MF-D]
- Boksem, M. A. S., Smolders, R. & de Cremer, D. (2009) Social power and approach-related neural activation. *Social Cognitive and Affective Neuroscience Advance Access*. Published online on March 20, 2009. [aPMN]
- Bolwig, N. (1964) Facial expressions in primates with remarks on a parallel development in certain carnivores (A preliminary report on work in progress). *Behaviour* 22:167–92. [JJO]
- Boly, M., Faymonville, M. E., Schnakers, C., Peigneux, P., Lambermont, B., Phillips, C., Lancellotti, P., Luxen, A., Lamy, M., Moonen, G., Maquet, P. & Laureys, S. (2008) Perception of pain in the minimally conscious state with PET activation: An observational study. *The Lancet Neurology* 7:1013–20. [CC]
- Boraston, Z., Corden, B., Miles, L., Skuse, D. & Blakemore, S. (2008) Brief report: Perception of genuine and posed smiles by individuals with autism. *Journal of Autism and Developmental Disorders* 38:574–80. [aPMN]
- Boroditsky, L. & Prinz, J. (2008) What thoughts are made of. In: *Embodied grounding: Social, cognitive, affective, and neuroscientific approaches*, ed. G. Semin & E. R. Smith, pp. 98–117. Cambridge University Press. [rPMN]
- Boroditsky, L. & Ramscar, M. (2002) The roles of body and mind in abstract thought. *Psychological Science* 13:185–89. [EM]
- Bouissac, P. (2001) The visual role of the sclera and the teeth in facial interaction. In: *Oralite et gestualite*, ed. C. Cave, I. Guaitella & S. Santi, pp. 161–66. L’Harmattan. [PBou]
- Bouissac, P. (2005) What is a trustworthy face? Available at: <http://www.semioticon.com/virtuals/risk/Trustworthyface.pdf>. [PBou]
- Bourgeois, P. & Hess, U. (2008) The impact of social context on mimicry. *Biological Psychology* 77:343–52. [aPMN]
- Bourgeron, T. (2009) A synaptic trek to autism. *Current Opinion in Neurobiology* 19:231–34. [KE]
- Bower, G. (1981) Mood and memory. *American Psychologist* 36:129–48. [aPMN]
- Bowers, D., Bauer, R. M., Coslett, H. B. & Heilman, K. M. (1985) Processing of faces by patients with unilateral hemisphere lesions: Dissociation between judgments of facial affect and facial identity. *Brain and Cognition* 4:258–72. [aPMN]
- Breiter, H. C., Etcoff, N. L., Whalen, P. J., Kennedy, W. A., Rauch, S. L., Buckner, R. L., Strauss, M. M., Hyman, S. E. & Rosen, B. R. (1996) Response and

- habituation of the human amygdala during visual processing of facial expression. *Neuron* 17:875–87. [aPMN]
- Briñol, P. & DeMarree, K. G., eds. (in press) *Social metacognition*. Psychology Press. [PBri]
- Briñol, P. & Petty, R. E. (2003) Overt head movements and persuasion: A self-validation analysis. *Journal of Personality and Social Psychology* 84:1123–39. [PBri]
- Briñol, P. & Petty, R. E. (2008) Embodied persuasion: Fundamental processes by which bodily responses can impact attitudes. In: *Embodiment grounding: Social, cognitive, affective, and neuroscientific approaches*, ed. G. R. Semin & E. R. Smith, pp. 184–207. Cambridge University Press. [PBri]
- Briñol, P., Petty, R. E. & Wagner, B. C. (2009) Body postures effects on self-evaluation: A self-validation approach. *European Journal of Social Psychology* 39:1053–64. [PBri]
- Brown, W. M., Palameta, B. & Moore, C. (2003) Are there nonverbal cues to commitment? An exploratory study using the zero-acquaintance video presentation paradigm. *Evolutionary Psychology* 1:42–69. [MM]
- Bruce, V. & Young, A. (1986) Understanding face-recognition. *British Journal of Psychology* 77:305–27. [BChak]
- Bruno, M., Vanhauzenhuysse, A., Schnakers, C., Boly, M., Gosseries, O., Demertzi, A., Majerus, S., Moonen, G., Hustinx, R. & Laureys, S. (2010) Visual fixation in the vegetative state: An observational case series PET study. *BMC Neurology* 10(1):35. [CC]
- Buchanan, T. W., Tranel, D. & Adolphs, R. (2009) The human amygdala in social function. In: *The human amygdala*, ed. P. J. Whalen & E. A. Phelps, pp. 289–318. Guilford Press. [PBou]
- Buck, R. (1984) *The communication of emotion*. Guilford Press. [aPMN]
- Buck, R. (1991) Social factors in facial display and communication: A reply to Chovil and others. *Journal of Nonverbal Behavior* 15:155–62. [aPMN]
- Burgoon, J. K., Buller, D. B. & Woodall, W. G. (1996) *Nonverbal communication: The unspoken dialog*, vol. 2, pp. 259–92. McGraw-Hill. [aPMN]
- Cacioppo, J., Petty, R., Losch, M. & Kim, H. (1986) Electromyographic activity over facial muscle regions can differentiate the valence and intensity of affective reactions. *Journal of Personality and Social Psychology* 50:260–68. [BChan, aPMN]
- Cahill, L. (2006) Why sex matters for neuroscience. *Nature Reviews Neuroscience* 7:477–84. [ES]
- Caldara, R. & Abdi, H. (2006) Simulating the “other-race” effect with autoassociative neural networks: Further evidence in favor of the face-space model. *Perception* 35(5):659–70. [RC]
- Caldara, R., Rossion, B., Bovet, P. & Hauert, C. A. (2004) Event-related potentials and time course of the “other-race” face classification advantage. *NeuroReport* 15(5):905–10. [RC]
- Caldara, R., Thut, G., Servois, P., Michel, C. M., Bovet, P. & Renault, B. (2003) Face versus non-face object perception and the “other-race” effect: A spatio-temporal event-related potential study. *Clinical Neurophysiology* 114(3):515–28. [RC]
- Caldara, R., Zhou, X. & Miellat, S. (2010) Putting culture under the “spotlight” reveals universal information use for face recognition. *PLoS ONE* 5(3):e9708. [RC]
- Calder, A. J., Keane, J., Cole, J., Campbell, R. & Young, A. W. (2000a) Facial expression recognition by people with Mobius syndrome. *Cognitive Neuropsychology* 17:73–87. [aPMN]
- Calder, A. J., Keane, J., Lawrence, A. D. & Manes, F. (2004) Impaired recognition of anger following damage to the ventral striatum. *Brain* 127:1958–69. [arPMN]
- Calder, A. J., Keane, J., Manes, F., Antoun, N. & Young, A. W. (2000b) Impaired recognition and experience of disgust following brain injury. *Nature Neuroscience* 3:1077–78. [aPMN]
- Calder, A. J., Lawrence, A. D. & Young, A. W. (2001) Neuropsychology of fear and loathing. *Nature Reviews Neuroscience* 2(5):352–63. [aPMN]
- Calder, A. J. & Young, A. W. (2005) Understanding the recognition of facial identity and facial expression. *Nature Review Neuroscience* 6:641–51. [aPMN]
- Calder, A. J., Young, A. W., Rowland, D., Perrett, D. I., Hodges, J. R. & Ectoff, N. L. (1996) Face perception after bilateral amygdala damage: Differentially severe impairment of fear. *Cognitive Neuropsychology* 13:699–745. [aPMN]
- Campeau, S. & Davis, M. (1995) Involvement of subcortical and cortical afferents to the lateral nucleus of the amygdala in fear conditioning measured with fear-potentiated startle in rats trained concurrently with auditory and visual conditioned stimuli. *Journal of Neuroscience* 15:2312–27. [rPMN]
- Campos, J. J., Mumme, D., Kermoian, R. & Campos, R. G. (1994) A functionalist perspective on the nature of emotion. *The Japanese Journal of Research on Emotions* 2(1):1–20. [JJO]
- Cannon, P. R., Hayes, A. E. & Tipper, S. P. (2009) An electromyographic investigation of the impact of task relevance on facial mimicry. *Cognition and Emotion* 23:918–29. [BChan, ES]
- Carr, L., Iacoboni, M., Dubeau, M. C., Mazziotta, J. C. & Lenzi, G. L. (2003) Neural mechanisms of empathy in humans: A relay from neural systems for imitation to limbic areas. *Proceedings of the National Academy of Sciences USA* 100:5497–502. [CH-H, aPMN]
- Cary, M. S. (1978) The role of gaze in the initiation of conversation. *Social Psychology Quarterly* 41:269–71. [BChan]
- Cashdan, E. (2004) Smiles, speech, and body posture: How women and men display sociometric status and power. *Journal of Nonverbal Behavior* 22:209–28. [aPMN]
- Centorrino, S., Djemai, E., Hopfensitz, A., Milinski, M. & Seabright, P. (2010) Smiling is a costly signal of cooperation opportunities: Experimental evidence from a trust game. Unpublished manuscript. [SC]
- Chakrabarti, B., Bullmore, E. & Baron-Cohen, S. (2006) Empathising with basic emotions: Common and discrete neural substrates. *Social Neuroscience* 1(3–4):364–84. [BChak]
- Chakrabarti, B., Kent, L., Suckling, J., Bullmore, E. T. & Baron-Cohen, S. (2006) Variations in human cannabinoid receptor (CNRI) gene modulate striatal response to happy faces. *European Journal of Neuroscience* 23:1944–48. [aPMN]
- Chance, M. R. A. (1962) The interpretation of some agonistic postures: The role of “cut-off” acts and postures. *Symposium of the Zoological Society* 8:71–89. [LH]
- Chartrand, T. L. & Bargh, J. A. (1999) The chameleon effect: The perception-behavior link and social interaction. *Journal of Personality and Social Psychology* 76:893–910. [PBri]
- Chawarska, K. & Shic, F. (2009) Looking but not seeing: Atypical visual scanning and recognition of faces in 2 and 4-year old children with Autism Spectrum Disorder. *Journal of Autism and Developmental Disorders* 39:1663–72. [AS]
- Chen, Y. H., Dammers, J., Boers, F., Leiberg, S., Edgar, J. C., Roberts, T. P. L. & Mathiak, K. (2009) The temporal dynamics of insula activity to disgust and happy facial expressions: A magnetoencephalography study. *NeuroImage* 47:1921–28. [J-MF-D]
- Cheng, Y., Chou, K.-H., Decety, J., Chen, I.-Y., Hung, D., Tzeng, O. J.-L. & Lin, C.-P. (2009) Sex differences in the neuroanatomy of human mirror-neuron system: A voxel-based morphometric investigation. *Neuroscience* 158:713–20. [ES]
- Choe, Y. & Smith, N. H. (2006) Motion-based autonomous grounding: Inferring external world properties from internal sensory states alone. In: *Proceedings of the 21st National Conference on Artificial Intelligence (AAAI 2006)*, ed. Y. Gil & R. Mooney, pp. 936–41. AAAI Press. [TAM]
- Choe, Y., Yang, H.-F. & Chern-Yeow Eng, D. (2007) Autonomous learning of the semantics of internal sensory states based on motor exploration. *International Journal of Humanoid Robotics* 4:211–43. [TAM]
- Chong, S. E., Werker, J. F., Russell, J. A. & Carroll, J. M. (2003) Three facial expressions mothers direct to their infants. *Infant and Child Development* 12(3):211–32. [J-MF-D]
- Chong, T. T. J., Williams, M. A., Cunnington, R. & Mattingley, J. B. (2008) Selective attention modulates inferior frontal gyrus activity during action observation. *NeuroImage* 40(1):298–307. [BChak]
- Clore, G. L. & Storbeck, J. (2006) Affect as information about liking, efficacy, and importance. In: *Hearts and minds: Affective influences on social cognition and behaviour*, ed. J. Forgas, pp. 123–42. Psychology Press. [aPMN]
- Cockburn, J., Bartlett, M., Tanaka, J., Movellan, J., Pierce, M. & Schultz, R. (2008) SmileMaze: A tutoring system in real-time facial expression perception and production for children with autism spectrum disorder. Paper presented at the International Conference on Automatic Face and Gesture Recognition, Workshop on Facial and Bodily Expressions for Control and Adaptation of Games, Amsterdam, The Netherlands, September 17–19, 2008. [MSB]
- Conty, L., Dezeache, G. & Grèzes, J. (2010) The spatio-temporal integration of social visual cues: A study coupling EEG and fMRI. Poster presented at the 16th International Conference on Functional Mapping of the Human Brain, Barcelona, Spain, June 6–10, 2010. Abstract forthcoming in a supplement of *NeuroImage*. [LC]
- Coussi-Korbel, S. (1994) Learning to outwit a competitor in mangabeys (*Cercocebus torquatus torquatus*). *Journal of Comparative Psychology* 108:164–71. [aPMN]
- Cristinzio, C., N’Diaye, K., Seeck, M., Vuilleumier, P. & Sander, D. (2010) Integration of gaze direction and facial expression in patients with unilateral amygdala damage. *Brain* 133(Part 1):248–61. [LC]
- Csibra, G. (2007) Action mirroring and action interpretation: An alternative account. In: *The sensorimotor foundations of higher cognition. Attention and performance XXII*, ed. P. Haggard, Y. Rossetti & M. Kawato, pp. 435–59. Oxford University Press. [JK]
- Csibra, G. & Gergely, G. (2009) Natural pedagogy. *Trends in Cognitive Sciences* 13(4):148–53. [LC]
- D’Entremont, B., Hains, S. & Muir, D. (1997) A demonstration of gaze following in 3- to 6-month olds. *Infant Behavior and Development* 20:569–72. [LC]
- Dalton, K. M., Nacewicz, B. M., Johnstone, T., Schaefer, H. S., Gernsbacher, M. A., Goldsmith, H. H., Alexander, A. & Davidson, R. J. (2005) Gaze fixation and the neural circuitry of face processing in autism. *Nature Neuroscience* 8:519–26. [BChak, aPMN]

- Damasio, A. R., Grabowski, T. J., Bechara, A., Damasio, H., Ponto, L. L. B., Parvizi, J. & Hichwa, R. D. (2000) Subcortical and cortical brain activity during the feeling of self-generated emotions. *Nature Neuroscience* 3:1049–56. [aPMN]
- Dapretto, M., Davies, M. S., Pfeifer, J. H., Scott, A. A., Sigman, M., Bookheimer, S. Y. & Iacoboni, M. (2005) Understanding emotions in others: Mirror neuron dysfunction in children with autism spectrum disorders. *Nature Neuroscience* 9:28–30. [PW]
- Darwin, C. (1872) *The expression of the emotions in man and animals*. John Murray. [JJO]
- Darwin, C. (1872/1965) *The expression of emotions in man and animals*. John Murray/University of Chicago Press. (Original work published in 1872). [J-MF-D]
- Darwin, C. (1872/1998) *The expression of the emotions in man and animals*. Oxford University Press. [aPMN]
- Davidson, R. J. (1993) The neuropsychology of emotion and affective style. In: *Handbook of emotion*, ed. M. Lewis & J. M. Haviland, pp. 143–54. Guilford Press. [aPMN]
- Davidson, R. J., Ekman, P., Saron, C., Senulis, J. & Friesen, W. (1990) Approach-withdrawal and cerebral asymmetry: Emotional expression and brain physiology I. *Journal of Personality and Social Psychology* 58:330–41. [aPMN]
- Davidson, R. J. & Hugdahl, K., eds. (1995) *Brain asymmetry*. MIT Press. [BChan]
- Davidson, R. J. & Irvin, W. (1999) The functional neuroanatomy of emotion and affective style. *Trends in Cognitive Science* 3:11–21. [aPMN]
- de Gelder, B., Vroomen, J., Pourtois, G. & Weiskrantz, L. (1999) Non-conscious recognition of affect in the absence of striate cortex. *NeuroReport* 10:3759–63. [rPMN]
- de Waal, F. B. M. (1989) *Peacemaking among primates*. Harvard University Press. [LH]
- de Waal, F. B. M. (2003) Darwin's legacy and the study of primate visual communication. *Annals of the New York Academy of Sciences* 1000:7–31. [rPMN]
- Decety, J. & Chaminade, T. (2003) Neural correlates of feeling sympathy. *Neuropsychologia* 41:127–38. [aPMN]
- Decety, J. & Chaminade, T. (2004) The neurophysiology of imitation and intersubjectivity. In: ed. S. Hurley & N. Chater. *Perspectives on imitation: From neuroscience to social science*, pp. 119–40. MIT Press. [aPMN]
- Decety, J. & Grèzes, J. (1999) Neural mechanisms subserving the perception of human actions. *Trends in Cognitive Science* 3:172–78. [aPMN]
- Decety, J. & Grèzes, J. (2006) The power of simulation: Imagining one's own and other's behavior. [Special Issue]. *Social Cognitive Neuroscience of Cognitive Brain Research* 1079:4–14. [aPMN]
- Deery S. & Kinnie N. (2002) Call centres and beyond: Athematic evaluation. *Human Resource Management Journal* 12:3–13. [FB]
- DeMarree, K. G., Briñol, P., Petty, R. E. & Smith, K. R. (2010) Facial validation through metacognitive processes. Unpublished manuscript, Texas Tech University. [PBri]
- Dick, A. S., Goldin-Meadow, S., Hasson, U., Skipper, J. I. & Small, S. L. (2009) Co-speech gestures influence neural activity in brain regions associated with processing semantic information. *Human Brain Mapping* 30(11):3509–26. [MWA]
- Dimberg, U. & Petterson, M. (2000) Facial reactions to happy and angry facial expressions: Evidence for right hemisphere dominance. *Psychophysiology* 37:693–96. [DL]
- Dimberg, U. & Thunberg, M. (1998) Rapid facial reactions to emotional facial expressions. *Scandinavian Journal of Psychology* 39(1):39–45. [aPMN]
- Dimberg, U., Thunberg, M. & Elmehed, K. (2000) Unconscious facial reactions to emotional facial expressions. *Psychological Science* 11:86–89. [BChan, DL]
- Dinstein, I., Gardner, J. L., Jazayeri, M. & Heeger, D. J. (2008) Executed and observed movements have different distributed representations in human aIPS. *The Journal of Neuroscience* 28:11231–39. [aPMN]
- Donovan, W. & Leavitt, L. (1980) Physiologic correlates of direct and averted gaze. *Biological Psychology* 10:189–99. [aPMN]
- Doron, N. N. & Ledoux, J. E. (1999) Organization of projections to the lateral amygdala from auditory and visual areas of the thalamus in the rat. *Journal of Comparative Neurology* 412:383–409. [rPMN]
- Duchenne de Boulogne, C.-B. (1862) *The mechanism of human facial expression*. Jules Renard. [aPMN]
- École Nationale Supérieure des Beaux-Arts (1999) *Duchenne de Boulogne 1806–1875*. Beaux-Arts de Paris. [aPMN]
- Edinger, J. A. & Patterson, M. L. (1983) Nonverbal involvement and social control. *Psychological Bulletin* 93(1):30–56. [LH]
- Effron, D. A., Niedenthal, P. M., Gil, S. & Droit-Volet, S. (2006) Embodied temporal perception of emotion. *Emotion* 6:1–9. [ES]
- Eibl-Eibesfeldt, I. (1971) *Love and hate: The natural history of behavior patterns*. Holt, Rinehard & Winston. [JJO]
- Eibl-Eibesfeldt, I. (1972) *Similarities and differences between cultures in expressive movements. Non-verbal communication*. Cambridge University Press. [aPMN]
- Ekman, P. (1989) The argument and evidence about universals in facial expressions of emotion. In: *Handbook of psychophysiology: The biological psychology of the emotions and social processes*, ed. H. Wagner & A. Manstead, pp. 143–64. John Wiley. [aPMN]
- Ekman, P. (1994) Strong evidence for universals in facial expressions: A reply to Russell's mistaken critique. *Psychological Bulletin* 115:268–87. [J-MF-D, aPMN]
- Ekman, P. (1997) Should we call it expression or communication? *Innovations in Social Science Research* 10(4):333–44. [MM]
- Ekman, P. (2001) *Telling lies: Clues to deceit in the marketplace, politics, and marriage*. W.W. Norton. [PBou, aPMN]
- Ekman, P., Davidson, R. & Friesen, W. V. (1990) The Duchenne smile: Emotional expression and brain physiology, II. *Journal of Personality and Social Psychology* 58:342–53. [J-MF-D, aPMN]
- Ekman, P. & Friesen, W. V. (1978) *Facial action coding system: A technique for the measurement of facial movement*. Consulting Psychologists Press. [BChak, aPMN]
- Ekman, P. & Friesen, W. V. (1982) Felt, false and miserable smiles. *Journal of Nonverbal Behavior* 6:238–52. [arPMN]
- Ekman, P., Friesen, W. V. & Ancoli, S. (1980) Facial signs of emotional experience. *Journal of Personality and Social Psychology* 39:1125–34. [BChan, aPMN]
- Ekman, P. & Heider, K. G. (1988) The universality of a contempt expression: A replication. *Motivation and Emotion* 12:303–308. [aPMN]
- Elfenbein, H. A. & Ambady, N. (2002) On the universality and cultural specificity of emotion recognition: A meta-analysis. *Psychological Bulletin* 128:203–35. [J-MF-D]
- Elliott, R., Friston, K. J. & Dolan, R. J. (2000) Dissociable neural responses in human reward systems. *Journal of Neuroscience* 20:6159–65. [aPMN]
- Ellsworth, P. & Carlsmith, J. M. (1973) Eye contact and gaze aversion in an aggressive encounter. *Journal of Personality and Social Psychology* 28(2):280–92. [LH]
- Elsabbagh, M., Volein, A., Csibra, G., Holmboe, K., Garwood, H., Tucker, L., Krljes, S., Baron-Cohen, S., Bolton, P., Charman, T., Baird, G. & Johnson, M. H. (2009) Neural correlates of eye gaze processing in the infant broader autism phenotype. *Biological Psychiatry* 65:31–38. [AS]
- Enticott, P. G., Johnston, P. J., Herring, S. E., Hoy, K. E. & Fitzgerald, P. B. (2008) Mirror neuron activation is associated with facial emotion processing. *Neuropsychologia* 46:2851–54. [CH-H]
- Erdelyi, M. H. (1974) A new look at the new look: Perceptual defense and vigilance. *Psychological Review* 81(1):1–25. [JSL]
- Fadiga, L., Fogassi, L., Pavesi, G. & Rizzolatti, G. (1995) Motor facilitation during action observation: A magnetic stimulation study. *Journal of Neurophysiology* 73:2608–11. [aPMN]
- Farroni, T., Csibra, G., Simion, F. & Johnson, M. H. (2002) Eye contact detection in humans from birth. *Proceedings of the National Academy of Sciences USA* 99(14):9602–605. [LC, aPMN]
- Farroni, T., Mansfield, E. M., Lai, C. & Johnson, M. H. (2003) Infants perceiving and acting on the eyes: Tests of an evolutionary hypothesis. *Journal of Experimental Child Psychology* 85(3):199–212. [LC]
- Farroni, T., Massaccesi, S., Pividori, D. & Johnson, M. (2004) Gaze following in newborns. *Infancy* 5(1):39–60. [aPMN]
- Fehr, E. & Gächter, S. (2000) Cooperation and punishment in public goods experiments. *The American Economic Review* 90(4):980–94. [SC]
- Feldman, R. & Eidelman, A. I. (2009) Biological and environmental initial conditions shape the trajectories of cognitive and social-emotional development across the first years of life. *Developmental Science* 12(1):194–200. [JES]
- Feldman, R., Gramat, A., Pariente, C., Kanety, H., Kuint, J. & Gilboa-Schechtman, E. (2009) Maternal depression and anxiety across the postpartum year and infant social engagement, fear regulation, and stress reactivity. *Journal of the American Academy of Child and Adolescent Psychiatry* 48(9):919–27. [JES]
- Feldman, R., Greenbaum, C. W. & Yirmiya, N. (1999) Mother-infant affect synchrony as an antecedent of the emergence of self-control. *Developmental Psychology* 35(1):223–31. [JES]
- Feldman-Barrett, L. & Niedenthal, P. M. (2004) Valence focus and perceptions of facial affect. *Emotion* 4:266–74. [aPMN]
- Fernández-Dols, J. M. & Carroll, J. M. (1997) Is the meaning perceived in facial expression independent of its context? In: *The psychology of facial expression*, ed. J. A. Russell & J. M. Fernández-Dols, pp. 275–94. Cambridge University Press. [J-MF-D]
- Fernández-Dols, J. M. & Russell, J. A. (2003) Emotion, affect, and mood in social judgments. In: *Handbook of psychology, vol. 5: Personality and social psychology*, ed. T. Millon & M. J. Lerner, pp. 283–98. Wiley. [J-MF-D]
- Fernández-Dols, J. M., Carrera, P., Barchard, K. & Gacitua, M. (2008) False recognition of facial expressions of emotion: Causes and consequences. *Emotion* 8:530–39. [J-MF-D]
- Feygin, D. L., Swain, J. E. & Leckman, J. F. (2006) The normalcy of neurosis: Evolutionary origins of obsessive-compulsive disorder and related behaviors. *Progress in Neuro-Psychopharmacology and Biological Psychiatry* 30(5):554–64. [JES]
- Fineman, S., ed. (2000) *Emotion in organizations*. Sage. [FB]

- Fischer, A. & Roseman, I. J. (2007) Beat them or ban them: Characteristics and social functions of anger and contempt. *Journal of Personality and Social Psychology* 93:103–15. [aPMN]
- Fischer, M. H. & Zwaan, R. A. (2008) Embodied language – A review of the role of the motor system in language comprehension. *Quarterly Journal of Experimental Psychology* 61(6):825–50. [JSL]
- Fiske, A. P. (1992) The four elementary forms of sociality: Framework for a unified theory of social relations. *Psychological Review* 99(4):689–723. [LH]
- Fiske, S. T., Cuddy, A. J. C. & Glick, P. (2006) Universal dimensions of social cognition: warmth and competence. *Trends in Cognitive Sciences* 11:77–83. [JMV]
- Fitzgerald, D. A., Angstadt, M., Jelsone, L. M., Nathan, P. J. & Phan, K. L. (2006) Beyond threat: Amygdala reactivity across multiple expressions of facial affect. *NeuroImage* 30:1441–48. [aPMN]
- Flack, J. C. & de Waal, F. B. M. (2007) Context modulates signal meaning in primate communication. *Proceedings of the National Academy of Science USA* 104(5):1581–86. [MM]
- Fodor, J. A. (1975) *The language of thought*. Crowel. [aPMN]
- Fodor, J. A. (1985) Précis of the modularity of mind. *Behavioral and Brain Sciences* 8:1–42. [DL]
- Fogel, A., Nelson-Goens, G., Hsu, H. & Shapiro, A. (2000) Do different infant smiles reflect different positive emotions? *Social Development* 9:497–520. [aPMN]
- Fraley, R. C., Niedenthal, P. M., Marks, M. J., Brumbaugh, C. C. & Vicary, A. (2006) Adult attachment and the perception of facial expressions of emotion: Probing the hyperactivating strategies underlying anxious attachment. *Journal of Personality* 74:1163–90. [aPMN]
- Frank, M. G. (2002) Smiles, lies, and emotion. In: *An empirical reflection on the smile*, ed. M. H. Abel, pp. 15–44. Edwin Mellen Press. [BChan, aPMN]
- Frank, M. G., Ekman, P. & Friesen, W. V. (1993) Behavioral markers and recognizability of the smile of enjoyment. *Journal of Personality and Social Psychology* 64:83–93. [aPMN]
- Frank, M., Ekman, P. & Friesen, W. (1997) *Behavioral markers and recognizability of the smile of enjoyment. What the face reveals: Basic and applied studies of spontaneous expression using the Facial Action Coding System (FACS)*, pp. 217–42. Oxford University Press. [aPMN]
- Frank, M. & Stennett, J. (2001) The forced-choice paradigm and the perception of facial expression of emotion. *Journal of Personality and Social Psychology* 80:75–85. [aPMN]
- Frank, T. (1988) *Passions within reason: The strategic role of the emotions*. W. W. Norton. [SC]
- Fridlund, A. (1991) The sociality of solitary smiling: Potentiation by an implicit audience. *Journal of Personality and Social Psychology* 60:229–40. [aPMN]
- Fridlund, A. J. (2002) The behavioral ecology view of smiling and other facial expressions. In: *An empirical reflection on the smile*, ed. M. H. Abel. Edwin Mellen Press. [aPMN]
- Froggatt, K. (1998) The place of metaphor and language in exploring nurses' emotional work. *Journal of Advanced Nursing* 28:332–38. [FB]
- Fusar-Poli, P., Placentin, A., Carletti, F., Landi, P., Alle, P., Surguladze, S., Benedetti, F., Abbamont, M., Gasparotti, R., Baral, F., Perez, J., McGuire, P. & Politi, P. (2009) Functional atlas of emotional faces processing: A voxel-based meta-analysis of 105 functional magnetic resonance imaging studies. *Journal of Psychiatry and Neuroscience* 34(6):418–32. [aPMN]
- Gallese, V. (2003) The roots of empathy: The shared manifold hypothesis and the neural basis of intersubjectivity. *Psychopathology* 36:171–80. [aPMN]
- Gallese, V. (2005) *Being like me: Self-other identity, mirror neurons, and empathy. Perspectives on imitation: From neuroscience to social science, vol. 1. Mechanisms of imitation and imitation in animals*, pp. 101–118. MIT Press. [aPMN]
- Gallese, V. (2007) Embodied simulation: From mirror neuron systems to interpersonal relations. *Novartis Foundation Symposium* 2278:3–12. [aPMN]
- Gallese, V., Fadiga, L., Fogassi, L. & Rizzolatti, G. (1996) Action recognition in the premotor cortex. *Brain* 119:593–609. [aPMN]
- Gallese, V. & Goldman, A. (1999) Mirror neurons and the simulation theory of mind-reading. *Trends in Cognitive Science* 2:493–500. [aPMN]
- Gallese, V. & Lakoff, G. (2005) The brain's concepts: The role of the sensory-motor system in conceptual knowledge. *Cognitive Neuropsychology* 22:455–79. [aPMN]
- Gans, N., Koole, G. & Mandelbaum, A. (2003) Telephone call centers: Tutorial, review, and research Prospects. *Manufacturing and Service Operations Management* 5(2):79–141. [FB]
- Geary, D. C. (2005) *The origin of the mind: Evolution of brain, cognition, and general intelligence*. American Psychological Association. [JMV]
- George, N. & Conty, L. (2008) Facing the gaze of others. *Neurophysiologie Clinique / Clinical Neurophysiology* 38(3):197–207. [LC]
- George, N., Driver, J. & Dolan, R. J. (2001) Seen gaze-direction modulates fusiform activity and its coupling with other brain areas during face processing. *NeuroImage* 13:1102–12. [AS]
- Gepner, B. & Feron, F. (2009) Autism: A world changing too fast for a mis-wired brain? *Neuroscience and Biobehavioral Reviews* 33:1227–42. [MSB]
- Giacino, J., Ashwal, S., Childs, N., Cranford, R., Jennett, B., Katz, D., Kelly, J., Rosenberg, J., Whyte, J. & Zafonte, R. (2002) The minimally conscious state: Definition and diagnostic criteria. *Neurology* 58:349–53. [CC]
- Giacino, J., Kalmar, K. & Whyte, J. (2004) The JFK coma recovery scale-revised: Measurement characteristics and diagnostic utility. *Archives of Physical Medicine and Rehabilitation* 85(12):2020–29. [CC]
- Glenberg, A. M. (1997) What memory is for. *Behavioral and Brain Sciences* 20:1–55. [MWA, EM]
- Golan, O. & Baron-Cohen, S. (2006) Systemizing empathy: Teaching adults with Asperger's Syndrome and High Functioning Autism to recognize emotions using interactive multimedia. *Development and Psychopathology* 18(2):589–617. [BChak, rPMN]
- Goldman, A. I. (2006) *Simulating minds: The philosophy, psychology, and neuroscience of mindreading*. Oxford University Press. [J-MF-D]
- Goldman, A. I. & Sripada, C. S. (2005) Simulationist models of face-based emotion recognition. *Cognition* 94(3):193–213. [BChak, CH-H, aPMN, ES]
- Graham, J. A. & Heywood, S. (1976) The effects of elimination of hand gesture and of verbal codability on speech performance. *European Journal of Social Psychology* 5:189–95. [MWA]
- Grandey, A., Fisk, G., Mattila, A., Jansen, K. & Sideman, L. (2005) Is "service with a smile" enough? Authenticity of positive displays during service encounters. *Organizational Behavior and Human Decision Processes* 96(1):38–55. [FB]
- Gullberg, M. & Holmqvist, K. (1999) Keeping an eye on gestures: Visual perception of gestures in face-to-face communication. *Pragmatics & Cognition* 7:35–63. [MWA]
- Gullberg, M. & Kita, S. (2009) Attention to speech-accompanying gestures: Eye movements and information uptake. *Journal of Nonverbal Behavior* 33(4): 251–77. [MWA]
- Hadjikhani, N., Hoge, R., Snyder, J. & de Gelder, B. (2008) Pointing with the eyes: The role of gaze in communicating danger. *Brain and Cognition* 68(1):1–8. [LC]
- Haidt, J. & Keltner, D. (1999) Culture and facial expression: Open-ended methods find more expressions and a gradient of recognition. *Cognition and Emotion* 13:225–66. [aPMN]
- Hains, S. M. J. & Muir, D. W. (1996) Infant sensitivity to adult eye direction. *Child Development* 67:1940–51. [aPMN]
- Haith, M. M. (1972) The forgotten message of the infant smile. *Merrill-Palmer Quarterly* 18:321. [aPMN]
- Halberstadt, J. & Niedenthal, P. M. (2001) Effects of emotion concepts on perceptual memory for emotional expressions. *Journal of Personality and Social Psychology* 81:587–98. [aPMN]
- Halberstadt, J., Winkelman, P., Niedenthal, P. & Dalle, N. (2009) Emotional conception: How embodied emotion concepts guide perception and facial action. *Psychological Science* 20:1254–61. [J-MF-D, DL, arPMN]
- Hall, J. A., Coats, E. J. & LeBeau, L. S. (2005) Nonverbal behavior and the vertical dimension of social relations: A meta-analysis. *Psychological Bulletin* 131(6):898–924. [LH]
- Hall, J. A., Hogan, T. G. & Carter, J. D. (2002) Assigned and felt status in relation to observer-coded and participant-reported smiling. *Journal of Nonverbal Behavior* 26(2):63–81. [MM]
- Hall, J. K., Hutton, S. B. & Morgan, M. J. (2010) Sex differences in scanning faces: Does attention to the eyes explain female superiority in facial expression recognition? *Cognition and Emotion* 24:629–37. [doi:10.1080/02699930902906882]. [rPMN, ES]
- Hamann, S. B., Stefanacci, L., Squire, L. R., Adolphs, R., Tranel, D., Damasio, H. & Damasio, A. (1996) Recognizing facial emotion. *Nature* 379:497. [aPMN]
- Hamon-Hill, C. & Barresi, J. (2008a) I feel the same way: Recognizing facial emotion as appropriate to context. [Abstract] *Canadian Psychology Abstracts* 49:2a, 11. [CH-H]
- Hamon-Hill, C. & Barresi, J. (2008b) I remember your smile: Recognizing facial emotions from a brief acquaintance. [Abstract]. Abstracts of the 2008 CSBBS (Canadian Society for Brain, Behaviour, and Cognitive Science) Annual Meeting. *Canadian Journal of Experimental Psychology* 62(4):261–321. [CH-H]
- Hamon-Hill, C. & Barresi, J. (2009) Disrupted embodied simulation while judging appropriateness of facial emotion to context. Paper presented at the Joint International Conference with the Canadian Society for Brain, Behavior, and Cognitive Sciences and the Experimental Psychology Society, York, United Kingdom, July 8–10, 2009. [CH-H]
- Harmon-Jones, E. & Segilman, J. (2001) State anger and prefrontal brain activity: Evidence that insult-related relative left-prefrontal activation is associated with experienced anger and aggression. *Journal of Personality and Social Psychology* 80:797–803. [BChan]
- Harnad, S. (1990) The symbol grounding problem. *Physica D* 42:335–46. [EM]
- Harver, A., Katkin, E. S. & Bloch, E. (1993) Signal-detection outcomes on heartbeat and respiratory resistance detection tasks in male and female subjects. *Psychophysiology* 30:223–30. [rPMN]
- Hasson, O. (1994) Cheating signals. *Journal of Theoretical Biology* 167:223–38. [MM]

- Hatfield, E., Cacioppo, J. T. & Rapson, R. L. (1992) Primitive emotional contagion. In: *Review of personality and social psychology: Emotion and social behavior, vol. 14*, ed. M. S. Clark, pp. 151–77. Sage. [aPMN]
- Hatfield, E., Cacioppo, J. T. & Rapson R. L. (1993) Emotional contagion. *Current Directions in Psychological Science* 2:96–99. [aPMN]
- Haxby, J., Hoffman, E. & Ida Gobbini, M. (2000) The distributed human neural system for face perception. *Trends in Cognitive Sciences* 4:223–33. [BChak]
- Heberlein, A. S. & Atkinson, A. (2009) Neuroscientific evidence for simulation and shared substrates in emotion recognition: Beyond faces. *Emotion Review* 1:162–77. [J-MF-D, aPMN]
- Heberlein, A. S., Padon, A. A., Gillihan, S. J., Farah, M. J. & Fellows, L. K. (2008) Ventromedial frontal lobe plays a critical role in facial emotion recognition. *Journal of Cognitive Neuroscience* 20:721–33. [J-MF-D]
- Hecht, M. A. & LaFrance, M. (1998) License or obligation to smile: The effect of power and sex on amount and type of smiling. *Personality and Social Psychology Bulletin* 24(12):1332–42. [aPMN]
- Hemenlotter, A., Dresel, C., Castrop, F., Ceballos-Baumann, A. O., Wohlschläger, A. M. & Haslinger, B. (2009) The link between facial feedback and neural activity within central circuitries of emotion: New insights from Botulinum Toxin-induced denervation of frown muscles. *Cerebral Cortex* 19:537–42. [aPMN]
- Hemenlotter, A., Schroeder, U., Erhard, P., Catrop, F., Haslinger, B., Stoecker, D., Lange, K. W. & Ceballos-Baumann, A. O. (2005) A common neural basis for receptive and expressive communication of pleasant facial affect. *NeuroImage* 26:581–91. [JK, aPMN]
- Hermans, E. J., Putman, P. & van Honk, J. (2006) Testosterone administration reduces empathetic behavior: A facial mimicry study. *Psychoneuroendocrinology* 31:859–66. [rPMN, ES]
- Hess, U., Adams, R. B., Jr. & Kleck, R. E. (2005) Who may frown and who should smile? Dominance, affiliation, and the display of happiness and anger. *Cognition and Emotion* 19:515–36. [aPMN]
- Hess, U., Adams, R. B., Jr. & Kleck, R. E. (2007) When two do the same, it might not mean the same: The perception of emotional expressions shown by men and women. In: *Group dynamics and emotional expression*, pp. 33–50. Cambridge University Press. [aPMN]
- Hess, U., Adams, R. B., Jr. & Kleck, R. E. (2009a) The categorical perception of emotions and traits. *Social Cognition* 27:319–25. [aPMN]
- Hess, U., Adams, R. B., Jr. & Kleck, R. E. (2009b) The face is not an empty canvas: How facial expressions interact with facial appearance. *Philosophical Transactions of the Royal Society B: Biological Sciences* 364:3497–504. [rPMN]
- Hess, U., Banse, R. & Kappas, A. (1995) The intensity of facial expression is determined by underlying affective state and social situation. *Journal of Personality and Social Psychology* 69:280–88. [aPMN]
- Hess, U., Beaupre, M. & Cheung, N. (2002) Who to whom and why – Cultural differences and similarities in the function of smiles. In: *An empirical reflection on the smile*, ed. M. Abel, pp. 187–216. Edwin Mellen Press. [aPMN, DAS]
- Hess, U. & Blairy, S. (2001) Facial mimicry and emotional contagion to dynamic emotional facial expressions and their influence on decoding accuracy. *International Journal of Psychophysiology* 40:129–41. [CH-H, aPMN]
- Hess, U., Blairy, S. & Kleck, R. E. (2000) The influence of facial emotion displays, gender, and ethnicity on judgments of dominance and affiliation. *Journal of Nonverbal Behavior* 24(4):265–83. [BChak]
- Hess, U., Blairy, S. & Philippot, P. (1999) Facial mimicry. In: *The social context of nonverbal behavior*, ed. P. Philippot, R. Feldman & E. Coats, pp. 213–41. Cambridge University Press. [aPMN]
- Hess, U. & Bourgeois, P. (in press) You smile – I smile: Emotion expression in social interaction. *Biological Psychology*. [aPMN]
- Hess, U. & Fischer, A. (under review) Emotional contagion: What you see is not always what you feel. [rPMN]
- Hess, U. & Kirouac, G. (2000) Emotion expression in groups. In: *Handbook of emotion*, 2nd edition, ed. M. Lewis & J. Haviland-Jones, pp. 368–81. Guilford Press. [rPMN]
- Hess, U. & Kleck, R. E. (1990) Differentiating emotion elicited and deliberate emotional facial expressions. *European Journal of Social Psychology* 20:369–85. [BChan, aPMN]
- Hess, U., Philippot, P. & Blairy, S. (1998) Facial reactions to emotional facial expressions: Affect or cognition? *Cognition and Emotion* 12:509–32. [rPMN]
- Hilgard, E. R. (1987) *Psychology in America: A historical survey*. Harcourt Brace, Jovanovich. [EM]
- Hirschleifer, J. (1987) On the emotions as guarantors of threats and promises. In: *The latest on the best: Essays on evolution and optimality*, ed. John Dupré. MIT Press. [SC]
- Hochschild, A. R. (1979) Emotion work, feeling rules, and social structure. *American Journal of Sociology* 85(3):551. [FB]
- Hochschild, A. R. (1983) *The managed heart: Commercialization of human feeling*. University of California Press. [FB]
- Hochschild, A. R. (2005) On the edge of the time bind: Time and market culture. *Social Research* 72(2):339–54. [FB]
- Hoehl, S. & Striano, T. (2008) Neural processing of eye gaze and threat-related emotional facial expressions in infancy. *Child Development* 79(6):1752–60. [LC]
- Holle, H., Gunter, T. C., Rüschemeyer, S.-A., Hennenlotter, A. & Iacoboni, M. (2008) Neural correlates of the processing of co-speech gestures. *NeuroImage* 39:2010–24. [MWA]
- Holmes, A., Green, S. & Vuilleumier, P. (2005) The involvement of distinct visual channels in rapid attention towards fearful facial expressions. *Cognition and Emotion* 19:899–922. [rPMN]
- Hooker, C. I., Paller, K. A., Gitelman, D. R., Parrish, T. B., Mesulam, M. & Reber, P. J. (2003) Brain networks for analyzing eye gaze. *Cognitive Brain Research* 17(2):406–18. [BChak, aPMN]
- Hostetter, A. B. & Alibali, M. W. (2008) Visible embodiment: Gestures as simulated action. *Psychonomic Bulletin and Review* 15:495–514. [MWA]
- Hostetter, A. B. & Alibali, M. W. (2010) Language, gesture, action! A test of the gesture as Simulated Action framework. *Journal of Memory and Language* 63:245–57. [MWA]
- Houde, S., Simard, A. & Hess, U. (2009) I show you how you feel: Mimicry as a function of assigned emotional state. Paper presented at the 49th Annual Meeting of the Society for Psychophysiological Research, Berlin, Germany, October 21–24, 2009. [rPMN]
- Iacoboni, M., Molnar-Szakacs, I., Gallese, V., Buccino, G., Mazziotta, J. C. & Rizzolatti, G. (2005) Grasping the intentions of others with one's own mirror neuron system. *PLoS Biology* 3(3):529–35. [CL]
- Iacoboni, M., Woods, R. P., Brass, M., Bekkering, H., Mazziotta, J. C. & Rizzolatti, G. (1999) Cortical mechanisms of human imitation. *Science* 286(5449):2526–28. [CL, aPMN]
- Iizuka, Y. (1992) Extraversion, introversion, and visual interaction. *Perceptual and Motor Skills* 74:43–50. [aPMN]
- Izard, C. (1971) *The face of emotion*. Appleton Century Crofts. [aPMN, JJO]
- Jack, R. E., Blais, C., Scheepers, C., Schyns, P. G. & Caldara, R. (2009) Cultural confusions show that facial expressions are not universal. *Current Biology* 19(18):1543–48. [RC, CL]
- Jacob, P. (2008) What do mirror neurons contribute to human social cognition? *Mind and Language* 23:190–223. [aPMN]
- Jacob, P. (2009) The tuning-fork model of human social cognition: A critique. *Consciousness and Cognition* 18:229–43. [aPMN]
- Jakobs, E., Manstead, A. S. R. & Fischer, A. H. (1999) Social motives and emotional feelings as determinants of facial displays: The case of smiling. *Personality and Social Psychology Bulletin* 25:424–35. [aPMN]
- Jeannerod, M. (2001) Neural simulation of action: A unifying mechanism for motor cognition. *NeuroImage* 14:S103–S109. [MWA]
- Johnson, M. H. (2005) Subcortical face processing. *Nature Reviews Neuroscience* 6:766–74. [AS]
- Johnson-Laird, P. & Oatley, K. (1989) The language of emotions: An analysis of a semantic field. *Cognition and Emotion* 3:81–123. [aPMN]
- Jörn, P. W., Scharlemann, C. C., Eckel, A. K. & Wilson, R. K. (2001) The value of a smile: Game theory with a human face. *Journal of Economic Psychology* 22(5):617–40. [TAM]
- Kaffman, A. & Meaney, M. J. (2007) Neurodevelopmental sequelae of postnatal maternal care in rodents: Clinical and research implications of molecular insights. *Journal of Child Psychology and Psychiatry* 48(3–4):224–44. [JES]
- Kagan, J. (2007) *What is emotion? History, measures, and meanings*. Yale University Press. [J-MF-D]
- Kalat, J. W. & Shirota, N. M. (2006) *Emotion*, Thomson Wadsworth. [CMC-S]
- Kawagoe, R., Takikawa, Y. & Hikosada, O. (1998) Expectation of reward modulates cognitive signals in the basal ganglia. *Nature Neuroscience* 1:411–16. [aPMN]
- Keillor, J. M., Barrett, A. M., Crucian, G. P., Kortenkamp, S. & Heilman, K. M. (2002) Emotional experience and perception in the absence of facial feedback. *Journal of the International Neuropsychological Society* 8(1):130–35. [aPMN]
- Kelly, D. J., Miell, S. & Caldara, R. (2010) Culture shapes eye movements for visually homogeneous objects. [Original Research Article]. *Frontiers in Perception Science* 1:6. [RC]
- Keltner, D. (1995) Signs of appeasement: Evidence for the distinct displays of embarrassment, amusement, and shame. *Journal of Personality and Social Psychology* 68(3):441–54. [aPMN]
- Keltner, D. & Gross, J. J. (1999) Functional accounts of emotion. *Cognition and Emotion* 13:467–80. [rPMN]
- Keltner, D. & Haidt, J. (1999) Social function of emotions at four levels of analysis. *Cognition and Emotion* 13:505–21. [arPMN]
- Keysers, C. & Gazzola, V. (2006) Towards a unifying neural theory of social cognition. *Progress in Brain Research* 156:379–401. [JSL]
- Keysers, C. & Gazzola, V. (2007) Integrating simulation and theory of mind: From self to social cognition. *Trends in Cognitive Sciences* 11(5):194–96. [CL, aPMN]

- Keysers, C. & Perrett, D. (2004) Demystifying social cognition: A Hebbian perspective. *Trends in Cognitive Science* 8(11):501–507. [BChak]
- Keysers, C., Wicker, B., Gazzola, V., Anton, J. L., Fogassi, L. & Gallese, V. (2004) A touching sight: SII/PV activation during the observation and experience of touch. *Neuron* 42(2):335–46. [BChak, aPMN]
- Kilts, C. D., Egan, G., Gideon, D. A., Ely, T. D. & Hoffman, J. M. (2003) Dissociable neural pathways are involved in the recognition of emotion in static and dynamic facial expressions. *NeuroImage* 18:156–68. [CH-H]
- Kim, P., Feldman, R., Leckman, J. F., Mayes, L. C. & Swain, J. E. (under review) Breastfeeding, brain activation to own infant cry, and maternal sensitivity. *Journal of Child Psychology and Psychiatry*. [JES]
- Kim, P., Leckman, J. F., Mayes, L. C., Newman, M. A., Feldman, R. & Swain, J. E. (2010) Perceived quality of maternal care in childhood and structure and function of mothers' brain. *Developmental Science* 13(4):662–73. [JES]
- Kimbara, I. (2006) On gestural mimicry. *Gesture* 6(1): 39–61. [MVA]
- Kimbara, I. (2008) Gesture form convergence in joint description. *Journal of Nonverbal Behavior* 32(2): 123–31. [MVA]
- Kirouac, G. & Hess, U. (1999) Group membership and the decoding of nonverbal behavior. In: *The social context of nonverbal behavior*, pp. 182–210. Cambridge University Press. [aPMN]
- Kitayama, S., Duffy, S., Kawamura, T. & Larsen, J. (2003) Perceiving an object and its context in different cultures: A cultural look at new look. *Psychological Science* 14:201–208. [CMC-S]
- Kleinhaus, N. M., Richards, T., Sterling, L., Stegbauer, K. C., Mahurin, R., Johnson, L. C., Greenson, J., Dawson, G. & Aylward, E. (2008) Abnormal functional connectivity in autism spectrum disorders during face processing. *Brain* 131:1000–12. [AS]
- Klineberg, O. (1940) *Social psychology*. Holt. [aPMN]
- Klinnert, M., Campos, J., Sorce, J., Emde, R. & Svejda, M. (1983) Emotions as behavior regulators in infancy: Social referencing in infancy. In: *Emotion: Theory, research and experience*, ed. R. Plutchik & H. Kellerman, pp. 57–86. Academic Press. [aPMN]
- Klucharev, V. & Sams, M. (2004) Interaction of gaze direction and facial expressions processing: ERP study. *NeuroReport* 15:621–25. [aPMN]
- Knapp, M. L. & Hall, J. A. (2005) *Nonverbal communication in human interaction*. Wadsworth. [RC]
- Kosslyn, S. M. (1976) Can imagery be distinguished from other forms of internal representation? Evidence from studies of information retrieval time. *Memory and Cognition* 4:291–97. [aPMN]
- Kövecses, Z. (1990) *Emotion concepts*. Springer. [FB]
- Kövecses, Z. (2008) Metaphor and emotion. In: *The Cambridge handbook of metaphor and thought*, ed. J. R. W. Gibbs, pp. 380–96. Cambridge University Press. [FB]
- Kraut, R. E. & Johnston, R. E. (1979) Social and emotional messages of smiling: An ethological approach. *Journal of Personality and Social Psychology* 37:1539–53. [aPMN]
- Kringelbach, M. L. (2005) The human orbitofrontal cortex: Linking reward to hedonic experience. *Nature Reviews Neuroscience* 6(9):691–702. [JES]
- Krumhuber, E. & Kappas, A. (2005) Moving smiles: The role of dynamic components for the perception of the genuineness of smiles. *Journal of Nonverbal Behavior* 29:3–24. [J-MF-D, aPMN]
- Krumhuber, E. G. & Manstead, A. S. R. (2009) Can Duchenne smiles be feigned? New evidence on felt and false smiles. *Emotion* 9:807–20. [J-MF-D]
- Krumhuber, E., Manstead, A. S. R., Cosker, D., Marshall, D., Rosin, P. L. & Kappas, A. (2007) Facial dynamics as indicators of trustworthiness and cooperative behavior. *Emotion* 7(4):730–35. [SC, J-MF-D]
- Krumhuber, E., Manstead, A. S. R. & Kappas, A. (2007) Temporal aspects of facial displays in person and expression perception: The effects of smile dynamics, head-tilt, and gender. *Journal of Nonverbal Behavior* 31:39–56. [aPMN, ES]
- Kunz, M., Prkachin, K. & Lautenbacher, S. (2009) The smile of pain. *Pain* 145:273–75. [J-MF-D]
- LaBarre, W. (1947) The culture basis of emotions and gestures. *Journal of Personality* 16:49–68. [aPMN]
- LaFrance, M. & Hecht, M. A. (1999) Option or obligation to smile: The effect of power and gender on facial expression. In: *The social context of non-verbal behaviour. Studies in emotion and social interactions*, ed. P. Philippot, R. S. Feldman & E. J. Coats, pp. 45–70. Cambridge University Press. [MM]
- Laird, J. D., Alibozak, T., Davainis, D., Deignan, K., Fontanella, K., Hong, J., Levy, B. & Pacheco, C. (1994) Individual differences in the effects of spontaneous mimicry on emotional contagion. *Motivation and Emotion* 18:231–46. [aPMN]
- Lakin, J. L., Chartrand, T. L. & Arkin, R. M. (2008) I am too just like you: Non-conscious mimicry as an automatic behavioral response to social exclusion. *Psychological Science* 19:816–22. [ES]
- Lakoff, G. (1987) *Women, fire, and dangerous things: What categories reveal about the mind*. University of Chicago Press. [FB]
- Lakoff, G. (1993) The syntax of metaphorical semantic role. In: *Semantics and the lexicon*, ed. J. Pustejovsky, pp. 27–36. Kluwer Academic. [FB]
- Lakoff, G. & Johnson, M. (1980) *Metaphors we live by*. University of Chicago Press. [FB]
- Lakoff, G. & Johnson, M. (1999) *Philosophy in the flesh: The embodied mind and its challenge to western thought*. Basic Books. [FB]
- Landauer, T. K. & Dumais, S. T. (1997) A solution to Plato's problem: The latent semantic analysis theory of acquisition, induction, and representation of knowledge. *Psychological Review* 104:211–40. [EM]
- Lane, R., Chua, P. & Dolan, R. (1999) Common effects of emotional valence, arousal and attention on neural activation during visual processing of pictures. *Neuropsychologia* 37:989–97. [aPMN]
- Lane, R. D., Reiman, E. M., Ahern, G. L., Schwartz, G. E. & Davidson, R. J. (1997) Neuroanatomical correlates of happiness, sadness, and disgust. *American Journal of Psychiatry* 154:926–33. [aPMN]
- Larson, E. B. & Yao, X. (2005) Clinical empathy as emotional labor in the patient–physician relationship. *Journal of the American Medical Association* 293(9):1100–106. [FB]
- Laureys, S., Faymonville, M. E., Peigneux, P., Damas, P., Lambermont, B., Del Fiore, G., Degueldre, C., Aerts, J., Luxen, A. & Franck, G. (2002) Cortical processing of noxious somatosensory stimuli in the persistent vegetative state. *NeuroImage* 17:732–41. [CC]
- Laureys, S., Faymonville, M., Degueldre, C., Fiore, G., Damas, P., Lambermont, B., Janssens, N., Aerts, J., Franck, G., Luxen, A., Moonen, G., Lamy, M. & Maquet, P. (2000) Auditory processing in the vegetative state. *Brain* 123(8):1589–601. [CC]
- Lawrence, A. D., Calder, A. J., McGowan, S. W. & Grasby, P. M. (2002) Selective disruption of the recognition of facial expressions of anger. *NeuroReport* 13:881–84. [aPMN]
- Lawrence, A. D., Chakrabarti, B. & Calder, A. J. (2004) Looking at happy and sad faces: An fMRI study. Paper presented at the Annual Meeting of the Cognitive Neuroscience Society, San Diego, CA, April 18–22, 2004. [aPMN]
- Lawrence, E., Shaw, P., Baker, D., Baron-Cohen, S. & David, A. (2004) Measuring empathy – Reliability and validity of the empathy quotient. *Psychological Medicine* 34:911–19. [BChak]
- Leary, T. (1957) *Interpersonal diagnosis of personality*. Ronald. [JMV]
- Leavitt, H. J. (2005) *Top down: Why hierarchies are here to stay and how to manage them more effectively*. Harvard Business School Press. [LH]
- Leckman, J. F. & Mayes, L. C. (1999) Preoccupations and behaviors associated with romantic and parental love. Perspectives on the origin of obsessive-compulsive disorder. *Child and Adolescent Psychiatry Clinics of North America* 8(3):635–65. [JES]
- Ledoux, J. (1996) *The emotional brain: The mysterious underpinnings of emotional life*. Simon & Schuster. [rPMN]
- LeDoux, J. E. (1996) *The emotional brain: The mysterious underpinnings of emotional life*. Simon and Schuster. [EM]
- LeDoux, J. E. (2007) Emotional memory. *Scholarpedia* 2(7):180. [aPMN]
- Lee, T.-W., Dolan, R. J. & Critchley, H. D. (2007) Controlling emotional expression: Behavioral and neural correlates of nonimitative emotional responses. *Cerebral Cortex* 18(1):104–13. [aPMN]
- Lee, T.-W., Josephs, O., Dolan, R. J. & Critchley, H. D. (2006) Imitating expressions: Emotion-specific neural substrates in facial mimicry. *Social Cognitive and Affective Neuroscience* 1(2):122–35. [aPMN]
- Lenzi, D., Trentini, C., Pantano, P., Macaluso, E., Iacoboni, M., Lenzi, G. L. & Ammaniti, M. (2009) Neural basis of maternal communication and emotional expression processing during infant preverbal stage. *Cerebral Cortex* 19(5): 1124–33. [rPMN, JES]
- Leonard, C. M., Rolls, E. T., Wilson, F. A. & Baylis, G. C. (1985) Neurons in the amygdala of the monkey with responses selective for faces. *Behavioural Brain Research* 15(2):159–76. [PBou]
- Leslie, K. R., Johnson-Frey, S. H. & Grafton, S. T. (2004) Functional imaging of face and hand imitation: Towards a motor theory of empathy. *NeuroImage* 21:601–607. [aPMN]
- Likowski, K. U., Mühlberger, A., Seibt, B., Pauli, P. & Weyers, P. (2008) Modulation of facial mimicry by attitudes. *Journal of Experimental Social Psychology* 44:1065–72. [aPMN]
- Linke, R., De Lima, A. D., Schwegler, H. & Pape, H. C. (1999) Direct synaptic connections of axons from superior colliculus with identified thalamo-amygdaloid projection neurons in the rat: Possible substrates of a subcortical visual pathway to the amygdala. *Journal of Comparative Neurology* 403:158–70. [rPMN]
- Lipp, O. V., Price, S. M. & Tellegen, C. L. (2009) No effect of inversion on attentional and affective processing of facial expressions. *Emotion* 9(2):248–59. [LH]
- Lishner, D. A., Cooter, A. B. & Zald, D. H. (2008) Rapid emotional contagion and expressive congruence under strong test conditions. *Journal of Nonverbal Behavior* 32:225–39. [J-MF-D]
- Liu, C., Ge, Y., Mai, X. & Luo, Y. (under review) Eyes are windows to the Chinese soul: Evidence from the detection of real and fake smiles. [CL]

- Lobmaier, J. S. & Perrett, D. I. (in press) The world smiles at me: Self-referential positivity bias when interpreting direction of attention. *Cognition and Emotion*. [JSL]
- Lobmaier, J. S., Tiddeman, B. & Perrett, D. I. (2008) Emotional expression modulates perceived gaze direction. *Emotion* 8(4):573–77. [JSL]
- Lohaus, A., Keller, H. & Voelker, S. (2001) Relationships between eye contact, maternal sensitivity, and infant crying. *International Journal of Behavioral Development* 25:542–48. [aPMN]
- Longo, M. R. & Bertenthal, B. I. (2009) Attention modulates the specificity of automatic imitation to human actors. *Experimental Brain Research* 192:739–44. [DL]
- Magee, J. C. & Galinsky, A. D. (2008) Social hierarchy: The self-reinforcing nature of power and status. *Academy of Management Annals* 2:351–98. [LH]
- Magnee, M. J. C. M., de Gelder, B., van Engeland, H. & Kemner, C. (2007) Facial electromyographic responses to emotional information from faces and voices in individuals with pervasive developmental disorder. *Journal of Child Psychology and Psychiatry* 48:1122–30. [PW]
- Magnée, M. J., Stekelenburg, J. J., Kemner, C. & de Gelder, B. (2007) Similar facial electromyographic responses to faces, voices, and body expressions. *NeuroReport* 18:369–72. [AS]
- Mahon, B. Z. & Caramazza, A. (2008) A critical look at the embodied cognition hypothesis and a new proposal for grounding conceptual content. *Journal of Physiology—Paris* 102:59–70. [EM]
- Maringer, M., Krumbhuber, E., Fischer, A. H. & Niedenthal P. M. (in press) Beyond smile dynamics: Mimicry and beliefs in judgments of smiles. *Emotion*. [BChan, CL, arPMN]
- Markman, A. B. & Dietrich, E. (2000) Extending the classical view of representation. *Trends in Cognitive Sciences* 4:470–75. [EM]
- Markus, H. R. & Kitayama, S. (1991) Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review* 98:224–53. [RC]
- Marsh, A. A., Adams, R. B. & Kleck, R. E. (2005) Why do fear and anger look the way they do? Form and social function in facial expressions. *Personality and Social Psychology Bulletin* 31:73–86. [JMV]
- Marshall, J. (2003) The canonical Smiley (and 1-line symbol) list. Available at: <http://www.astro.umd.edu/~marshall/smileys.html>. [CL]
- Massimelli, M. (2007) The anencephalic newborn: Medical/legal and bioethical issues. *Panminerva Medica* 49(2):83–96. [CC]
- Mathews, A., Fox, E., Yiend, J. & Calder, A. (2003) The face of fear: Effects of eye gaze and emotion on visual attention. *Visual Cognition* 10(7):823–35. [JSL]
- Matsumoto, D., Yoo, S. H. & Fontaine, J. (2008) Mapping expressive differences around the world: The relationship between emotional display rules and individualism versus collectivism. *Journal of Cross-Cultural Psychology* 39(1):55–74. [CMC-S]
- McArthur, L. Z. & Baron, R. M. (1983) Toward an ecological theory of social perception. *Psychological Review* 90:215–38. [aPMN]
- McIntosh, D. (1996) Facial feedback hypotheses: Evidence, implications, and directions. *Motivation and Emotion* 20:121–47. [aPMN]
- McIntosh, D. N. (2006) Spontaneous facial mimicry, liking and emotional contagion. *Polish Psychological Bulletin* 37:31–42. [aPMN]
- McIntosh, D. N., Reichmann-Decker, A., Winkelman, P. & Wilbarger, J. L. (2006) When the social mirror breaks: Deficits in automatic, but not voluntary, mimicry of emotional facial expressions in autism. *Developmental Science* 9:295–302. [aPMN, AS, PW]
- McNeil, N. M., Alibali, M. W. & Evans, J. L. (2000) The role of gesture in children's comprehension of spoken language: Now they need it, now they don't. *Journal of Nonverbal Behavior* 24:131–50. [MWA]
- McNeill, D. (in press) Gesten der Macht und die Macht der Gesten (Gestures of power and the power of gestures) In: *Gesten, Inszenierung, Aufführung und Praxis (Gesture, Staging, Performance, and Practice)*, ed. E. Fischer-Lichte & C. Wulf. Wilhelm Fink. [MWA]
- Mehrabian, A. (1969) Significance of posture and position in the communication of attitude and status relationships. *Psychological Bulletin* 71(5):359–72. [LH]
- Mehu, M. & Dunbar, R. I. M. (2008) Naturalistic observations of smiling and laughter in human group interactions. *Behaviour* 145:1747–80. [MM]
- Mehu, M., Grammer, K. & Dunbar, R. I. M. (2007) Smiles when sharing. *Evolution and Human Behavior* 28(6):415–22. [SC, MM]
- Melville, H. (1852/1996) *Pierre, or, the ambiguities*. Penguin. [aPMN]
- Menzel, E. W., Jr. (1973) Leadership and communication in young chimpanzees. In: *Precultural primate behavior*, ed. J. E. W. Menzel, pp. 192–225. Karger. [aPMN]
- Menzel, E. W., Jr. (1974) A group of young chimpanzees in a one-acre field. In: *Behavior of nonhuman primates*, ed. A. M. Schrier & F. Stollnitz, pp. 83–153. Academic Press. [aPMN]
- Mermillod, M., Bonin, P., Mondillon, L., Alleysson, D. & Vermeulen, N. (in press a) Coarse scales are sufficient for efficient categorization of emotional facial expressions: Evidence from neural computation. *Neurocomputing*. [rPMN]
- Mermillod, M., Droit-Volet, S., Devaux, D., Schaefer, A. & Vermeulen, N. (in press b) Are coarse scales sufficient for fast detection of visual threat? *Psychological Science*. [rPMN]
- Mermillod, M., Vuilleumier, P., Peyrin, C., Alleysson, D. & Marendaz, C. (2009) The importance of low spatial frequency information for recognizing fearful facial expressions. *Connection Science* 21(1):75–83. [rPMN]
- Mesquita, B., Barrett, L. F. & Smith, E. R., eds. (2010) *The mind in context*. Guilford Press. [DL]
- Messinger, D. S., Fogel, A. & Dickson, K. L. (2001) All smiles are positive, but some smiles are more positive than others. *Developmental Psychology* 37:642–53. [aPMN]
- Michel, C., Caldara, R. & Rossion, B. (2006a) Same-race faces are perceived more holistically than other-race faces. *Visual Cognition* 14(1):55–73. [RC]
- Michel, C., Rossion, B., Han, J., Chung, C. S. & Caldara, R. (2006b) Holistic processing is finely tuned for faces of one's own race. *Psychological Science* 17(7):608–15. [RC]
- Milders, M., Crawford, J. R., Lamb, A. & Simpson, S. A. (2003) Differential deficits in expression recognition in gene-carriers and patients with Huntington's disease. *Neuropsychologia* 41:1484–92. [J-MF-D]
- Miles, L. & Johnston, L. (2007) Detecting happiness: Perceiver sensitivity to enjoyment and non-enjoyment smiles. *Journal of Nonverbal Behavior* 31:259–75. [aPMN]
- Minagawa-Kawai, Y., Matsuoka, S., Dan, I., Naoi, N., Nakamura, K. & Kojima, S. (2009) Prefrontal activation associated with social attachment: Facial-emotion recognition in mothers and infants. *Cerebral Cortex* 19:284–92. [aPMN]
- Minagawa-Kawai, Y., Matsuoka, S., Dan, I., Naoi, N., Nakamura, K. & Kojima, S. (2009) Prefrontal activation associated with social attachment: Facial-emotion recognition in mothers and infants. *Cerebral Cortex* 19(2):284–92. [JES]
- Mobbs, D., Greicius, M. D., Abdel-Azim, E., Menon, V. & Reiss, A. L. (2003) Humor modulates the mesolimbic reward centers. *Neuron* 40:1041–48. [aPMN]
- Moffatt, C. A. & Nelson, R. J. (1992) May/December romance: Adaptive significance non probabilis est. *Behavioral and Brain Sciences* 15:106–7. [rPMN]
- Mojzisch, A., Schilbach, L., Helmert, J., Pannasch, S., Velichkovsky, B. & Vogeley, K. (2006) The effects of self-involvement on attention, arousal, and facial expression during social interaction with virtual others: A psychophysiological study. *Social Neuroscience* 1:184–95. [aPMN]
- Mondillon, L., Niedenthal, P. M., Gil, S. & Droit-Volet, S. (2007) Imitation and in-group versus outgroup members' facial expressions of anger: A test with a time perception task. *Social Neuroscience* 2:223–37. [arPMN]
- Montague, D. P. & Walker-Andrews, A. S. (2001) Peekaboo: A new look at infants' perception of emotion expressions. *Developmental Psychology* 37(6):826–38. [LC]
- Montepare, J. M. & Dobish, H. (2003) The contribution of emotion perceptions and their overgeneralizations to trait impressions. *Journal of Nonverbal Behavior* 27:237–54. [JMV]
- Montgomery, K. J., Isenberg, N. & Haxby, J. V. (2007) Communicative hand gestures and object-directed hand movements activated the mirror neuron system. *Social Cognitive and Affective Neuroscience* 2:114–22. [MWA]
- Morris, J. S., Friston, K. J., Buchel, C., Frith, C. D., Young, A. W., Calder, A. J. & Dolan, R. J. (1998) A neuromodulatory role for the human amygdala in processing emotional facial expressions. *Brain* 121:47–57. [aPMN]
- Morris, J. S., Frith, C. D., Perrett, D. I., Rowland, D., Young, A. W., Calder, A. J. & Dolan, R. J. (1996) A differential neural response in the human amygdala to fearful and happy facial expressions. *Nature* 383:812–15. [aPMN]
- Morris, J. S., Öhman, A. & Dolan, R. J. (1999) A subcortical pathway to the right amygdala mediating "unseen" fear. *Proceedings of the National Academy of Sciences USA* 96:1680–85. [rPMN]
- Morris, M. W. & Keltner, D. (2000) How emotions work: The social functions of emotional expression in negotiations. *Research in Organizational Behavior* 22:1–50. [FB]
- Morris, M. W. & Peng, K. (1994) Culture and cause: American and Chinese attributions for social and physical events. *Journal of Personality and Social Psychology* 64(6):949–71. [CMC-S]
- Morton, E. W. (1977) On the occurrence and significance of motivation-structural rules in some bird and mammal sounds. *American Naturalist* 111:855–69. [JJO]
- Multi-Society Task Force on PVS (1994) Medical aspects of the persistent vegetative state. *New England Journal of Medicine* 330(21):1499–508. [CC]
- Murphy, F. C., Michael, A., Robbins, T. W. & Sahakian, B. J. (2003) Neuropsychological impairment in patients with major depressive disorder: The effects of feedback on task performance. *Psychological Medicine* 33:455–67. [aPMN]
- N'Diaye, K., Sander, D. & Vuilleumier, P. (2009) Self-relevance processing in the human amygdala: Gaze direction, facial expression, and emotion intensity. *Emotion* 9(6):798–806. [LC, MM]
- Niedenthal, P. M. (2007) Embodying emotion. *Science* 316:1002–1005. [PBou, J-MF-D, aPMN]
- Niedenthal, P. M. (2008) Emotion concepts. In: *Handbook of emotion*, 3rd edition, ed. M. Lewis, J. M. Haviland-Jones & L. F. Barrett. Guilford Press. [aPMN]

- Niedenthal, P. M., Barsalou, L. W., Ric, F. & Krauth-Gruber, S. (2005a) Embodiment in the acquisition and use of emotion knowledge. In: *Emotion: Conscious and unconscious*, ed. L. Feldman-Barrett, P. M. Niedenthal & P. Winkielman, pp. 21–50. Guilford Press. [arPMN]
- Niedenthal, P. M., Barsalou, L. W., Winkielman, P., Krauth-Gruber, S. & Ric, F. (2005b) Embodiment in attitudes, social perception, and emotion. *Personality and Social Psychology Review* 9:184–211. [aPMN]
- Niedenthal, P. M., Brauer, M., Halberstadt, J. & Innes-Ker, A. (2001) When did her smile drop? Facial mimicry and the influence of emotional state on the detection of change in emotional expression. *Cognition and Emotion* 15:853–64. [CH-H, aPMN, ES]
- Niedenthal, P. M., Halberstadt, J. B., Margolin, J. & Innes-Ker, A. H. (2000) Emotional state and the detection of change in facial expression of emotion. *European Journal of Social Psychology* 30:211–22. [JSL, aPMN]
- Niedenthal, P. M., Hess, U. & Miyamoto, Y. (in preparation) Interpreting the smile across cultures. [RC, aPMN]
- Niedenthal, P. M., Kruth-Gruber, S. & Ric, F. (2006) *The psychology of emotion: Interpersonal, experiential, and cognitive approaches*. Principles of Social Psychology Series. Psychology Press. [rPMN]
- Niedenthal, P. M. & Maringer, M. (2009) Embodied emotion considered. *Emotion Review* 1:122–28. [rPMN]
- Niedenthal, P. M., Winkielman, P., Mondillon, L. & Vermeulen, N. (2009) Embodiment of emotion concepts. *Journal of Personality and Social Psychology* 96(6):1120–36. [J-MF-D, aPMN]
- Nitschke, J. B., Nelson, E. E., Rusch, B. D., Fox, A. S., Oakes, T. R. & Davidson, R. J. (2004) Orbitofrontal cortex tracks positive mood in mothers viewing pictures of their newborn infants. *NeuroImage* 21(2):583–92. [aPMN, JES]
- Noriuchi, M., Kikuchi, Y. & Senoo, A. (2008) The functional neuroanatomy of maternal love: Mother's response to infant's attachment behaviors. *Biological Psychiatry* 63(4):415–23. [DL, JES]
- Oberman, L. M., Hubbard, E. M., McCleery, J. P., Ramachandran, V. S. & Pineda, J. A. (2005) EEG evidence for mirror neuron dysfunction in autism. *Cognitive Brain Research* 24:190–98. [PW]
- Oberman, L. M., Ramachandran, V. S. & Pineda, J. A. (2008) Modulation of mu suppression in children with autism spectrum disorders in response to familiar or unfamiliar stimuli: The mirror neuron hypothesis. *Neuropsychologia* 46:1558–65. [PW]
- Oberman, L. M., Winkielman, P. & Ramachandran, V. S. (2007) Face to face: Blocking facial mimicry can selectively impair recognition of emotional expressions. *Social Neuroscience* 2:167–78. [CH-H, aPMN, ES, PW]
- Oberman, L. M., Winkielman, P. & Ramachandran, V. S. (2009) Slow echo: Facial EMG evidence for the delay of spontaneous, but not voluntary, emotional mimicry in children with autism spectrum disorders. *Developmental Science* 12:510–20. [MSB, AS, PW]
- O'Doherty, J., Critchley, H., Deichmann, R. & Dolan, R. J. (2003) Dissociating valence of outcome from behavioral control in human orbital and ventral prefrontal cortices. *Journal of Neuroscience* 23:7931–39. [aPMN]
- O'Doherty, J., Kringelbach, M. L., Rolls, E. T., Hornak, J. & Andrews C. (2001) Abstract reward and punishment representations in the human orbitofrontal cortex. *Nature Neuroscience* 4(1):95–102. [aPMN]
- Ohala, J. J. (1984) An ethological perspective on common cross-language utilization of F0 of voice. *Phonetica* 41:1–16. [JJO]
- Öhman, A., Lundqvist, D. & Esteves, F. (2001) The face in the crowd revisited: A threat advantage with schematic stimuli. *Journal of Personality and Social Psychology* 80(3):381–96. [LH, aPMN]
- Okun, M., Bowers, D., Springer, U., Shapira, N., Malone, D., Rezaei, A., Nuttin, B., Heilman, K. M., Morecraft, R. J., Rasmussen, S. A., Greenberg, B. D., Foote, K. D., Goodman, W. K. (2004) What's in a "Smile"? Intra-operative observations of contralateral smiles induced by deep brain stimulation. *Neurocase* 10(4):271–79. [aPMN]
- Olsson, A. & Phelps, E. A. (2004) Learned fear of "unseen" faces after Pavlovian, observational, and instructed fear. *Psychological Science* 15:822–28. [EM]
- Olsson, A. & Phelps, E. A. (2007) Social learning of fear. *Nature Neuroscience* 10:1095–102. [EM]
- Ortony, A., Clore, G. & Foss, M. (1987) The referential structure of the affective lexicon. *Cognitive Science* 11:341–64. [aPMN]
- Osgood, C. E., Suci, G. J. & Tannenbaum, P. H. (1957) *The measurement of meaning*. University of Illinois Press. [LH]
- Ouellette, N., Hamon-Hill, C. & Barresi, J. (2010) Differential effect of disrupted simulation during emotion recognition in dynamic and static facial expressions. Poster presented at 22nd Annual Convention of the Association for Psychological Science, Boston, MA, May 27–30, 2010. [CH-H]
- Owen, A., Coleman, M., Boly, M., Davis, M., Laureys, S. & Pickard, J. (2006) Detecting awareness in the vegetative state. *Science* 313:1402. [CC]
- Owren, M. J. & Rendall, D. (2001) Sound on the rebound: Bringing form and function back to the forefront in understanding nonhuman primate vocal signaling. *Evolutionary Anthropology* 10:58–71. [rPMN]
- Palermo, R. & Rhodes, G. (2007) Are you always on my mind? A review of how face perception and attention interact. *Neuropsychologia* 45:75–92. [DL]
- Panksepp, J., Nelson, E. & Siviy, S. (1994) Brain opioids and mother-infant social motivation. *Acta Paediatrica Supplement* 397:40–46. [JES]
- Parkinson, B. (1996) Emotions are social. *British Journal of Psychology* 87:663–83. [DL]
- Parkinson, J. A., Cardinal, R. N. & Everitt, B. J. (2000) Limbic cortical–ventral striatal systems underlying appetitive conditioning. *Progress in Brain Research* 126:263–85. [aPMN]
- Parr, L. A. & Waller, B. (2006) Understanding chimpanzee facial expression: Insights into the evolution of communication. *Social Cognitive and Affective Neuroscience* 1:221–28. [aPMN]
- Patterson, M. L. (1982) A sequential functional model of nonverbal exchange. *Psychological Review* 89:231–49. [aPMN]
- Patterson, M. L. (1983) *Nonverbal behavior: A functional perspective*. Springer. [aPMN]
- Pegna, A. J., Khatib, A., Lazeyras, F. & Seghier, M. L. (2004) Discriminating emotional faces without primary visual cortices involves the right amygdala. *Nature Neuroscience* 8:24–25. [rPMN]
- Peña Cervel, S. (2001) A cognitive approach to the role of body parts in the conceptualization of emotion metaphors. *Epos* 17:245–60. [FB]
- Pennebaker, J. W. & Roberts, T. A. (1992) Toward a his and hers theory of emotion: Gender differences in visceral perception. *Journal of Social and Clinical Psychology* 11:199–212. [rPMN]
- Petty, R. E., Briñol, P. & Tormala, Z. L. (2002) Thought confidence as a determinant of persuasion: The self-validation hypothesis. *Journal of Personality and Social Psychology* 82:722–41. [PBri]
- Petty, R. E. & Cacioppo, J. T. (1986) The elaboration likelihood model of persuasion. *Advances in Experimental Social Psychology* 19:123–205. [PBri]
- Phillips, M. L., Bullmore, E. T., Howard, R., Woodruff, P. W. R., Wright, I. C., Williams, S. C. R., Simmons, A., Andrew, C., Brammer, M. J. & David, A. S. (1998) Investigation of facial recognition memory and happy and sad facial expression perception: An fMRI study. *Psychiatry Research: Neuroimaging* 83:127–38. [aPMN]
- Pitcher, D., Garrido, L., Walsh, V. & Duchaine, B. (2008) TMS disrupts the perception and embodiment of facial expressions. *Journal of Neuroscience* 28(36):8929–33. [aPMN]
- Pollack, A. (1996) Happy in the East (^\_^) or smiling in the West:-). *The New York Times*, August 12, 1996, p. D5. [CL]
- Pourtois, G., Dan, E. S., Grandjean, D., Sander, D. & Vuilleumier, P. (2005) Enhanced extrastriate visual response to bandpass spatial frequency filtered fearful faces: Time course and topographic evoked-potentials mapping. *Human Brain Mapping* 26:65–79. [rPMN]
- Pourtois, G., Sander, D., Andres, M., Grandjean, D., Reveret, L., Olivier, E. & Vuilleumier, P. (2004) Dissociable roles of the human somatosensory and superior temporal cortices for processing social face signals. *European Journal of Neuroscience* 20(12):3507–15. [LC, aPMN, DAS]
- Pourtois, G. & Vuilleumier, P. (2006) The perception of fear in faces: Involuntary and unconscious responses in the human brain as revealed by functional imaging. In: *Fear in cognitive neurosciences*, pp. 63–95. Nova Science Publishers. [aPMN]
- Preuschoft, S. & van Hooff, J. A. R. A. M. (1997) The social function of "smile" and "laughter": Variations across primate species and societies. In: *Non-verbal communication: Where nature meets culture*, ed. U. Segerstrale & P. Molnár, pp. 171–89. Erlbaum. [MM, aPMN]
- Pugh, S. D. (2001) Service with a smile: Emotional contagion in the service encounter. *Academy of Management Journal* 44(5):1018–27. [FB]
- Putman, P., Hermans, E. & van Honk, J. (2006) Anxiety meets fear in perception of dynamic expressive gaze. *Emotion* 6(1):94–102. [JSL]
- Rafaeli, A. (1989) When clerks meet customers: A test of variables related to emotional expressions on the job. *Journal of Applied Psychology* 74(3):385–93. [FB]
- Rafaeli, A. & Sutton, R. I. (1990) Busy stores and demanding customers: How do they affect the display of positive emotion? *Academy of Management Journal* 33(3):623–37. [FB]
- Rapcsak, S. Z., Galper, S. R., Comer, J. F., Reminger, S. L., Nielsen, L., Kaszniak, A. W., Verfaellie, M., Laguna, J. F., Labiner, D. M. & Cohen, R. A. (2000) Fear recognition deficits after focal brain damage: A cautionary note. *Neurology* 54:575–81. [J-MF-D]
- Rauch, S. L., Shin, L. M., Dougherty, D. D., Alpert, N. M., Orr, S. P., Lasko, M., Macklin, M. L., Fischman, A. J. & Pitman, R. K. (1999) Neural activation during sexual and competitive arousal in healthy men. *Psychiatry Research, Neuroimaging Section* 911–10. [aPMN]
- Reddy, V. (2003) On being the object of attention: Implications for self-other consciousness. *Trends in Cognitive Science* 7(9):397–402. [LC]
- Redican, W. K. (1975) Facial expression in non human primates. In: *Primate behavior*, vol. 4, ed. L. A. Rosenblum, pp. 103–94. Academic Press. [LH]

- Redoute, J., Stoleru, S., Gregoire, M., Costes, N., Cinotti, L., Lavenne, F., Le Bars, D., Forest, M. & Pujol, J. (2000) Brain processing of visual sexual stimuli in human males. *Human Brain Mapping* 11:162–77. [aPMN]
- Rees, C. E., Knight, L. V. & Wilkinson, C. E. (2007) Doctors being up there and we being down here: A metaphorical analysis of talk about student/doctor-patient relationships. *Social Science & Medicine* 65(4):725–37. [FB]
- Richardson, H. J. & Howcroft, D. (2006) The contradictions of CRM - A critical lens on call centres. *Information and Organization* 16(1):56–81. [FB]
- Richeson, J., Todd, A., Trawalter, S. & Baird, A. (2008) Eye-gaze direction modulates race-related amygdala activity. *Group Processes and Intergroup Relations* 11:233–46. [aPMN]
- Rinn, W. E. (1991) Neuropsychology of facial expression. In: *Fundamentals of nonverbal behavior*, ed. R. S. Feldman & B. Rimé, pp. 3–30. Press Syndicate of the University of Cambridge. [aPMN]
- Rizzolatti, G. & Craighero, L. (2004) The mirror-neuron system. *Annual Review of Neuroscience* 27:169–92. [aPMN]
- Rizzolatti, G. & Fabbri-Destro, M. (2008) The mirror neuron system and its role in social cognition. *Current Opinion in Neurobiology* 18:179–84. [KE]
- Rizzolatti, G., Fadiga, L., Gallese, V. & Fogassi, L. (1996) Premotor cortex and the recognition of motor actions. *Cognitive Brain Research* 3:131–41. [aPMN]
- Rizzolatti, G., Fogassi, L. & Gallese, V. (2001) Neurophysiological mechanisms underlying the understanding and imitation of action. *Nature Reviews Neuroscience* 2:661–70. [MVA]
- Rolls, E. (2000) The orbitofrontal cortex and reward. *Cerebral Cortex* 10(3):284–94. [aPMN]
- Rolls, E. T. (2004) The functions of the orbitofrontal cortex. *Brain and Cognition* 55:11–29. [aPMN]
- Rosenberg, S., Nelson, C. & Vivekananthan, P. (1968) A multidimensional approach to the structure of personality impressions. *Journal of Personality and Social Psychology* 9:283–94. [JMV]
- Russell, J. A. (1994) Is there universal recognition of emotion from facial expression? A review of the cross-cultural studies. *Psychological Bulletin* 115:102–41. [J-MF-D]
- Russo, N. (1975) Eye contact, interpersonal distance, and the equilibrium theory. *Journal of Personality and Social Psychology* 31:497–502. [aPMN]
- Rutherford, M. D. & McIntosh, D. N. (2007) Rules versus prototype matching: Strategies of perception of emotional facial expressions in the autism spectrum. *Journal of Autism and Developmental Disorders* 37:187–96. [PW]
- Ruys, K. I. & Aarts, H. (in press) When competition merges people's behavior: Interdependency activates shared action representations. *Journal of Experimental Social Psychology*. DOI: 10.1016/j.jesp.2010.05.016. [DL]
- Ruys, K. I. & Stapel, D. A. (2008a) Emotion elicitor or emotion-messenger? Subliminal exposure to two faces of facial expressions. *Psychological Science* 19:593–600. [DL]
- Ruys, K. I. & Stapel, D. A. (2008b) The secret life of emotions. *Psychological Science* 19:385–91. [DL]
- Saether, L., Van Belle, W., Laeng, B., Brennen, T. & Øvervoll, M. (2009) Anchoring gaze when categorizing faces' sex: Evidence from eye-tracking data. *Vision Research* 49:2870–80. [doi:10.1016/j.visres.2009.09.001]. [ES]
- Sander, D., Grafman, J. & Zalla, T. (2003) The human amygdala: An evolved system for relevance detection. *Reviews in the Neurosciences* 14(4):303–16. [LC, aPMN]
- Sander, D., Grandjean, D., Kaiser, S., Wehrle, T. & Scherer, K. R. (2007) Interaction effects of perceived gaze direction and dynamic facial expression: Evidence for appraisal theories of emotion. *European Journal of Cognitive Psychology* 19(3):470–80. [LC, MM]
- Sato, W., Kochiyama, T., Uono, S. & Yoshikawa, S. (2010) Amygdala integrates emotional expression and gaze direction in response to dynamic facial expressions. *NeuroImage* 50(4):1658–65. [LC]
- Sauter, D. A. (2010) More than happy: The need for disentangling positive emotions. *Current Directions in Psychological Science* 19(1):36–40. [DAS]
- Sauter, D. A. (in press) Are positive vocalizations perceived as communicating happiness across cultural boundaries? *Communicative & Integrative Biology*. [DAS]
- Sauter, D. A., Eisner, F., Ekman, P. & Scott, S. K. (2010) Cross-cultural recognition of basic emotions through nonverbal emotional vocalizations. *Proceedings of the National Academy of Sciences USA* 107(6):2408–12. [DAS]
- Scharlemann, J. P. W., Eckel, C. C., Kacelnik, A. & Wilson, R. K. (2001) The value of a smile: Game theory with a human face. *Journal of Economic Psychology* 22(5):617–40. [TAM]
- Scherer, K. R. (1987) Towards a dynamic theory of emotion: The component process model of affective states. *Geneva Studies in Emotion and Communication* 1:1–98. Retrieved from [http://www.unige.ch/fapse/emotion/publications/pdf/tde\\_1987.pdf](http://www.unige.ch/fapse/emotion/publications/pdf/tde_1987.pdf). [rPMN]
- Scherer, K. R. (2001) *Appraisal processes in emotion: Theory, methods, research*. Oxford University Press. [JSL]
- Schilbach, L., Eickhoff, S. B., Mojszisch, A. & Vogeley, K. (2008) What's in a smile? Neural correlates of facial embodiment during social interaction. *Social Neuroscience* 3:37–50. [DL, aPMN]
- Schilbach, L., Wohlschlaeger, A., Kraemer, N., Newen, A., Shah, N. & Fink, G., (2006) Being with virtual others: Neural correlates of social interaction. *Neuropsychologia* 44:718–30. [aPMN]
- Schmid-Mast, M. & Hall, J. A. (2004) When is dominance related to smiling? Assigned dominance, dominance preference, trait dominance, and gender moderators. *Sex Roles* 50(5–6):387–99. [MM]
- Schnakers, C., Perrin, F., Schabus, M., Majerus, S., Ledoux, D., Damas, P., Boly, M., Vanhauwenhuyse, A., Bruno, M. A., Moonen, G. & Laureys, S. (2008) Voluntary brain processing in disorders of consciousness. *Neurology* 71:1614–20. [CC]
- Schneider, K. & Josephs, I. (1991) The expressive and communicative functions of preschool children's smiles in an achievement situation. *Journal of Nonverbal Behavior* 15:185–98. [J-MF-D]
- Schore, A. (2001) Effects of a secure attachment relationship on right brain development, affect regulation, and infant mental health. *Infant Mental Health Journal* 22:7–66. [aPMN]
- Schrammel, F., Pannasch, S., Graupner, S.-T., Mojszisch, A. & Velichkovsky, B. M. (2009) Virtual friend or threat? The effects of facial expressions and gaze interaction on psychophysiological responses and emotional experience. *Psychophysiology* 46:922–31. [BChan, aPMN]
- Schulte-Rüther, M., Markowitsch, H. J., Shah, N. J., Fink, G. R. & Piefke, M. (2008) Gender differences in brain networks supporting empathy. *NeuroImage* 42:393–403. [ES]
- Schultz, R., Gauthier, I., Klin, A., Fulbright, R., Anderson, A. & Volkmar, F. (2000) Abnormal ventral temporal cortical activity during face discrimination among individuals with autism and Asperger syndrome. *Archives of General Psychiatry* 57:331–40. [aPMN]
- Schultz, W. (2007) Multiple dopamine functions at different time courses. *Annual Review of Neuroscience* 30:259–88. [PBou]
- Schwarz, N. (1990) Feelings as information: Informational and motivational functions of affective states. In: *Foundations of social behavior*, vol. 2E, ed. T. Higgins & R. Sorrentino, pp. 527–61. Guilford Press. [JSL]
- Schyns, P. G., Bonnar, L. & Gosselin, F. (2002) Show me the features! Understanding recognition from the use of visual information. *Psychological Science* 13:402–409. [ES]
- Semin, G. R. & Cacioppo, J. T. (2008) Grounding social cognition: Synchronization, entrainment, and coordination. In: *Embodied grounding: Social, cognitive, affective, and neuroscientific approaches*, ed. G. R. Semin & E. R. Smith, pp. 119–47. Cambridge University Press. [aPMN]
- Senior, C., Phillips, M. L., Barnes, J. & David, A. S. (1999) An investigation into the perception of dominance from schematic faces: A study using the World-Wide Web. *Behavior Research Methods, Instruments and Computers* 31:341–46. [aPMN]
- Senju, A. & Johnson, M. A. (2009a) The eye contact effect: Mechanisms and development. *Trends in Cognitive Sciences* 13:127–34. [rPMN, AS]
- Senju, A. & Johnson, M. H. (2009b) Atypical eye contact in autism: Models, mechanisms and development. *Neuroscience and Biobehavioral Reviews* 33:1204–14. [AS]
- Senju, A., Yaguchi, K., Tojo, Y. & Hasegawa, T. (2003) Eye contact does not facilitate detection in children with autism. *Cognition* 89:443–51. [AS]
- Shi, C. & Davis, M. (2001) Visual pathways involved in fear conditioning measured with fear potentiated startle: Behavioral and anatomic studies. *Journal of Neuroscience* 21:9844–55. [rPMN]
- Shiota, M. N., Campos, B. & Keltner, D. (2003) The faces of positive emotion: Prototype displays of awe, amusement, and pride. *Annals of the New York Academy of Sciences* 1000(1):296–99. [DAS]
- Singer, T. (2006) The neuronal basis and ontogeny of empathy and mind reading: Review of the literature and implications for future research. *Neuroscience and Biobehavioral Reviews* 30:855–63. [ES]
- Singer, T., Seymour, B., O'Doherty, J., Kaube, H., Dolan, R. & Frith, C. (2004) Empathy for pain involves the affective but not sensory components of pain. *Science* 303(5661):1157–67. [BChak]
- Smith, E. & Semin, G. (2007) Situated social cognition. *Current Directions in Psychological Science* 16:132–35. [aPMN]
- Smith, K. R., DeMarree, K. G., Briñol, P. & Petty, R. E. (2010) *Mimicry: A self-validation analysis*. Unpublished manuscript, Texas Tech University. [PBri]
- Smith, M. L., Cottrell, G. W., Gosselin, F. & Schyns, P. G. (2005) Transmitting and decoding facial expressions. *Psychological Science* 16(3):184–89. [CL]
- Smith, M. L., Cottrell, G., Gosselin, F. & Schyns, P. G. (2005) Transmitting and decoding facial expressions of emotions. *Psychological Science* 16:184–89. [aPMN]
- Solomon, K. O. & Barsalou, L. W. (2004) Perceptual simulation in property verification. *Memory and Cognition* 32:244–59. [aPMN]
- Soltis, J. (2004) The signal functions of early infant crying. *Behavioral and Brain Sciences* 27(4):443–58; discussion 459–90. [JES]
- Sonnby-Borgström, M. (2002) Automatic mimicry reactions as related to differences in emotional empathy. *Scandinavian Journal of Psychology* 43:433–43. [aPMN]

- Soussignan, R. (2002) Duchenne smile, emotional experience, and autonomic reactivity: A test of the facial feedback hypothesis. *Emotion* 2:52–74. [aPMN]
- Spence, M. (1973) Job market signaling. *The Quarterly Journal of Economics* 87(3):355–74. [SC]
- Spezio, M., Adolphs, R., Hurley, R. & Piven, J. (2007a) Abnormal use of facial information in high-functioning autism. *Journal of Autism and Developmental Disorders* 37:929–39. [aPMN]
- Spezio, M. L., Huang, P.-Y. S., Castelli, F. & Adolphs, R. (2007b) Amygdala damage impairs eye contact during conversations with real people. *Journal of Neuroscience* 27:3994–97. [aPMN]
- Stel, M. & van Knippenberg, A. (2008) The role of facial mimicry in the recognition of affect. *Psychological Science* 19:984–85. [aPMN, ES]
- Stel, M., van den Heuvel, C. & Smeets, R. (2008) Facial feedback mechanisms in autistic spectrum disorders. *Journal of Autism and Developmental Disorders* 38:1250–58. [PW]
- Strack, F. & Deutsch, R. (2004) Reflective and impulsive determinants of social behavior. *Personality and Social Psychology Review* 8:220–47. [aPMN]
- Strathearn, L., Fonagy, P., Amico, J. & Montague, P. R. (2009) Adult attachment predicts maternal brain and oxytocin response to infant cues. *Neuropsychopharmacology* 34(12):2655–66. [rPMN]
- Straube, T., Weisbrod, A., Schmidt, S., Raschdorf, C., Preul, C., Mentzel, H. J. & Miltner, W. H. R. (2010) No impairment of recognition and experience of disgust in a patient with a right-hemispheric lesion of the insula and basal ganglia. *Neuropsychologia* 48:1735–41. [J-MF-D]
- Strayer, J. (1993) Children's concordant emotions and cognitions in response to observed emotions. *Child Development* 64(1):188–201. [aPMN]
- Striano, T., Kopp, F., Grossmann, T. & Reid, V. (2006) Eye contact influences neural processing of emotional expressions in 4-month-old infants. *Social Cognitive and Affective Neuroscience* 1:87–94. [aPMN]
- Surakka, V. & Hietanen, J. (1998) Facial and emotional reactions to Duchenne and non-Duchenne smiles. *International Journal of Psychophysiology* 29(1):23–33. [aPMN]
- Surguladze, S. A., Brammer, M. J., Young, A. W., Andrew, C., Travis, M. J., Williams, S. C. & Phillips, M. L. (2003) A preferential increase in the extrastriate response to signals of danger. *NeuroImage* 19:1317–28. [aPMN]
- Sutton, R. I. (1991) Maintaining norms about expressed emotions: The case of bill collectors. *Administrative Science Quarterly* 36(2):245. [FB]
- Sutton, R. I. & Rafaeli, A. (1988) Untangling the relationship between displayed emotions and organizational sales: The case of convenience stores. *Academy of Management Journal* 31(3):461–87. [FB]
- Swain, J. E. (2008) Baby stimuli and the parent brain: Functional neuroimaging of the neural substrates of parent–infant attachment. *Psychiatry (Edgmont)* 5(8): 28–36. [rPMN, JES]
- Swain, J. E. (2010) The human parental brain: In vivo neuroimaging. *Progress in Neuro-Psychopharmacology & Biological Psychiatry*. 2010 Oct 29. [Epub ahead of print]
- Swain, J. E. & Lorberbaum, J. P. (2008) Imaging the human parental brain. In: *Neurobiology of the parental brain*, ed. R. S. Bridges, pp. 83–100. Elsevier. [JES]
- Swain, J. E., Lorberbaum, J. P., Kose, S. & Strathearn, L. (2007) Brain basis of early parent–infant interactions: Psychology, physiology, and in vivo functional neuroimaging studies. *Journal of Child Psychology and Psychiatry* 48(3–4):262–87. [JES]
- Swain, J. E., Mayes, L. C. & Leckman, J. F. (2004) The development of parent–infant attachment through dynamic and interactive signaling loops of care and cry. *Behavioral and Brain Sciences* 27(4):472–73. [JES]
- Symons, L. A., Hains, S. M. J. & Muir, D. W. (1998) Look at me: 5-month-old infants' sensitivity to very small deviations in eye-gaze during social interactions. *Infant Behavioral Development* 21:531–36. [aPMN]
- Tager-Flusberg, H. (2007) Evaluating the theory-of-mind hypothesis of autism. *Current Directions in Psychological Science* 16:311–15. [KE]
- Taylor, P. & Bain, P. (1999) "An assembly line in the head": Work and employee relations in the call centre. *Industrial Relations Journal* 30(2):101–17. [FB]
- Theoret, H., Halligan, E., Kobayashi, M., Fregni, F., Tager-Flusberg, H. & Pascual-Leone, A. (2005) Impaired motor facilitation during action observation in individuals with autism spectrum disorder. *Current Biology* 15:R84–R85. [PW]
- Thibault, P., Levesque, M., Gosselin, P. & Hess, U. (2008) Cultural aspects of smile authenticity. Paper presented at the 29th International Congress of Psychology, Berlin, Germany, July 20–25, 2008. [aPMN]
- Thibault, P., Levesque, M., Gosselin, P. & Hess, U. (submitted) The Duchenne marker is NOT a universal signal of smile authenticity: But it can be learned! [aPMN]
- Tiedens, L. Z. & Fragale, A. R. (2003) Power moves: Complementarity in dominant and submissive nonverbal behavior. *Journal of Personality and Social Psychology* 84(3):558–68. [LH]
- Tinbergen, N. (1963) On aims and methods of ethology. *Zeitschrift für Tierpsychologie* 20:410–33. [MM]
- Tipples, J., Atkinson, A. P. & Young, A. W. (2002) The eyebrow frown: A salient social signal. *Emotion* 2:288–96. [aPMN]
- Todorov, A. (2008) Evaluating faces on trustworthiness: An extension of systems for recognition of emotions signaling approach/avoidance behaviors. *Annals of the New York Academy of Sciences* 1124:208–24. [JMV]
- Tomalski, P., Johnson, M. H. & Csibra, G. (2009) Temporal-nasal asymmetry of rapid orienting to face-like stimuli. *NeuroReport* 20:1309–12. [AS]
- Tomkins, S. S. (1962) *Affect imagery consciousness: Vol. 1. The positive affects*. Springer. [rPMN]
- Tomkins, S. S. (1963) *Affect imagery consciousness: Vol. 2. The negative affects*. Springer. [rPMN]
- Tracy, J. L. & Robins, R. W. (2004) Show your pride: Evidence for a discrete emotion expression. *Psychological Science* 15:194–97. [aPMN]
- Tracy, J. L. & Robins, R. W. (2008) The nonverbal expression of pride: Evidence for cross-cultural recognition. *Journal of Personality and Social Psychology* 94:516–30. [aPMN]
- Trevarthen, C. (1974) Conversations with a two-month-old. *New Scientist* 2:230–35. [aPMN]
- Tronick, E. Z. (1989) Emotions and emotional communication in infants. *American Psychologist* 44(2):112–19. [JES]
- Tronick, E., Als, H., Adamson, L., Wise, S. & Brazelton, T. (1978) The infant's response to entrapment between contradictory messages in face to face interaction. *Journal of the American Academy of Child Psychiatry* 17:1–13. [aPMN]
- Tsao, D. Y. & Livingstone, M. S. (2008) Mechanisms of face perception. *Annual Review of Neuroscience* 31:411–37. [PBou]
- Turella, L., Pierno, A., Tubaldi, F. & Castiello, U. (2009) Mirror neurons in humans: Consisting or confounding evidence? *Brain and Language* 108:10–21. [aPMN]
- van Baaren, R. B., Maddux, W. W., Chartrand, T. L., de Bouter, C. & van Knippenberg, A. (2003) It takes two to mimic: Behavioral consequences of self-construals. *Journal of Personality and Social Psychology* 84:1093–102. [DL]
- van der Gaag, C., Minderaa, R. & Keyers, C. (2007) Facial expressions: What the mirror neuron system can and cannot tell us. *Social Neuroscience* 2:179–222. [aPMN]
- Van Hooff, J. A. R. A. M. (1967) The facial displays of the catarrhine monkeys and apes. In: *Primate ethology*, ed. D. Morris, pp. 7–68. Weidenfeld & Nicolson. [LH]
- van Hooff, J. A. R. A. M. (1976) The comparison of the facial expressions in man and higher primates. In: *Methods of inference from animal to human behavior*, ed. M. von Cranach, pp. 165–96. Aldine. [aPMN]
- Vanhaudenhuyse, A., Schnakers, C., Bredart, S. & Laureys, S. (2008) Assessment of visual pursuit in post-comatose states: Use a mirror. *Journal of Neurology Neurosurgery and Psychiatry* 79(2):223. [CC]
- Vatsyayan, K. (1996) *Bharata, the Natyasastra*. Sahitya Akademi. [BChak]
- Vazire, S., Naumann, L. P., Rentfrow, P. J. & Gosling, S. D. (2009) Smiling reflects different emotions in men and women. *Behavioral and Brain Sciences* 32:403–405. [J-MF-D]
- Vigil, J. M. (2009) A socio-relational framework of sex differences in the expression of emotion. *Behavioral and Brain Sciences* 32:375–428. [J-MF-D, ES, JMV]
- Vizioli, L., Foreman, K., Rousselet, G. A. & Caldara, R. (2010) Inverting faces elicits sensitivity to race on the N170 component: A cross-cultural study. *Journal of Vision* 10(1):1–23. [RC]
- von Cranach, M. (1971) The role of orienting behavior in human interaction. In: *Behavior and environment: The use of space by animal and man*, ed. A. H. Esser, pp. 217–37. Plenum Press. [aPMN]
- Vrij, A., Semin, G. R. & Bull, R. (2006) Insight into behavior displayed during deception. *Human Communication Research* 22(4):544–62. [SC]
- Vuilleumier, P., Armony, J. L., Driver, J. & Dolan, R. J. (2003) Distinct spatial frequency sensitivities for processing faces and emotional expressions. *Nature Neuroscience* 6:624–31. [rPMN]
- Wacker, J., Chavanon, M. L., Leue, A. & Stemmler, G. (2010) Trait BIS predicts alpha asymmetry and P300 in a go/no-go task. *European Journal of Personality* 24:85–105. [rPMN]
- Waller, B. & Dunbar, R. I. M. (2005) Differential behavioural effects of silent bared teeth display and relaxed open mouth display in chimpanzees (*Pan troglodytes*). *Ethology* 111:129–42. [aPMN]
- Walsh, D. & Hewitt, J. (1985) Giving men the come-on: Effect of eye contact and smiling in a bar environment. *Perceptual and Motor Skills* 61:873–74. [aPMN]
- Whalen, P. J., Davis, F. C., Oler, J. A., Kim, H., Kim, M. J. & Neta, M. (2009) Human amygdala response to facial expressions of emotion. In: *The human amygdala*, ed. P. Whalen & E. A. Phelps, pp. 265–88. Guilford Press. [PBou]
- Whalen, P. J. & Kleck, R. E. (2008) The shape of faces (to come). *Nature Neuroscience* 11(7):739–40. [LH]
- Whalen, P. J., Rauch, S. L., Etkoff, N. L., McInerney, S. C., Lee, M. & Jenike, M. A. (1998) Masked presentations of emotional facial expressions modulate

- amygdala activity without explicit knowledge. *Journal of Neuroscience* 18:411–18. [aPMN]
- Whalen, P. J., Shin, L. M., McInerney, S. C., Fischer, H., Wright, C. I. & Rauch, S. L. (2001) A functional MRI study of human amygdala responses to facial expressions of fear vs. anger. *Emotion* 1:70–83. [aPMN]
- Wicker, B., Keysers, C., Plailly, J., Royet, J. P., Gallese, V. & Rizzolatti, G. (2003) Both of us disgusted in my insula: The common neural basis of seeing and feeling disgust. *Neuron* 40:655–64. [BChak, aPMN]
- Wild, B., Erb, M. & Bartels, M. (2001) Are emotions contagious? Evoked emotions while viewing emotionally expressive faces: Quality, quantity, time course, and gender differences. *Psychiatry Research* 102:109–24. [aPMN]
- Willems, R. M., Özyürek, A. & Hagoort, P. (2007) When language meets action: The neural integration of gesture and speech. *Cerebral Cortex* 17:2322–33. [MSB]
- Williams, J., Whiten, A., Suddendorf, T. & Perrett, D. I. (2001) Imitation, mirror neurons and autism. *Neuroscience and Biobehavioral Reviews* 25(4): 287–95. [MSB]
- Winkelman, P., McIntosh, D. N. & Oberman, L. (2009) Embodied and disembodied emotion processing: Learning from and about typical and autistic individuals. *Emotion Review* 2:178–90. [aPMN, PW]
- Winston, J. S., O'Doherty, J. & Dolan, R. J. (2003) Common and distinct neural responses during direct and incidental processing of multiple facial emotions. *NeuroImage* 20:84–97. [aPMN]
- Wiseman, R. L. & Pan, X. (2004) Smiling in the People's Republic of China and the United States: Status and situational influences on the social appropriateness of smiling. *Intercultural Communication Studies* 13(1):1–18. [CMC-S]
- Wojciszke, B. (2005) Morality and competence in person and self perception. *European Review of Social Psychology* 16:155–88. [JMV]
- Woodworth, R. S. (1915) A revision of imageless thought. *Psychological Review* 22:1–27. [EM]
- Working Party of the Royal College of Physicians (2003) The vegetative state: Guidance on diagnosis and management. *Clinical Medicine* 3:249–54. [CC]
- xinhuanet. (2008) The mystery of the small points in those ancient ladies' face at the Beijing Olympics opening ceremony. Available at: <http://cul.shangdu.com/recommend/20080811-10249/index.shtml>. [CL]
- Xu, X., Zuo, X., Wang, X. & Han, S. (2009) Do you feel my pain? Racial group membership modulates empathic neural responses. *Journal of Neuroscience* 29(26):8525–29. [RC]
- Yabar, Y., Johnston, L., Miles, L. & Peace, V. (2006) Implicit behavioral mimicry: Investigating the impact of group membership. *Journal of Nonverbal Behavior* 30:97–113. [J-MF-D]
- Yang, T. T., Menon, V., Eliez, S., Blasey, C., White, C. D., Reid, A. J., Gotlib, I. H. & Reiss, A. L. (2002) Amygdalar activation associated with positive and negative facial expressions. *NeuroReport* 13:1737–41. [aPMN]
- Yu, N. (2008) Metaphor form body and culture. In: *The Cambridge handbook of metaphor and thought*, ed. J. R. W. Gibbs, pp. 247–61. Cambridge University Press. [FB]
- Yuki, M., Maddux, W. W. & Masuda, T. (2007) Are the windows to the soul the same in the East and West? Cultural differences in using the eyes and mouth as cues to recognize emotions in Japan and the United States. *Journal of Experimental Social Psychology* 43(2):303–11. [CL]
- Yuki, M., Maddux, W. W. & Masuda, T. (2007) Are the windows to the soul the same in the East and West? Cultural differences in using the eyes and mouth to recognize emotions in Japan and the United States. *Journal of Experimental Social Psychology* 43:202–11. [rPMN]
- Zahavi, A. (1975) Mate selection: A selection for a handicap. *Journal of Theoretical Biology* 53(1): 205–14. [SC]
- Zajonc, R. B., Adelman, P. K., Murphy, S. T. & Niedenthal, P. M. (1987) Convergence in the physical appearance of spouses: An implication of the vascular theory of emotional efference. *Motivation and Emotion* 11:335–46. [aPMN]
- Zajonc, R., Murphy, S. & Inglehart, M. (1989) Feeling and facial efference: Implications of the vascular theory of emotion. *Psychological Review* 96:395–416. [aPMN]
- Zapf, D. (2002) Emotion work and psychological well-being: A review of the literature and some conceptual considerations. *Human Resource Management Review* 12(2): 237–68. [FB]
- Zebrowitz, L. A., Kikuchi, M. & Fellous, J. M. (2010) Facial resemblance to emotions: Group differences, impression effects, and race stereotypes. *Journal of Personality and Social Psychology* 98:175–89. [J-MF-D]
- Zink, C. F., Tong, Y., Chen, Q., Bassett, D., Stein, J. L. & Meyer-Lindenberg, A. (2008) Know your place: Neural processing of social hierarchy in humans. *Neuron* 58: 273–83. [aPMN]
- Zwaan, R. A. (2008) Experiential traces and mental simulations in language comprehension. In: *Symbols, embodiment, and meaning*, ed. M. DeVega, A. M. Glenberg & A. C. Graesser, pp. 165–80. Oxford University Press. [EM]