

Methodological Issues Regarding Cross-Cultural Studies of Judgments of Facial Expressions

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Abstract

We discuss four methodological issues regarding cross-cultural judgment studies of facial expressions of emotion involving design, sampling, stimuli, and dependent variables. We use examples of relatively recent studies in this area to highlight and discuss these issues. We contend that careful consideration of these, and other, cross-cultural methodological issues can help researchers minimize methodological errors, and can guide the field to address new and different research questions that can continue to facilitate an evolution in the field's thinking about the nature of culture, emotion, and facial expressions.

Keywords

culture, facial expressions, judgments

Cross-cultural studies examining judgments of facial expressions of emotion continue to make important contributions to the affective science literature. In this brief article we discuss four methodological issues regarding such studies involving issues about design, sampling, stimuli, and dependent variables. We do not intend to conduct a comprehensive review of the cross-cultural judgment studies of facial expressions of emotion, nor do we argue for or against the meaning of the findings that have been generated to date vis-à-vis questions about the universality versus cultural specificity of facial expressions of emotion (although our position has been well established elsewhere; see Hwang & Matsumoto, 2016; Matsumoto & Hwang, 2013b). We also do not argue that any particular research is perfect. Instead we focus on relatively recent studies, generally published in the 2000s, and use those studies as examples to highlight methodological issues and concerns that face researchers interested in conducting cross-cultural studies and/or interpreting their results. In what follows we select four issues for discussion; they are by no means exhaustive of the many methodological concerns that face cross-cultural researchers and studies (see Matsumoto & van de Vijver, 2011, for a more complete presentation of cross-cultural research methodology). Rather they stand out from our reading of the recent literature. We contend that careful consideration of these, and other, cross-cultural methodological issues can help

researchers, including ourselves, minimize methodological errors, and can guide the field to address new and different research questions that can continue to facilitate an evolution in the field's thinking about the nature of culture, emotion, and facial expressions.

Design Issues

Most “cross-cultural” studies in the literature are quasi-experimental designs using a participant variable (usually self-identified cultural or ethnic group membership) as the independent variable. These designs are not problematic when the goal of the study is to document the existence of cross-cultural similarities or differences. They are limited, however, in that they do not allow for empirically justified interpretations about culture as the source of any obtained differences. When group differences in judging/labeling emotions on judgment tasks are found, the sources of those differences are usually predicted to occur and are interpreted to have occurred because of culture, but the mere documentation of those differences does not justify such claims. There are, in fact, many ways in which two or more countries, ethnicities, or racial groups may differ, some of which may be cultural, some not. Campbell (1961) referred to these types of errors in inference as the ecological fallacy, and in relation to

cross-cultural studies, they have been referred to as *cultural attribution fallacy*—the inference that something “cultural” about the groups being compared is actually characteristic of the groups and caused the observed group difference despite the lack of empirical justification to do so (Matsumoto & Yoo, 2006).

For example, referring to samples from East Asian cultures as “collectivistic” or “interdependent” and samples from the US or Canada as “individualistic” or “independent,” making predictions about “cultural” differences in emotion judgments as a function of those characterizations, and interpreting observed group differences according to those characterizations is a common practice (for recent examples see Ito, Masuda, & Li, 2013; Stanley, Zhang, Fung, & Isaacowitz, 2013). To be sure there is a large extant literature providing empirical support for such characterizations (e.g., Kitayama, Markus, Matsumoto, & Norasakkunkit, 1997; Nisbett, Peng, Choi, & Norenzayan, 2001; Varnum, Grossmann, Kitayama, & Nisbett, 2010). But there is also a growing literature challenging such claims with data (Harb & Smith, 2008; Kashima & Hardie, 2000; Matsumoto, 1999; Oyserman, Coon, & Kimmelmeier, 2002). Even if such characterizations are accepted, those group characterizations in and of themselves do not provide empirical justification for attributing group differences to them in those specific studies because the differences may have occurred because of some other disparities between the samples (see also Bond & Tedeschi, 2001; Poortinga, van de Vijver, Joe, & van de Koppel, 1987).

If group differences are to be interpreted as cultural in an empirically justified manner, data are required to link the differences to the cultural variables. There are many ways to conduct such linkage studies (see Matsumoto & Yoo, 2006, for a review). One way to do so is to demonstrate associations between emotion recognition agreement rates across cultures and cultural dimensions of variability. Almost 30 years ago we examined such correlations across 15 cultures, reporting that emotion recognition accuracy rates were indeed correlated with individualism–collectivism, which is an often used cultural dimension, but also with Hofstede’s (1980) dimension known as power distance (Matsumoto, 1989). Another way to do so is to examine the degree to which individual-level measures of cultural variables mediate observed group differences. One study that did so reported that almost all the variance in observed differences in a US–Japan comparison was accounted for by individualism–collectivism and status differentiation (Matsumoto et al., 2002). Because status differentiation is conceptually related to power distance, these types of findings urge caution in assuming or interpreting group differences to be associated exclusively with any single cultural dimension such as individualism/independence or collectivism/interdependence (especially when not empirically justified).

Sampling Issues

Most cross-cultural research is really cross-national, and makes the reasonable assumption that people from different countries come from different cultures.¹ This assumption, however, is blurred when participants who are sojourners (e.g., international

students) are recruited in a host country and are classified as cultural representatives of their home countries (e.g., see Blais, Jack, Scheepers, Fiset, & Caldara, 2008; Ito et al., 2013, Study 1; Jack, Blais, Scheepers, Schyns, & Caldara, 2009; Jack, Garrod, Yu, Caldara, & Schyns, 2012). The recruitment of sojourner samples in research characterized as “cross-cultural” raises several issues that deserve attention vis-à-vis the validity of characterizing them as representatives of their home culture.

One issue concerns self-selection. Many international students self-select to travel and study abroad. Thus they may differ from the average member of their home country to begin with. In many cases they come from socioeconomic classes that are different (and higher) than the typical member of their home countries. This self-selection process may raise questions about whether or not data from international students should be considered cross-cultural, at least in the sense of their culture of origin. Many studies have demonstrated psychocultural differences between sojourners/immigrants and home country members (Matsumoto, Weissman, Preston, Brown, & Kupperbusch, 1997; Takaki, 1989).²

Another issue concerns grouping. Studies involving international students have taken samples from different home countries and classified them into a single “cultural” group, most likely to raise statistical power. For example, Blais et al. (2008) classified ($n = 8$) Chinese international students and ($n = 6$) Japanese international students as “East Asian.” Ito et al. (2013, Study 1) classified ($n = 20$) Chinese, ($n = 11$) Japanese, ($n = 8$) Koreans, and ($n = 2$) others as “East Asian.” Doing so, however, raises questions about the homogenizability of culture by such mixings, especially when cultural data from home countries are sometimes associated with drastic differences (Hofstede, 2001; Schwartz, 2004), despite their relatively close geoproximity.

A third issue that arises when recruiting international students concerns the possible effects of acculturation. When recruiting international students, measuring and limiting the amount of time in the host country is helpful in controlling possible acculturation biases (e.g., Blais et al., 2008, tested their East Asian samples within 1 week of their arrival in the UK). The length of time a sojourner has been in a host country, however, is only one of the acculturation issues of concern. For example, international students typically need to pass a language proficiency criterion for entrance into a university in the host country. Learning a different language itself creates a different cultural frame of mind, and language can prime cultural frame-switching in bi- and multilingual individuals (Benet-Martinez, Lee, & Leu, 2006; Benet-Martinez, Leu, Lee, & Morris, 2002; Hong, Morris, Chiu, & Benet-Martinez, 2000). Moreover, there are differences in the ways in which bilinguals perceive facial expressions of emotion depending on the language in which they are tested (Matsumoto, Anguas-Wong, & Martinez, 2008; Matsumoto & Assar, 1992). Thus limiting the length of sojourning time in the host country in and of itself may not sufficiently address these issues.

One way to begin to address these issues is to measure and control for possible underlying acculturation effects by including measures of acculturation whenever immigrant or

sojourning samples are recruited, and to utilize their scores as covariates and/or manipulation checks of the samples. Many such measures exist (e.g., see Phinney, 1992; Tsai, Ying, & Lee, 2000; Ward & Kennedy, 1999), as well as related measures of intercultural adjustment and adaptation (see Matsumoto & Hwang, 2013a, for a review of 10 such tests). Measures of intercultural adjustment are associated with emotion recognition scores in international students (Yoo, Matsumoto, & LeRoux, 2006), highlighting the potential utility of including such measures (see also Boehnke, Lietz, Schreier, & Wilhelm, 2011, for a more complete discussion of sampling issues in cross-cultural research).

Stimuli and Ecological Validity

Judgment studies involve images of facial expressions used as stimuli, and considering the universe of facial signals is important in conducting studies and interpreting findings. One of the first distinctions to note about faces is the difference between their physiognomic and expressive features. The former refers to the structural aspects of the face, the latter to the morphological features associated with movements of the mimetic musculature of the face. The physiognomic features of the face alone provide many messages to observers (see Re & Rule, 2016, for a review). We focus here, however, on the many facial behaviors that are produced by movements of the musculature and that form the basis of expressions.

Facial expressions signal not only emotions but also a host of other affective, cognitive, and physical states, including pain, anxiety, sexual excitement, various types of positive feelings, intentions, personality traits, conversation regulators, adaptors, and speech articulation (see Ekman, 1978, for an early review that did not distinguish between physiognomy and morphology; see Hwang & Matsumoto, 2016, for a more recent review). Emotional expressions are somewhat unique in that they can change second to second, or fractions thereof, and have specific timing, laterality, and symmetry characteristics (Ekman, Hager, & Friesen, 1981; Hager & Ekman, 1985). What makes signaling confusing, however, is the fact that some of the same muscles used for emotional expressions are also used to signal other states. For example, brow raising, with or without a raising of the upper eyelid, occurs when the emotion of surprise is elicited, and is also used as an emblematic greeting in many cultures (Eibl-Eibesfeldt, 1989) as well as a facial illustrator (Ekman, 1978).

These characteristics of facial expressions of emotion suggest that, when images of them are used in judgment studies, evidence for the ecological validity of those stimuli as emotion signals is needed. One way to provide such evidence is to code for the muscles that are activated in the stimulus expressions and to match the muscle movements with those that have been empirically documented to occur in previous research when those same intended emotions were spontaneously elicited. If the stimuli are to be used in cross-cultural judgment studies, the ecological validity data should come from multiple cultures, including if at all possible the cultures of the observers being

tested. This, of course, presumes that such ecological validity data exist in the first place. Not doing so runs the risk of obtaining judgments on expressions that may or may not refer to actual emotional signals when emotions are elicited, despite whatever labels may be imposed on the expressions.

Most recent cross-cultural judgment studies utilize stimuli that were posed. Posing itself is not necessarily a limiting factor provided that data are presented that demonstrate that the produced expressions are valid analogs of expressions that occur when emotions are actually elicited (i.e., data on the ecological validity of the posed expressions). Examples of stimulus sets that have done so are the Pictures of Facial Affect (Ekman & Friesen, 1976), the Japanese and Caucasian Facial Expressions of Emotion (Matsumoto & Ekman, 1988), and the Montreal Set of Facial Displays of Emotion.³ It is noteworthy that when studies utilize these kinds of stimuli, recognition agreement rates across cultures is typically high and greater than chance (Dailey et al., 2010; Jack et al., 2009; Lee, Chiu, & Chan, 2005; Stanley et al., 2013).

Some studies use posed expressions for which there are no ecological validity data but for which there are observer reliability data (e.g., see Blais et al., 2008, which used the Karolinka Directed Emotional Faces and the Asian Face Image Database; Dailey et al., 2010, used the California Facial Expressions Database and the Japanese Female Facial Expressions data set; Stanley et al., 2013, used the Chinese Facial Expressions of Emotion set). Certainly such reliability data are useful and definitely better than no data at all. But reliability is different than validity, and observer judgments may be reliable (i.e., have high consensus) to expressions that do not occur in real life (i.e., have little ecological validity). This may occur with mimed expressions, caricatures of expressions, emotion referents, or other kinds of expressions that are similar to but not quite the same as spontaneous emotional expressions. Given that expressions may overlap in morphological characteristics between emotion and nonemotional states, as discussed before, it is entirely possible that reliability in observer judgments be obtained for expressions that are close to, but not quite exactly, those that occur when emotions are elicited spontaneously, which may affect emotion recognition accuracy rates in subsequent studies (especially depending on the nature of the judgment tasks).⁴

Some studies in the literature have utilized stimuli with presumed emotion labels given at one time but for which subsequent research has not provided ecological validity data. For example two recent studies (Kayyal & Russell, 2013; Naab & Russell, 2007) have used as stimuli faces of members of a preliterate tribe recorded in the 1960s (Ekman, 1980). Some of those faces were characterized as displaying emotions, for which subsequent research has provided ecological validity data (e.g., happiness, sadness, anger, surprise, disgust). Some faces, however, characterized other emotions and nonemotional states for which subsequent research has *not* provided ecological validity data for their *unique* expression in the face (e.g., interested, embarrassed, perplexed, hesitant, relaxed). Combining judgment data on those faces without regard to their ecological

validity may raise questions about definitive conclusions that can be drawn. Notably in these same studies, emotion recognition rates were typically higher for faces with external ecological validity.

When facial expressions of emotion are elicited spontaneously and in real-life situations, they can change very rapidly. A study of the spontaneous expressions of Olympic athletes, for instance, showed that the average time for immediate emotional expressions that occurred at the end of a medal match to transform to a culturally regulated expression was 1 s (Matsumoto, Willingham, & Ollide, 2009). Thus, even when studying spontaneously produced expressions, it is important to know exactly from what slice of time each expression was sampled. One study, for example, involved “spontaneously produced facial expressions of athletes in the 2012 Olympics” (Kayyal, Widen, & Russell, 2015, p. 287). Perusal of the stimuli used in that study, however, indicated that, while some of the expressions were indeed captured at the precise moment of winning or losing a medal, some of them were captured later, when the athletes were posing and/or during the medal ceremonies. Given that expressions change in moment-to-moment fashion, and that previous studies have documented that the expressions of Olympic athletes are different during the medal ceremonies compared to right when they won or lost a medal (Matsumoto & Willingham, 2006), it is not clear that the expressions referred to the immediate emotional reaction of winning or losing. The expressions in the Kayyal et al. (2015) stimuli also included expressions associated with triumph, which recent research has shown involves not only face but whole body expressions (Hwang & Matsumoto, 2014; Matsumoto & Hwang, 2012).

Over the years many studies have examined judgments of facial expressions of emotions in various contexts, including combinations of faces with information about what elicited them (e.g., Ekman, Friesen, & Ellsworth, 1972; Fernandez-Dols, Sierra, & Ruiz-Belda, 1993; Frijda, 1969; Goodenough & Tinker, 1931; Knudsen & Muzekari, 1983), with other bodily responses (Aviezer et al., 2008; Meeren, van Heijnsbergen, & de Gelder, 2005), with other faces seen prior to the target emotional expression to be judged (Carroll & Russell, 1996; Ekman, O’Sullivan, & Matsumoto, 1991; Goldberg, 1951; Russell & Fehr, 1987), with larger angle shots of the same face that includes more information (Munn, 1940; Vinacke, 1949), and with other people’s faces or scenery to project different affective tones (Ito, Masuda, & Hioki, 2012; Ito et al., 2013; Masuda et al., 2008). Although these studies have undoubtedly made many valuable contributions to the literature, one of the problems that have plagued the field is the fairly inconsistent findings from these studies, with some advocating a face superiority effect, others advocating context superiority, others advocating an additive effect, and others advocating none of these. We suggest that at least part of the inconsistencies across findings is rooted in differences in the types of pairings that have been used in previous research, and a lack of consideration of the ecological validity of the pairings when utilized. Space restrictions limit an extended discussion of the associated issues here (interested readers are referred to Matsumoto

& Hwang, 2010, for a review and suggested taxonomy of the kinds of context pairings found in the literature). We note here, however, that when ecologically valid faces are paired with ecologically valid context information about the circumstances that elicited them at equivalent signal clarities, judgment agreement rates about what emotions are signaled in the faces are very high and cultural differences do not occur (Matsumoto, Hwang, & Yamada, 2012).

In summary, judgment studies of facial expressions of emotion, whether cross-cultural or not, should pay strict attention to the nature of the images used as stimuli in those studies, taking into account the precise and momentary nature of facial expressions of emotions that actually occur in real life, and the contexts within which they occur. Because emotional expressions can change second to second, or fractions thereof, have specific timing, laterality, and symmetry characteristics (Ekman et al., 1981; Hager & Ekman, 1985), and may be used to signal multiple mental states, images used in judgment studies need to be checked for their ecological validity against existing data sources (not reliability data from a separate group of judges).

Dependent Variables

The final topic we visit concerns the nature of the dependent responses observers make. While early cross-cultural judgment studies utilized forced or fixed choice tasks (Frank & Stennett, 2001), more recent studies have employed many different types of judgment tasks, including multiscale ratings across different emotion labels (Kayyal & Russell, 2013; Kayyal et al., 2015; Naab & Russell, 2007; Yrizarry, Matsumoto, & Wilson-Cohn, 1998), open-ended responses (Gendron, Lindquist, Barsalou, & Barrett, 2012; Matsumoto & Ekman, 2004), sorting tasks (Gendron et al., 2012), judgments of familiarity (Blais et al., 2008), and valence ratings (Ito et al., 2013). The variety of judgment tasks used in the literature begs the question of what is “recognition,” what is being “judged,” and how this process differs, or not, with “perception.”

The first issue to consider is that because some of the same muscles used in emotional expressions are used to signal other nonemotional states, it is no wonder that when judgment tasks limit the response alternatives to emotion labels, recognition agreement is relatively high, but when other response alternatives are allowed (e.g., open-ended responses), recognition agreement is lower, an effect that has been replicated for decades (Gendron et al., 2012; Matsumoto & Ekman, 2004; Rosenberg & Ekman, 1995; Russell, 1994). Open-ended responses allow for emotion *and* nonemotional signals to be observed, affecting recognition rates for emotion labels. Such data argue against the notion that a certain facial expression is a unique signal of an emotional state *and nothing else*, but students of facial expressions have noted for years the morphological similarities between facial expressions of emotion and nonemotional expressions, as mentioned before.⁵

Still, the use of different types of dependent variables in recent research raises questions about what is “recognition.” Does recognition require assigning a verbal label to a face? Can

recognition occur without verbally labeling what is recognized? Does measuring recognition with a verbal label constrain responses (and thus knowledge) by the way it is measured (i.e., through the use of verbal labels)? If researchers require language in response to a stimulus, whether a verbal label or open-ended response, then how do the constraints of the language and the various cultural influences on that language influence responses? These are important questions, given that emotion judgments differ even in the same observers when different languages are used to assess recognition (Matsumoto et al., 2008; Matsumoto & Assar, 1992). More broadly, this issue raises questions about the degree to which cultural differences in language-based recognition tasks are affected by any inherent limitations of the methodology (e.g., cultural influences on the language itself) vis-à-vis providing information about the signal value of the facial expression. And it raises questions about whether recognition can occur without language.

This issue is compounded when quantitative judgment data are subjected to complex statistical analyses (e.g., cluster or multidimensional scaling, as was done by Gendron et al., 2012; and Yrizarry et al., 1998). Although it is clear that the dimensions produced by such analyses characterize the dimensions underlying the given ratings, drawing conclusions about the dimensions that are occurring in the mind of the perceiver may be a leap of faith, because of the simple fact that the dimensions were derived from quantitative data that were artificially contrived by the researchers.

Future cross-cultural studies may address the possibility that “recognizing” emotional expressions is not as much about labeling it verbally but understanding its meaning and function in a given context with minimal cognition, even implicitly. Previous studies using scenario-matching tasks approach a solution (Matsumoto & Ekman, 2004; Rosenberg & Ekman, 1995), but of course the presented scenarios depend on verbal language and are thus limited for the same reasons as described before. One recent study used a nonlinguistic discrimination task to demonstrate that ecologically valid facial expressions of emotion were perceived as distinct categories despite the fact that the language of the observer group (Yucatec Mayans) did not contain the typical emotion labels attributed to the faces (Sauter, LeGuen, & Haun, 2011). Such findings open the door to the possibility of future cross-cultural studies involving nonlinguistic tasks to explore the nature and function of facial expressions of emotion.⁶

Conclusion

As we mentioned at the beginning of this article, our goal was not to conduct a comprehensive review of the literature in this area, nor to argue for or against the meaning of the findings that have been generated to date vis-à-vis questions about the universality versus cultural specificity of facial expressions of emotion. We also acknowledge that there is no perfect study, and that all of the existing studies have made important contributions in their own ways. Instead our goal was to use recent studies as examples to highlight methodological issues and

concerns that face researchers interested in conducting cross-cultural studies and/or interpreting their results. The four issues we selected for discussion here are by no means exhaustive of the many methodological concerns that face cross-cultural researchers and studies; of the four, we believe that issues concerning the ecological validity of the stimuli used are of paramount concern in any judgment study, cross-cultural or not. At the same time cross-cultural research raises a host of other methodological issues that researchers must deal with in order to place their studies and their findings properly within a broader literature.

We welcome the recent, renewed surge of cross-cultural studies on judgments of facial expressions of emotion. At the same time we urge a deeper consideration of the meaning and implications of the methodological issues such studies bring to bear on that literature. We contend that careful consideration of the complex methodological issues associated with valid cross-cultural studies can continue to facilitate the development of more sophisticated and nuanced research questions to be addressed, questions that should help guide the field beyond oversimplified debates that have occurred in the field for decades. An evolution in the field’s thinking about the methodological issues concerning cross-cultural judgment studies will portend an evolution of the field’s thinking about the very nature of culture, emotion, and facial expressions, an evolution that is long overdue.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Notes

- 1 Although in reality most cross-national samples are not really cross-national, either. They are usually cross-university samples of specific courses in psychology departments in different universities that are in different countries. Thus, much of what we discuss in what follows vis-à-vis sampling validation issues is certainly relevant for the typical cross-national type of cross-cultural study as well (as it is for any quasi-experimental design with a participant variable as an independent variable).
- 2 To be sure, this same logic may also be at work when considering American samples from U.S. universities (or any university sample in any country). These samples may also be self-selected to some degree and may or may not be representative of nonuniversity student samples in the same country.
- 3 The Montreal Set of Facial Displays of Emotion (slides) is available from Ursula Hess, Department of Psychology, University of Quebec at Montreal, PO Box, 8888.
- 4 For example, note that the ingroup advantage in emotion recognition that was reported in Dailey et al. (2010) only occurred with the Japanese Female Facial Expressions data set, for which no ecological validity has been reported. Data from the same observers in the same study making judgments of the Japanese and Caucasian Facial Expressions of Emotion (JACFEE) set did not produce an ingroup effect. Other studies using the JACFEE have also not produced the ingroup effect (Lee et al., 2005; Matsumoto, 2002).
- 5 Relatedly, Yik and Russell (1999) reported that facial expressions of emotion provided both social and emotional messages to observers,

with no cultural differences among English-speaking Canadians, Cantonese-speaking Hong Kong Chinese, and Japanese-speaking Japanese. This finding is entirely consistent with evolutionary accounts of facial expressions of emotion that note their interpersonal and sociocultural functions (Hwang & Matsumoto, 2016; Keltner & Haidt, 1999).

- 6 A related literature would include studies of the concept of social referencing—the process whereby infants seek out information from others to clarify a situation and then use that information to act (Hertenstein & Campos, 2004; Klinnert, Campos, & Sorce, 1983; Sorce, Emde, Campos, & Klinnert, 1985).

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