

Cultural Differences in Emotional Expressions and Body Language

Beatrice de Gelder and Elisabeth Huis in 't Veld

Abstract

As our environment becomes increasingly more international, we are interacting increasingly more with people from different cultures. During social interactions, it is important to respond appropriately to the cues that are relevant in a given situation. People are expected to behave in a suitable way to avoid offending others. For example, an appropriate response to a greeting can avoid much misunderstanding. Cultural variations have often been named as possible factors for explaining differences in processing emotions. Because culture is in part about regulating social interaction, one expects to find that cultural norms define display rules that are at least characteristic of the daily expressions of emotions. This chapter addresses whether there are important cultural factors that determine whole-body expressions of emotion, how they are perceived, how they are displayed, and what they are.

Key Words: culture, neuroscience, body expressions of emotion, social interactions, processing emotions

Cultural Perspectives on the Perception of Body Expression

With current communication technologies and global enterprises, our environment is becoming more international every day. This means that we are interacting increasingly more with people from different cultures. During social interactions, it is very important to respond appropriately to the cues that are relevant in a given situation. People are expected to behave in a suitable way in order to avoid offending others. For example, an appropriate response to a greeting can avoid a lot of misunderstanding, and correctly judging the intentions of one's business partner can make all the difference between reaching a desirable deal or not. Cultural variations have often been named as possible factors for explaining differences in processing emotions. Because culture is in part about regulating social interaction, one expects to find that cultural norms define display rules that are at least characteristic of the daily expressions of emotions. This chapter addresses the

questions of whether there are also important cultural factors that determine whole body expressions of emotion, how they are perceived, how they are displayed, and what they are.

The few studies that have investigated cultural aspects of body expressions and emotion have examined facial expression recognition in different cultures. Again, the vast majority of research articles on cross-cultural differences in emotion perception have examined the recognition of facial expressions. In briefly reviewing this literature, one notes that there is nothing like a systematic analysis of the kinds of questions and the types of issues that belong specifically here. In many of the studies, it is not clear where, at what level, and at what stage during individual face processing cultural effects can enter the processing routines. The notion of *culture* is rarely commented on, and that of *race* is usually used at a descriptive level only, sidestepping the sophisticated analyses that biologists and anthropologists use nowadays to understand this term.

One might view this set of questions as belonging to the new field of cultural neuroscience, expecting that they will be treated more systematically in the near future. Growing insight in the neurological processes underlying face and emotion recognition, the influence of race and culture on these processes, and cultural variations in display rules provides a framework for the much needed research on cultural differences in the bodily expressions of emotion and social interactions.

Culture, Race, and Face Perception

The main aspects of faces that have been studied from a cross-cultural perspective are identity, expression, and gaze direction. A fourth aspect is equally interesting and concerns cultural differences in the way observers from different racial and cultural backgrounds take advantage of multiple and parallel channels of social information input, such as recognizing a person's emotion from his facial expressions as well as from his tone of voice. We briefly review some relevant studies in each of these areas.

Race and Person Identity

Face perception has been a topic of extensive research, and whether people perceive faces of their own race differently than those of other races has been of interest to researchers for over 50 years. The phenomenon known as the "other race effect" refers to the fact that people are better at recognizing faces from their own race than faces from other racial groups (Lindsay, Jack, & Christian, 1991; O'Toole, Deffenbacher, Valentin, & Abdi, 1994; for review, see Meissner & Brigham, 2001). Our lab performed a few experiments on the other-race effect using Chinese subjects who had no previous exposure to Caucasian faces. We used an extensive battery of tasks that were available from previous experiments in our laboratory. The tasks had been developed to investigate both neurologically intact and impaired observers, as well as various clinical populations. Therefore, these tasks taxed verbal and cognitive functions (e.g., memory) as little as possible. For example, during all match-to-sample tasks, one picture was always presented on top, and a matching picture had to be chosen from the two pictures below. One experiment focused on identity recognition and required matching the target stimulus shown in frontal view to the correct foil shown in three-fourths profile. One block presented Caucasian faces and the other Chinese. We did not find the other-race effect since our results showed no difference between groups or stimuli (Sinke, 2012).

One important and well-studied phenomenon in face recognition pertains to the idea that recognition of the face is more dependent on holistic, or configural, processing than, for example, object recognition (Tanaka & Farah, 1993). Consequently, it has been surmised that the other-race effect could be explained by improved holistic processing for same-race faces (Michel, Rossion, Han, Chung, & Caldara, 2006). In our lab, we recently created the identity face-matching task as described previously with South African faces from a Xhosa population. Caucasian students performed the task with upright and inverted Caucasian and South African faces. In line with the other-race effect, Caucasian participants showed higher accuracy rates and faster reaction times on Caucasian than on South African faces. This task also allows the creation of a measure of configuration processing as measured with the face-inversion effect (Farah, Tanaka, & Drain, 1995; Yin, 1969). Interestingly, the inversion effect was comparable for both Caucasian and South African faces, so the other-race effect as found in this study could not readily be explained by an effect of race on configural processing. These results are in line with those of other studies that found evidence for the other-race effect even though no differences in configural processing could be found, giving rise to the idea that the other-race effect cannot be completely explained by differences in holistic processing (Michel, Caldara, & Rossion, 2006; Mondloch et al., 2010). In addition, these effects have been studied using an event-related potential (ERP) known to be specifically involved in face processing, the N170 (Eimer, 1998). The studies investigating the face inversion effect show slightly different but, again, somewhat varied results, indicating that both same- and other-race faces are processed holistically, although it may be delayed for other races (Wiese, Stahl, & Schweinberger, 2009) or increased for same-race faces (Caharel et al., 2011; Gajewski, Schlegel, & Stoerig, 2008; Montalan et al., 2013; Vizioli, Foreman, Rousselet, & Caldara, 2009). In contrast, Hahn, Jantzen, and Symons (2012) found that same-race faces were processed more holistically than faces from other races using a technique called "Thatcherization," rotating only the eyes and mouth within a face.

Another important aspect in cross-racial facial recognition is the extent to which people have experience with other races (Bukach, Cottle, Ubiwa, & Miller, 2012; Rhodes et al., 2009; Stahl, Wiese, & Schweinberger, 2008). In addition to

the race of the perceived person, and the degree to which perceivers have experience with other races, Michel, Corneille, and Rossion (2010) showed that the degree to which the same, racially ambiguous face is processed holistically depends on what the observer perceived to be the race of the stimulus. Another explanation for racial differences in holistic processing may be baseline differences between people of different races. For example, there is evidence that Asians may process faces and other stimuli more configurally than Caucasians (Michel, Caldara, et al., 2006; Tanaka, Kiefer, & Bukach, 2004, for an overview, see Miyamoto, 2013). Our lab recently conducted a part-to-whole matching experiment in Japan. Participants matched eyes or mouths to a picture of a whole Caucasian face, or they matched doors or windows to a picture of a whole house. Accuracy scores and reaction times of the Japanese participants were similar to those of a Dutch control group and, furthermore, they showed the same pattern in face and object part recognition as a Dutch control sample. In short, the Japanese participants did not show an other-race effect, which may be explained by these baseline differences in holistic processing between populations.

The next question concerns the time during perceptual processing when race influences face perception. Walker and Tanaka (2003) found this race effect already at early stages of perceptual encoding by using a sequential matching task with natural and morphed East Asian and Caucasian faces. However, the N170 ERP has given rise to larger amplitudes for other than same race faces (Caharel et al., 2011; Gajewski et al., 2008; Herrmann et al., 2007; Stahl et al., 2008; Walker, Silvert, Hewstone, & Nobre, 2008). This was not seen in the earlier P100 ERP (Caharel et al., 2011; Herrmann et al., 2007; Stahl et al., 2008). Thus, a race effect seems to manifest itself at a later stage, related to the structural encoding stage of the face and later, at approximately 250–300 ms (Caldara, Rossion, Bovet, & Hauert, 2004; Caldara et al., 2003; Tanaka & Pierce, 2009). In conclusion, the picture of the other-race effect is still not very solid and the explanation is not clear, as one can also discern from recent meta-analysis reports (Michel, Rossion, et al., 2006; Young, Hugenberg, Bernstein, & Sacco, 2012).

Race and Facial Expressions

Facial expressions play a major role in communication, but this role may be modulated by culture or race. The debate on universal facial expressions of basic emotions has been occurring

for decades (see Nelson & Russell, 2013; Scherer, Clark-Polner, & Mortillaro, 2011). Currently, however, many researchers take a position that is a sort of compromise between the classical Ekman position on universal emotions enshrined in the Ekman facial expressions and the realization that there is a measure of cultural relativity.

A modest position that only touches that debate tangentially concerns the influence of culture at the level of the display rules for emotions. Culture provides various kinds of rules about which facial expressions to display, when, and where. This is a vast topic, and dealing with it systematically would require contributions from anthropologists and sociologists, among others. To illustrate, there is cultural variability in the level of the display rules for emotions. For example, Japanese people are perceived as less likely to show negative emotions such as fear or anger but more likely to express positive emotions (Hess, Blairy, & Kleck, 2000). At the least, there are cultural differences in the appropriateness of expressing certain emotions in certain situations. Overall, Asians are less prone to express negative emotions such as contempt and fear (Chung, 2012; Safdar et al., 2009). A well-known experiment showed that Japanese participants were prone to mask negative emotions by smiling, whereas Americans did not (Friesen, 1972). Evidence for this emotion suppression was found when Asian and American participants were asked to suppress their emotion in response to images while ERPs were recorded. In Asian participants, but not in Americans, a significant decrease in the late positive potential (LPP), a measure of emotional processing, was found (Murata, Moser, & Kitayama, 2013). Possibly because of these traditions, people in some East Asian countries tend to be more emotionally introverted (Bond, 1993; Matsumoto, Yoo, Hirayama, & Petrova, 2005).

Because of these cultural differences in display rules, it can be hypothesized that Asians are more experienced than Westerners in estimating emotional states from looking at the eyes because it is well-known that muscles around the eyes (orbicularis oculi) are difficult to control (Ekman & Friesen, 2003). An interesting day-to-day result of this focus on the eyes can be seen in emoticons used in different areas of the world (Pollack, 1996). Whereas Westerners keep the eyes constant (two simple dots) but change the mouth to signify different emotions, Japanese keep the mouth as a straight line while changing the eye symbols for each emotion. To test this cultural bias on the eye versus the mouth, Yuki,

Maddux, and Masuda (2007) used both emoticons and real faces and manipulated independently the eyes and mouths. They found that Japanese participants rated the emotion by focusing mainly on the eyes, whereas American participants used the mouth as a prominent cue (also see Blais, Jack, Scheepers, Fiset, & Caldara, 2008). These findings are supported by a study that examined the eye movements of Eastern and Western participants during the decoding of facial expressions. It was found that Eastern people, in contrast to Westerners, fixate on the eye region instead of looking at multiple regions of the face. In addition, these different scan patterns are likely to be an underlying cause of recognition deficits in certain emotions (Jack, Blais, Scheepers, Schyns, & Caldara, 2009). In contrast, Asians and Caucasians were found to use largely the same cortical networks while trying to decode emotion from the eyes of both their in-group and their out-group, although these networks were more active in response to eyes belonging to the same race (Adams, Rule, et al., 2010).

Also on a more physical level, emotions are not always expressed similarly or to the same degree between different cultures (Elfenbein, 2013). For example, when participants from Quebec and Gabon were asked to freely express emotions, it was found that the groups used different action units for different emotional expressions (Elfenbein, Beaupre, Levesque, & Hess, 2007). In other words, people from different cultures use different facial muscles to express emotion. It may therefore not come as a surprise that what people expect to see in an emotional expression differs as well. This cultural variety was demonstrated by adding random noise to a standard face or by using a random action unit generator to create random expressions, after which participants were asked to judge the emotion seen in the random noise. These responses were then used to create average expected emotional expressions, which differed in each culture (Jack, Caldara, & Schyns, 2012; Jack, Garrod, Yu, Caldara, & Schyns, 2012). Also, there is evidence supporting the notion that the left side of the face may be more strongly influenced by culture than the right side and that there are cultural differences in these hemifacial biases (Elfenbein, Mandal, Ambady, Harizuka, & Kumar, 2004; Mandal, Harizuka, Bhushan, & Mishra, 2001). These effects are important to take into consideration not only for researchers who are interested in facial responses, emotional contagion, or imitation but also because they may be of importance for new emerging techniques such as facial interpretation

software for smartphones, security cameras, or games. In conclusion, it seems that a Facial Action Coding System (FACS; Ekman & Friesen, 1978), which maps all the muscles used for facial expressions, would need to be different for each culture.

Probably because of these differences in the expression of emotion, there are subtle differences in how people from different countries interpret facial expressions of emotions (Elfenbein & Ambady, 2002). There seems to be an in-group advantage especially for the recognition of culturally “natural” emotions and a majority advantage for standardized (FACS) expressions (Beaupre & Hess, 2005; Elfenbein et al., 2007; for review, see Kang & Lau, 2013). In a functional magnetic resonance imaging (fMRI) experiment, Chiao et al. (2008) showed Japanese and American participants emotional faces of their in- and out-groups, and it was found that the amygdala responded more strongly to fearful expressions of the in-group. However, there may also be differences in the way the Japanese brain and the Caucasian brain process emotion to begin with; it was found that the Japanese rely more on the premotor cortex and the insula, whereas Caucasians recruited the posterior cingulate, the supplementary motor area, and the amygdala (Moriguchi et al., 2005).

A meta-analysis by Elfenbein and Ambady (2002; see also Elfenbein & Ambady, 2003) clearly showed that the in-group advantage was reduced when more intercultural contact was established. An fMRI study found that culture and duration of stay influenced amygdala activation and its relationship to the recognition of anger and disgust (Derntl et al., 2009). Studies of cultural factors need to more systematically compare results obtained with groups before and after they have had extensive exposure to the other culture. In any case, living in a multicultural environment or not must be a relevant factor. Therefore, in our experiment, we tested Chinese students who had recently arrived in The Netherlands (no more than 2 weeks) so that their contact with Western people was at a minimum. The previously mentioned study on Chinese versus Dutch identity recognition also contained a memory experiment. Dutch and Chinese participants were asked to memorize a set of Caucasian faces. In one experiment, the faces wore neutral expressions. The Dutch participants performed significantly better than the Chinese. However, the difference between the two groups disappeared when the faces to remember were showing a fearful, sad, or happy expression. This suggests that neutral faces of strangers are more

difficult to remember. It also indicates that memory for faces of people from another race is at least to some extent culturally specific, but it may also be dependent on emotion and probably the interplay between race and gender (Krumhuber & Manstead, 2011). However, the pattern was different when we used a task that required matching an expression to the correct similar one rather than a memory test. Overall, the Dutch participants were rather faster than Chinese participants in matching the Caucasian facial expression. However, this was also dependent on the emotion; Chinese students were slower than the Dutch on all emotions except *happy*. *Fear* and *surprise* were recognized less accurately in the two groups than the other emotions. Taking these and previous results into consideration, *happy* seems to be the facial emotion most easily recognized across cultures.

Culture and Gaze

Humans use information on the direction of gaze of others to rapidly orient themselves to the location where the gaze is directed—a process that is useful to detect relevant events in the environment. However, this automatic orienting behavior seems to be influenced by the in-group versus out-group status of the observed face. For example, an Italian study showed that black participants shifted attention similarly to the averted gaze of black and white faces, whereas white participants selectively shifted attention only in response to individuals of their same group (Pavan, Dalmaso, Galfano, & Castelli, 2011). Another study showed that the own-race effect for the memory of faces is also dependent on eye gaze, where same-race faces were recognized better only when the gaze was direct (Adams, Pauker, & Weisbuch, 2010). It is interesting to note how some effects that were previously deemed to be automatic attention effects are now found to be under the control of social factors (Shepherd, 2010). Certainly, more research is needed to unravel the various components of these complex behaviors, and it might also shed light on the question of cultural or racial influences on the perception of bodily expressions. Comparable to gaze direction, body language provides directional information, and a disruption of these processes as a result of racial interactions can be indicative of the effect of race on body language.

Regarding the perception of emotion and gaze, it was found that East Asians experience a face as angrier when the eye contact is direct (Akechi et al., 2013). Furthermore, another study found that the

direct gaze of out-group members is experienced as more intense than the gaze of in-group members in an Asian versus Caucasian comparison (Kramer et al., 2013). This may be explained by greater amygdala responses to the direct gaze of out-group members (Adams, Franklin, et al., 2010; Richeson, Todd, Trawalter, & Baird, 2008).

Culture and Affective Cue Selection

To date, cross-cultural studies of emotion have typically used facial expressions not accompanied by information from the voice as expected in the natural environment (de Gelder & Bertelson, 2003; de Gelder, Bocker, Tuomainen, Hensen, & Vroomen, 1999; de Gelder & Vroomen, 2000; Massaro & Egan, 1996). However, there are indications of cross-cultural differences in the way information from the face and information from the voice are combined. Cultural differences were reported not only in unisensory stimuli but also in the susceptibility to ignore information in visual (Masuda et al., 2008) and auditory (Ishii, Reyes, & Kitayama, 2003) modalities. The very process of integrating emotional cues from different modalities may also be culture sensitive. We investigated cultural differences in the multisensory perception of emotion between Japanese and Dutch participants. In line with the view that the Japanese are sensitive to contextual information (Masuda et al., 2008) and to vocal affect (Ishii et al., 2003), we expected that they would weigh cues in the voice more than the Dutch when presented with audiovisual stimuli. We used short fragments voiced by two Japanese and two Dutch female speakers in their native language. Each fragment with neutral linguistic meaning was uttered with happy or angry emotion, and the fragments were combined with happy and angry facial expressions. Our results demonstrated that when the face and the voice did not represent the same emotion, the Japanese participants weighted cues in the voices more than did the Dutch participants. These findings provide the first evidence that culture modulates multisensory integration of affective information (Tanaka et al., 2010). The results are consistent with those of a study reporting that the Japanese are more susceptible to affective prosody and less susceptible to linguistic content compared to Americans (Ishii et al., 2003). Our results are also consistent with a lesser degree of audiovisual speech integration in the Japanese (Sekiyama & Tohkura, 1991). These results can be interpreted as showing that in multisensory situations, the Japanese people rely more

on a vocal affect than a facial expression because direct or excessive eye contact can be considered rude in their culture (Malpass & Kravitz, 1969) or because they tend to use a less efficient strategy to judge the facial expression (Jack et al., 2009). It also may be related to the fact that Japanese people control the display of their own feelings in the face (Ekman, 1972; Matsumoto, Takeuchi, Andayani, Kouznetsova, & Krupp, 1998). This may lead to a lower reliance on the face and higher reliance on the voice when judging a person's emotion.

Cultural Differences in the Recognition of Bodily Expressions

Although there is no doubt that the face, or voice, can indicate much about a person's feelings or intentions, body language is another very important indicator. Bodily expressions of emotion have only recently become a domain of interest, and knowledge in this area is increasing rapidly (for reviews, see de Gelder, 2006; de Gelder, Snyder, Greve, Gerard, & Hadjikhani, 2004; de Gelder et al., 2010), although cultural differences in perceiving bodily expressions have not yet received much attention. We previously stated that facial expressions can be culturally diverse, and there is evidence that the same might be true for bodily expressions. In 1988, Scherer et al. found that the Japanese do not use as many movements of the hands, arms, and body in certain emotional situations. Furthermore, the Japanese and Americans have some unique and differing features that enable them to recognize emotion from body posture, whereas other features may be universal. For example, a bent head and arms hanging next to the body are essential for Japanese participants to recognize sadness, but Sri Lankans and Americans accept other poses for sadness as well. Also, poses that are viewed as fearful by Japanese people are perceived as angry by Sri Lankans (Kleinsmith, De Silva, & Bianchi-Berthouze, 2006; Sogon & Masutani, 1989). The study by Kleinsmith et al. (2006) also supports the theory that some cultures may be less expressive: When American and Japanese participants are asked to rate how intensive the emotion is that a person must be feeling based on bodily expression, the ratings of the Japanese are higher than those of Americans. The same was previously found for Chinese participants: The Chinese rate facial expression of negative emotions of other Chinese as more intense than those of Caucasians (Zhu, Ho, & Bonanno, 2013). This implies that a Japanese observer infers that someone might be feeling more than she is expressing. On the other hand,

although cultural diversity exists, it seems that there is at least some universality with regard to recognizing emotional expressions in the body. For example, Americans and Indians were asked to categorize emotional dance expressions as described in ancient Indian texts, and both groups were able to do this accurately (Hejmadi, Davidson, & Rozin, 2000). Similarly, in-group and out-group effects, as discussed with facial expressions, may be similar with regard to bodily expressions: Caucasians are faster to recognize angry body language when a black face is combined with an angry body than when a Caucasian face is combined with the exact same angry body (Hinzman & Kelly, 2013). In contrast, African and American children judged the expression of emotional faces, faces and bodies, and bodies alone, and no cultural differences were found in the body-only condition (Tuminello & Davidson, 2011).

Additionally, in a recent behavioural study, we found that white Western European participants perceived black bodies of ambiguous emotion as angrier than ambiguous white bodies when in a neutral context (i.e., paired with neutral sounds); however, when the bodies were paired with affective sounds there was no difference in emotion categorization, suggesting that specific multisensory contexts may be able to reduce or eliminate race-specific biases in emotion perception. We also investigated the cerebral correlates of "other race" body emotion perception, scanning white European participants using fMRI. Here, we clearly saw regions which activated more to other race, vs. own race bodies, including the bilateral interparietal lobule and fusiform gyrus.

In our lab, we tested the same group of Chinese subjects with instrumental and emotional bodily expressions, and the procedure was the same as that used for faces. Here also, no differences were found between groups or stimulus categories. In contrast with the facial expression results, where *happy* is the best recognized expression, *sad* seems to be the most prominently recognized body emotion for both groups. In a follow-up experiment using images of day-to-day scenes with and without other people present, we investigated the role of the context in which bodily expressions are encountered. When judging the emotion of bodily expressions shown in nonsocial contexts, we found that the Chinese were generally slower in judging the emotion of the target body than the Dutch. However, because we had also found this for the previous match-to-sample tasks in general, we cannot say conclusively that it is because of the context. Both groups were distracted

by a fearful context when the body is neutral, leading to more time taken to respond.

In addition, bodily expressions in social contexts that show other people engaging in activity with either the same or a contrasting emotional significance are more difficult to recognize by either group when the bodily expression is incongruent with the scene. All participants were influenced by an incongruent (happy or neutral) social scene showing fearful target bodies and also by a fearful social scene showing happy target bodies (as shown by the accuracy data). However, the Chinese did perform better than the Dutch students in general, which was not the case when the bodies were presented in a nonsocial context or without context. An explanation for this could be that the Chinese are in fact more influenced by the social scene, but in a different way: Because there are other people present in the scenes, they might feel some pressure to perform better. We know that such unrealistic social cues can indeed have an influence on behavior (e.g., Bateson, Nettle, & Roberts, 2006), and because the Chinese students were raised in a collectivistic society, this could have a greater effect on them. One possible explanation of why the incongruent social scenes do not distract could be the short stimulus duration of 100 ms. A previous study showed that Japanese participants who had to judge a target body within a social scene looked more at the other people in the scene—but only after 1 s (Masuda et al., 2008). This finding, however, could not be attributed to any ambiguity in the scenes: Both groups recognized the emotion expressed by the people in the scene equally well, and neither had any trouble recognizing happy scenes.

In addition, Chinese participants seemed to be more specialized for faces compared to Dutch participants; they were more accurate in recognizing both Chinese and Caucasian identities, and they did this faster than identifying shoes or bodies. With regard to Caucasian emotions, Chinese participants needed more time than their Dutch counterparts independent of whether these emotions were expressed in the face or the body. They also needed more time to recognize (emotional) bodies in a nonsocial context—but not when bodies were perceived in a social context, in which case the Chinese were faster than the Dutch. Thus, although an incongruent scene similarly influenced both groups, a social scene did have more effect on the Chinese participants. One might speculate that this is related to the fact that traditional Chinese society is less individualistic than Western society.

Currently, however, these are rather broad and vague categorizations.

To add to the existing literature, a bodily expression recognition experiment was performed in Japan and The Netherlands. Participants performed a sample-to-match task with angry, fearful, happy, and neutral expressions of Japanese and Dutch bodily expressions. Caucasian expressions were recognized more accurately than Japanese stimuli by both Dutch and Japanese participants. Interestingly, Japanese participants were better at recognizing fearful Japanese expressions than were the Dutch participants. However, it is important to note that Japanese angry and fearful bodily expressions yielded lower accuracy scores than those of Japanese happy and neutral expressions from both nationalities. This has previously been found for Japanese facial expressions (Malpass & Kravitz, 1969). It can be argued that these stimuli may be less expressive than the Caucasian expressions because it is culturally less accepted to express negative emotions in Japan. Further analyses on behavioral ratings of the stimuli should be taken into account.

Cultural Differences in Social Interactions

Much research has focused on the one-sided action of perceiving the face, or body, of another human. How does race influence the process of daily interaction? Participants of four different nationalities (Irish, Guatemalan, Peruvian, and Serbian) were asked to rate the intensity of social interactions between two English people. In this situation, an in-group effect was found; Irish participants rated the emotions as more intense than did people from other nationalities (Sneddon, McKeown, McRorie, & Vukicevic, 2011). Recalling the discussion of display rules, it has been found that Asians react less angrily than Americans in an anger-provoking situation with an experimenter (Mauss, Butler, Roberts, & Chu, 2010), but they experience greater physiological responses in confrontational or intercultural social interactions (Butler, Lee, & Gross, 2009; Mauss & Butler, 2010).

Another important aspect of social interaction is the ability to understand other people not only by reading facial and bodily expressions but also by reading their gestures. Molnar-Szakacs, Wu, Robles, and Iacoboni (2007) measured corticospinal excitability—a measure of motor resonance or, in other words, the responsiveness of the motor cortex—in response to actors of the in- and out-group playing out both culturally known

and unknown gestures. Interestingly, motor resonance was increased only in response to in-group members, independent of the gestures. However, another study indicated that in females, the opposite pattern can occur (Desy & Theoret, 2007). In line with these results, observing both the familiar and the unfamiliar gestures of in-group members also facilitates the mirror neuron networks and the insula (Liew, Han, & Aziz-Zadeh, 2011). In addition, cortical networks involved in imitation, including the motor areas (Losin, Iacoboni, Martin, Cross, & Dapretto, 2012), respond differently to gestures performed by people of another race.

Conclusion

Social interactions are a large part of daily human life, and in these interactions we use information from facial expressions, body posture, and tone of voice. Race and culture are increasingly important aspects in this regard, and they influence these processes that are at the heart of successful communication. In the literature reviewed, we found that navigating in an environment with many people of other nationalities might influence one's ability to remember their faces, interpret their emotions and gestures, or even misunderstand their gaze. There are many situations in daily life in which this can have detrimental effects. For example, in doctor–patient relationships, it has been found that race may interrupt effective doctor–patient communication or impede the trust that patients have in their doctor due to misinterpretations of nonverbal behavior (Levine & Ambady, 2013). Furthermore, people were willing to listen more often to a computer avatar giving them advice when the avatar was a member of their in-group (Pratt, Hauser, Ugray, & Patterson, 2007), which can severely impact adherence to medication or treatment in a medical setting. It is reasonable to assume that this may also play a role in other real-life interactions—for example, between teachers and students, doctors and patients, therapists and clients, and police officers and the public. If these kinds of processes, essential for communication, are influenced by race or culture, the same might be true for the perception of body language in day-to-day interaction. To make the comparison with daily life, this might influence the effectiveness of police officers or firefighters working in a multicultural environment, requiring astute responses from others in a high-stress situation.

Studies on display rules have consistently found that some cultures are more likely to

suppress their emotions, especially negative ones, in social interactions. This again is something that should be taken into account in important interracial interactions. For example, to take a therapist–client perspective, the role of depression on emotional expression is vastly different for people from different cultures (Chentsova-Dutton, Tsai, & Gotlib, 2010; Su, Lee, & Oishi, 2013). On a more positive note, it has been suggested that detrimental effects of emotion suppression are also dependent on culture, where the negative effects are less for people with Asian values who are more likely to suppress their emotion (Butler, Lee, & Gross, 2007).

More diverse studies with different populations are necessary. For example, fMRI studies are predominantly done on Caucasian populations, even though people from other races may have a slightly different brain structure (Bai et al., 2012; Isamah et al., 2010). Some studies have examined the previously reviewed race effects in clinical populations, such as those with autism (Hirschfeld, Bartmess, White, & Frith, 2007) or schizophrenia (Pinkham et al., 2008), finding that these syndromes do not interact with racial biases. However, it was found that children with Williams syndrome do not have racial stereotypes (Santos, Meyer-Lindenberg, & Deruelle, 2010) and that emotion perception may be differentially affected in different populations with schizophrenia (Brekke, Nakagami, Kee, & Green, 2005; Leppanen et al., 2006).

References

- Adams, R. B., Franklin, R. G., Rule, N. O., Freeman, J. B., Kveraga, K., Hadjikhani, N., et al. (2010). Culture, gaze and the neural processing of fear expressions. *Social Cognitive and Affective Neuroscience*, 5, 340–348. doi:10.1093/scan/nsp047
- 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, 478–481. doi:10.1016/j.jesp.2009.12.016
- Adams, R. B., Rule, N. O., Franklin, R. G., Wang, E., Stevenson, M. T., Yoshikawa, S., et al. (2010). Cross-cultural reading the mind in the eyes: An fMRI investigation. *Journal of Cognitive Neuroscience*, 22, 97–108. doi:10.1162/jocn.2009.21187
- Akechi, H., Senju, A., Uibo, H., Kikuchi, Y., Hasegawa, T., & Hietanen, J. K. (2013). Attention to eye contact in the West and East: Autonomic responses and evaluative ratings. *PLoS ONE*, 8(3), e59312. doi:10.1371/journal.pone.0059312
- Bai, J., Abdul-Rahman, M. F., Rifkin-Graboi, A., Chong, Y. S., Kwek, K., Saw, S. M., et al. (2012). Population differences in brain morphology and microstructure among Chinese, Malay, and Indian neonates. *PLoS ONE*, 7(10), e47816. doi:10.1371/journal.pone.0047816

- Batson, M., Nettle, D., & Roberts, G. (2006). Cues of being watched enhance cooperation in a real-world setting. *Biology Letters*, 2, 412–414. doi:10.1098/rsbl.2006.0509
- Beaupre, M. G., & Hess, U. (2005). Cross-cultural emotion recognition among Canadian ethnic groups. *Journal of Cross-Cultural Psychology*, 36, 355–370. doi:10.1177/0022022104273656
- 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
- Bond, M. H. (1993). Emotions and their expression in Chinese culture. *Journal of Nonverbal Behavior*, 17, 245–262. doi:10.1007/Bf00987240
- Brekke, J. S., Nakagami, E., Kee, K. S., & Green, M. F. (2005). Cross-ethnic differences in perception of emotion in schizophrenia. *Schizophrenia Research*, 77, 289–298. doi:10.1016/j.schres.2005.04.004
- Bukach, C. M., Cottle, J., Ubiwa, J., & Miller, J. (2012). Individuation experience predicts other-race effects in holistic processing for both Caucasian and Black participants. *Cognition*, 123, 319–324. doi:10.1016/j.cognition.2012.02.007
- Butler, E. A., Lee, T. L., & Gross, J. J. (2007). Emotion regulation and culture: Are the social consequences of emotion suppression culture-specific? *Emotion*, 7, 30–48. doi:10.1037/1528-3542.7.1.30
- Butler, E. A., Lee, T. L., & Gross, J. J. (2009). Does expressing your emotions raise or lower your blood pressure? The answer depends on cultural context. *Journal of Cross-Cultural Psychology*, 40, 510–517. doi:10.1177/0022022109332845
- Caharel, S., Montalan, B., Fromager, E., Bernard, C., Lalonde, R., & Mohamed, R. (2011). Other-race and inversion effects during the structural encoding stage of face processing in a race categorization task: An event-related brain potential study. *International Journal of Psychophysiology*, 79, 266–271. doi:10.1016/j.ijpsycho.2010.10.018
- 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, 905–910. doi:10.1097/01.wnr.0000119729.93564.3e
- Caldara, R., Thut, G., Servoir, 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, 515–528. doi:10.1016/S1388-2457(02)00407-8
- Chentsova-Dutton, Y. E., Tsai, J. L., & Gotlib, I. H. (2010). Further evidence for the cultural norm hypothesis: Positive emotion in depressed and control European American and Asian American women. *Cultural Diversity & Ethnic Minority Psychology*, 16, 284–295. doi:10.1037/A0017562
- Chiao, J. Y., Iidaka, T., Gordon, H. L., Nogawa, J., Bar, M., Aminoff, E., et al. (2008). Cultural specificity in amygdala response to fear faces. *Journal of Cognitive Neuroscience*, 20, 2167–2174. doi:10.1162/jocn.2008.20151
- Chung, J. M. (2012). The contribution of self-deceptive enhancement to display rules in the United States and Japan. *Asian Journal of Social Psychology*, 15, 69–75. doi:10.1111/j.1467-839X.2011.01358.x
- de Gelder, B. (2006). Towards the neurobiology of emotional body language. *Nature Reviews Neuroscience*, 7, 242–249. doi:10.1038/Nrn1872
- de Gelder, B., & Bertelson, P. (2003). Multisensory integration, perception and ecological validity. *Trends in Cognitive Sciences*, 7, 460–467. doi:10.1016/j.tics.2003.08.014
- de Gelder, B., Bocker, K. B. E., Tuomainen, J., Hensen, M., & Vroomen, J. (1999). The combined perception of emotion from voice and face: Early interaction revealed by human electric brain responses. *Neuroscience Letters*, 260, 133–136. doi:10.1016/S0304-3940(98)00963-X
- de Gelder, B., Snyder, J., Greve, D., Gerard, G., & Hadjikhani, N. (2004). Fear fosters flight: A mechanism for fear contagion when perceiving emotion expressed by a whole body. *Proceedings of the National Academy of Sciences of the USA*, 101, 16701–16706. doi:10.1073/pnas.0407042101
- de Gelder, B., Van den Stock, J., Meeremans, H. K., Sinke, C. B., Kret, M. E., & Tamietto, M. (2010). Standing up for the body: Recent progress in uncovering the networks involved in the perception of bodies and bodily expressions. *Neuroscience and Biobehavioral Reviews*, 34, 513–527. doi:10.1016/j.neubiorev.2009.10.008
- de Gelder, B., & Vroomen, J. (2000). The perception of emotions by ear and by eye. *Cognition & Emotion*, 14, 289–311.
- Derntl, B., Habel, U., Robinson, S., Windischberger, C., Kryspin-Exner, I., Gur, R. C., et al. (2009). Amygdala activation during recognition of emotions in a foreign ethnic group is associated with duration of stay. *Social Neuroscience*, 4, 294–307. doi:10.1080/17470910802571633
- Desy, M. C., & Theoret, H. (2007). Modulation of motor cortex excitability by physical similarity with an observed hand action. *PLoS ONE*, 2(10), e971. doi:10.1371/journal.pone.0000971
- Eimer, M. (1998). Does the face-specific N170 component reflect the activity of a specialized eye processor? *NeuroReport*, 9, 2945–2948. doi:10.1097/00001756-199809140-00005
- Ekman, P. (1972). Universals and cultural differences in facial expressions of emotion. In J. Cole (Ed.), *Nebraska symposium on motivation*. Lincoln, NE: University of Nebraska Press.
- Ekman, P., & Friesen, W. V. (1978). *Facial Action Coding System (FACS): A technique for the measurement of facial action*. Palo Alto, CA: Consulting Psychologists Press.
- Ekman, P., & Friesen, W. V. (2003). *Unmasking the face: A guide to recognizing emotions from facial clues*. Los Altos, CA: Malor Books.
- Elfenbein, H. A. (2013). Nonverbal dialects and accents in facial expressions of emotion. *Emotion Review*, 5, 90–96. doi:10.1177/1754073912451332
- Elfenbein, H. A., & Ambady, N. (2002). On the universality and cultural specificity of emotion recognition: A meta-analysis. *Psychological Bulletin*, 128, 203–235. doi:10.1037/0033-2909.128.2.203
- Elfenbein, H. A., & Ambady, N. (2003). When familiarity breeds accuracy: Cultural exposure and facial emotion recognition. *Journal of Personality and Social Psychology*, 85, 276–290. doi:10.1037/0022-3514.85.2.276
- Elfenbein, H. A., Beaupre, M., Levesque, M., & Hess, U. (2007). Toward a dialect theory: Cultural differences in the expression and recognition of posed facial expressions. *Emotion*, 7, 131–146. doi:10.1037/1528-3542.7.1.131
- Elfenbein, H. A., Mandal, M. K., Ambady, N., Harizuka, S., & Kumar, S. (2004). Hemifacial differences in the in-group advantage in emotion recognition. *Cognition & Emotion*, 18, 613–629. doi:10.1080/02699930341000257
- Farah, M. J., Tanaka, J. W., & Drain, H. M. (1995). What causes the face inversion effect. *Journal of Experimental Psychology: Human Perception and Performance*, 21, 628–634. doi:10.1037/0096-1523.21.3.628

- Friesen, W. V. (1972). *Cultural differences in facial expressions in a social situation: An experimental test of the concept of display rules*. Doctoral dissertation, University of California, San Francisco.
- Gajewski, P. D., Schlegel, K., & Stoerig, P. (2008). Effects of human race and face inversion on the N170: A cross-race study. *Journal of Psychophysiology*, *22*, 157–165. doi:10.1027/0269-8803.22.4.157
- Hahn, A. C., Jantzen, K. J., & Symons, L. A. (2012). Thatcherization impacts the processing of own-race faces more so than other-race faces: An ERP study. *Social Neuroscience*, *7*, 113–125. doi:10.1080/17470919.2011.583080
- Hejmadi, A., Davidson, R. J., & Rozin, P. (2000). Exploring Hindu Indian emotion expressions: Evidence for accurate recognition by Americans and Indians. *Psychological Science*, *11*, 183–187. doi:10.1111/1467-9280.00239
- Herrmann, M. J., Schreppe, T., Jäger, D., Koehler, S., Ehlis, A. C., & Fallgatter, A. J. (2007). The other-race effect for face perception: An event-related potential study. *Journal of Neural Transmission*, *114*, 951–957. doi:10.1007/s00702-007-0624-9
- 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*, 265–283. doi:10.1023/A:1006623213355
- Hinzman, L., & Kelly, S. D. (2013). Effects of emotional body language on rapid out-group judgments. *Journal of Experimental Social Psychology*, *49*, 152–155. doi:10.1016/j.jesp.2012.07.010
- Hirschfeld, L., Bartmess, E., White, S., & Frith, U. (2007). Can autistic children predict behavior by social stereotypes? *Current Biology*, *17*, R451–R452. doi:10.1016/j.cub.2007.04.051
- Isamah, N., Faison, W., Payne, M. E., MacFall, J., Steffens, D. C., Beyer, J. L., et al. (2010). Variability in frontotemporal brain structure: The importance of recruitment of African Americans in neuroscience research. *PLoS ONE*, *5*(10), e13642. doi:10.1371/journal.pone.0013642
- Ishii, K., Reyes, J. A., & Kitayama, S. (2003). Spontaneous attention to word content versus emotional tone: Differences among three cultures. *Psychological Science*, *14*, 39–46. doi:10.1111/1467-9280.01416
- Jack, R. E., Blais, C., Scheepers, C., Schyns, P. G., & Caldara, A. (2009). Cultural confusions show that facial expressions are not universal. *Current Biology*, *19*, 1543–1548.
- Jack, R. E., Caldara, R., & Schyns, P. G. (2012). Internal representations reveal cultural diversity in expectations of facial expressions of emotion. *Journal of Experimental Psychology: General*, *141*, 19–25. doi:10.1037/A0023463
- Jack, R. E., Garrod, O. G. B., Yu, H., Caldara, R., & Schyns, P. G. (2012). Facial expressions of emotion are not culturally universal. *Proceedings of the National Academy of Sciences of the USA*, *109*, 7241–7244.
- Kang, S. M., & Lau, A. S. (2013). Revisiting the out-group advantage in emotion recognition in a multicultural society: Further evidence for the in-group advantage. *Emotion*, *13*, 203–215. doi:10.1037/A0030013
- Kleinsmith, A., De Silva, P. R., & Bianchi-Berthouze, N. (2006). Cross-cultural differences in recognizing affect from body posture. *Interacting with Computers*, *18*, 1371–1389. doi:10.1016/j.intcom.2006.04.003
- Kramer, K., Bente, G., Luo, S. Y., Pfeiffer, U. J., Han, S. H., & Vogeley, K. (2013). Influence of ethnic group-membership and gaze direction on the perception of emotions: A cross-cultural study between Germany and China. *PLoS ONE*, *8*(6), e66335. doi:10.1371/journal.pone.0066335
- Krumhuber, E. G., & Manstead, A. S. R. (2011). When memory is better for out-group faces: On negative emotions and gender roles. *Journal of Nonverbal Behavior*, *35*, 51–61. doi:10.1007/s10919-010-0096-8
- Leppanen, J. M., Niehaus, D. J. H., Koen, L., Du Toit, E., Schoeman, R., & Emsley, R. (2006). Emotional face processing deficit in schizophrenia: A replication study in a South African Xhosa population. *Schizophrenia Research*, *84*, 323–330. doi:10.1016/j.schres.2006.02.007
- Levine, C. S., & Ambady, N. (2013). The role of non-verbal behaviour in racial disparities in health care: Implications and solutions. *Medical Education*, *47*, 867–876. doi:10.1111/Medu.12216
- Liew, S. L., Han, S. H., & Aziz-Zadeh, L. (2011). Familiarity modulates mirror neuron and mentalizing regions during intention understanding. *Human Brain Mapping*, *32*, 1986–1997. doi:10.1002/Hbm.21164
- Lindsay, D. S., Jack, P. C., & Christian, M. A. (1991). Other-race face perception. *Journal of Applied Psychology*, *76*, 587–589. doi:10.1037//0021-9010.76.4.587
- Losin, E. A. R., Iacoboni, M., Martin, A., Cross, K. A., & Dapretto, M. (2012). Race modulates neural activity during imitation. *NeuroImage*, *59*, 3594–3603. doi:10.1016/j.neuroimage.2011.10.074
- Malpass, R. S., & Kravitz, J. (1969). Recognition for faces of own and other race. *Journal of Personality and Social Psychology*, *13*, 330–334.
- Mandal, M. K., Harizuka, S., Bhushan, B., & Mishra, R. C. (2001). Cultural variation in hemifacial asymmetry of emotion expressions. *British Journal of Social Psychology*, *40*, 385–398. doi:10.1348/014466601164885
- Massaro, D. W., & Egan, P. B. (1996). Perceiving affect from the voice and the face. *Psychonomic Bulletin & Review*, *3*, 215–221. doi:10.3758/BF03212421
- Masuda, T., Ellsworth, P. C., Mesquita, B., Leu, J., Tanida, S., & de Veerdonk, E. V. (2008). Placing the face in context: Cultural differences in the perception of facial emotion. *Journal of Personality and Social Psychology*, *94*, 365–381. doi:10.1037/0022-3514.94.3.365
- Matsumoto, D., Takeuchi, S., Andayani, S., Kouznetsova, N., & Krupp, D. (1998). The contribution of individualism–collectivism to cross-national differences in display rules. *Asian Journal of Social Psychology*, *1*, 147–165.
- Matsumoto, D., Yoo, S. H., Hirayama, S., & Petrova, G. (2005). Development and validation of a measure of display rule knowledge: The display rule assessment inventory. *Emotion*, *5*, 23–40. doi:10.1037/1528-3542.5.1.23
- Mauss, I. B., & Butler, E. A. (2010). Cultural context moderates the relationship between emotion control values and cardiovascular challenge versus threat responses. *Biological Psychology*, *84*, 521–530. doi:10.1016/j.biopsycho.2009.09.010
- Mauss, I. B., Butler, E. A., Roberts, N. A., & Chu, A. (2010). Emotion control values and responding to an anger provocation in Asian-American and European-American individuals. *Cognition & Emotion*, *24*, 1026–1043. doi:10.1080/02699930903122273

- Meissner, C. A., & Brigham, J. C. (2001). Thirty years of investigating the own-race bias in memory for faces—A meta-analytic review. *Psychology Public Policy and Law, 7*, 3–35. doi:10.1037/11076-8971.7.1.3
- Michel, C., Caldara, R., & Rossion, B. (2006). Same-race faces are perceived more holistically than other-race faces. *Visual Cognition, 14*, 55–73. doi:10.1080/13506280500158761
- Michel, C., Cornille, O., & Rossion, B. (2010). Holistic face encoding is modulated by perceived face race: Evidence from perceptual adaptation. *Visual Cognition, 18*, 434–455. doi:10.1080/13506280902819697
- Michel, C., Rossion, B., Han, J., Chung, C. S., & Caldara, R. (2006). Holistic processing is finely tuned for faces of one's own race. *Psychological Science, 17*, 608–615. doi:10.1111/j.1467-9280.2006.01752.x
- Miyamoto, Y. (2013). Culture and analytic versus holistic cognition: Toward multilevel analyses of cultural influences. *Advances in Experimental Social Psychology, 47*, 131–188. doi:10.1016/B978-0-12-407236-7.00003-6
- Molnar-Szakacs, I., Wu, A. D., Robles, F. J., & Iacoboni, M. (2007). Do you see what I mean? Corticospinal excitability during observation of culture-specific gestures. *PLoS ONE, 2*(7), e626. doi:10.1371/journal.pone.0000626
- Mondloch, C. J., Elms, N., Maurer, D., Rhodes, G., Hayward, W. G., Tanaka, J. W., et al. (2010). Processes underlying the cross-race effect: An investigation of holistic, featural, and relational processing of own-race versus other-race faces. *Perception, 39*, 1065–1085. doi:10.1068/P6608
- Montalan, B., Veujoz, M., Boitout, A., Leleu, A., Camus, O., Lalonde, R., et al. (2013). Investigation of effects of face rotation on race processing: An ERPs study. *Brain and Cognition, 81*, 360–369. doi:10.1016/j.bandc.2012.12.004
- Moriguchi, Y., Ohnishi, T., Kawachi, R. T., Mori, T., Hirakata, M., Yamada, M., et al. (2005). Specific brain activation in Japanese and Caucasian people to fearful faces. *NeuroReport, 16*, 133–136. doi:10.1097/00001756-200502080-00012
- Murata, A., Moser, J. S., & Kitayama, S. (2013). Culture shapes electrocortical responses during emotion suppression. *Social Cognitive and Affective Neuroscience, 8*, 595–601. doi:10.1093/Scan/Nss036
- Nelson, N. L., & Russell, J. A. (2013). Universality revisited. *Emotion Review, 5*, 8–15. doi:10.1177/1754073912457227
- O'Toole, A. J., Deffenbacher, K. A., Valentin, D., & Abdi, H. (1994). Structural aspects of face recognition and the other-race effect. *Memory & Cognition, 22*, 208–224. doi:10.3758/Bf03208892
- Pavan, G., Dalmazo, M., Galfano, G., & Castelli, L. (2011). Racial group membership is associated to gaze-mediated orienting in Italy. *PLoS ONE, 6*(10), e25608. doi:10.1371/journal.pone.0025608
- Pinkham, A. E., Sasson, N. J., Calkins, M. E., Richard, J., Hughett, P., Gur, R. E., et al. (2008). The other-race effect in face processing among African American and Caucasian individuals with schizophrenia. *American Journal of Psychiatry, 165*, 639–645. doi:10.1176/appi.ajp.2007.07101604
- Pollack, A. (1996, August 12). Happy in the East (Λ_Λ) or smiling in the West:-). *The New York Times*, D5.
- Pratt, J. A., Hauser, K., Ugray, Z., & Patterson, O. (2007). Looking at human-computer interface design: Effects of ethnicity in computer agents. *Interacting with Computers, 19*, 512–523. doi:10.1016/j.intcom.2007.02.003
- Rhodes, G., Ewing, L., Hayward, W. G., Maurer, D., Mondloch, C. J., & Tanaka, J. W. (2009). Contact and other-race effects in configural and component processing of faces. *British Journal of Psychology, 100*, 717–728. doi:10.1348/000712608x396503
- Richeson, J. A., Todd, A. R., Trawalter, S., & Baird, A. A. (2008). Eye-gaze direction modulates race-related amygdala activity. *Group Processes & Intergroup Relations, 11*, 233–246. doi:10.1177/1368430207088040
- Safdar, S., Friedlmeier, W., Matsumoto, D., Yoo, S. H., Kwantes, C. T., Kakai, H., et al. (2009). Variations of emotional display rules within and across cultures: A comparison between Canada, USA, and Japan. *Canadian Journal of Behavioural Science, 41*, 1–10. doi:10.1037/A0014387
- Santos, A., Meyer-Lindenberg, A., & Deruelle, C. (2010). Absence of racial, but not gender, stereotyping in Williams syndrome children. *Current Biology, 20*, R307–R308. doi:10.1016/j.cub.2010.02.009
- Scherer, K. R., Clark-Polner, E., & Mortillaro, M. (2011). In the eye of the beholder? Universality and cultural specificity in the expression and perception of emotion. *International Journal of Psychology, 46*, 401–435. doi:10.1080/00207594.2011.626049
- Scherer, K. R., Matsumoto, D., Wallbott, H. G., & Kudoh, T. (1988). Emotional experience in cultural context: A comparison between Europe, Japan, and the USA. In K. R. Scherer (Ed.), *Facets of emotion: Recent research* (pp. 5–30). Hillsdale, NJ: Erlbaum.
- Sekiyama, K., & Tohkura, Y. (1991). McGurk effect in non-English listeners—Few visual effects for Japanese subjects hearing Japanese syllables of high auditory intelligibility. *Journal of the Acoustical Society of America, 90*, 1797–1805. doi:10.1121/1.401660
- Shepherd, S. V. (2010). Following gaze: Gaze-following behavior as a window into social cognition. *Frontiers in Integrative Neuroscience, 4*, 5. doi:10.3389/fnint.2010.00005
- Sinke, C. B. A. (2012). *Perception of emotions from faces and bodies and the influence of context*. Unpublished doctoral dissertation, Tilburg University, Tilburg, The Netherlands.
- Sneddon, I., McKeown, G., McRorie, M., & Vukicevic, T. (2011). Cross-cultural patterns in dynamic ratings of positive and negative natural emotional behaviour. *PLoS ONE, 6*(2), e14679. doi:10.1371/journal.pone.0014679
- Sogon, S., & Masutani, M. (1989). Identification of emotion from body movements—A cross-cultural study of Americans and Japanese. *Psychological Reports, 65*, 35–46.
- Stahl, J., Wiese, H., & Schweinberger, S. R. (2008). Expertise and own-race bias in face processing: An event-related potential study. *NeuroReport, 19*, 583–587.
- Su, J. C., Lee, R. M., & Oishi, S. (2013). The role of culture and self-construal in the link between expressive suppression and depressive symptoms. *Journal of Cross-Cultural Psychology, 44*, 316–331. doi:10.1177/0022022112443413
- Tanaka, A., Koizumi, A., Imai, H., Hiramatsu, S., Hiramoto, E., & de Gelder, B. (2010). I feel your voice: Cultural differences in the multisensory perception of emotion. *Psychological Science, 21*, 1259–1262. doi:10.1177/0956797610380698
- Tanaka, J. W., & Farah, M. J. (1993). Parts and wholes in face recognition. *Quarterly Journal of Experimental Psychology, 46*, 225–245.
- Tanaka, J. W., Kiefer, M., & Bukach, C. M. (2004). A holistic account of the own-race effect in face recognition: Evidence

- from a cross-cultural study. *Cognition*, 93, B1–B9. doi:10.1016/j.cognition.2003.09.011
- Tanaka, J. W., & Pierce, L. J. (2009). The neural plasticity of other-race face recognition. *Cognitive Affective & Behavioral Neuroscience*, 9, 122–131. doi:10.3758/Cabn.9.1.122
- Tuminello, E. R., & Davidson, D. (2011). What the face and body reveal: In-group emotion effects and stereotyping of emotion in African American and European American children. *Journal of Experimental Child Psychology*, 110, 258–274. doi:10.1016/j.jecp.2011.02.016
- Vizioli, L., Foreman, K., Rousselet, G. A., & Caldara, R. (2009). Inverting faces elicits sensitivity to race on the N170 component: A cross-cultural study. *Journal of Vision*, 10, 15. doi:10.1167/10.1.15
- Walker, P. M., Silvert, L., Hewstone, M., & Nobre, A. C. (2008). Social contact and other-race face processing in the human brain. *Social Cognitive and Affective Neuroscience*, 3, 16–25. doi:10.1093/Scan/Nsm035
- Walker, P. M., & Tanaka, J. W. (2003). An encoding advantage for own-race versus other-race faces. *Perception*, 32, 1117–1125. doi:10.1068/P5098
- Wiese, H., Stahl, J., & Schweinberger, S. R. (2009). Configural processing of other-race faces is delayed but not decreased. *Biological Psychology*, 81, 103–109. doi:10.1016/j.biopsycho.2009.03.002
- Yin, R. K. (1969). Looking at upside-down faces. *Journal of Experimental Psychology*, 81, 141–145.
- Young, S. G., Hugenberg, K., Bernstein, M. J., & Sacco, D. F. (2012). Perception and motivation in face recognition: A critical review of theories of the cross-race effect. *Personality and Social Psychology Review*, 16, 116–142. doi:10.1177/1088868311418987
- 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, 303–311. doi:10.1016/j.jesp.2006.02.004
- Zhu, Z. Y., Ho, S. M. Y., & Bonanno, G. A. (2013). Cultural similarities and differences in the perception of emotional valence and intensity: A comparison of Americans and Hong Kong Chinese. *American Journal of Psychology*, 126, 261–273.