Published in final edited form as:

Emotion. 2013 April ; 13(2): 203–215. doi:10.1037/a0030013.

Revisiting the Out-Group Advantage in Emotion Recognition in a Multicultural Society: Further Evidence for the In-Group Advantage

Sun-Mee Kang,

California State University, Northridge

Anna S. Lau

University of California, Los Angeles

Abstract

Recent studies have accumulated supporting evidence for in-group advantage in emotion recognition, with individuals more accurately perceiving emotions expressed by cultural in-group members. However, inconsistent results appear in balanced-design studies involving the majority and minority groups residing within a single nation: There is an apparent pattern of an out-group advantage, implying that minority group members show heightened sensitivity toward emotional expressions of the majority group members. Two studies were conducted to further explore why the out-group advantage emerged in multicultural societies. In Study 1, based on a careful review of existing studies involving majority and minority groups, both new and previously reviewed, a new approach to assess the in-group and out-group advantage was proposed and applied. In Study 2, the minority out-group advantage was further tested in an experimental study. European American and Asian American students were asked to identify emotions of European and Asian Americans presented in static photos of imitated emotional expressions and full-channel video presentations of spontaneous emotional expressions. The results revealed that a mutual in-group advantage was observed in the spontaneous expressions condition, but not in the imitated expression condition. Significance and implications of the findings from this study are discussed regarding intergroup interactions in a multicultural society.

Keywords

in-group advantage; out-group advantage; emotion recognition; between-groups differences; spontaneous expressions

Since Elfenbein and Ambady's seminal review (2002a) marshalling evidence for an in-group advantage in emotion recognition, further studies have provided additional support, documenting that emotional communication tends to be more accurate when encoders and decoders belong to the same cultural group (Elfenbein, Beaupré, Lévesque, & Hess, 2007;

Elfenbein, Mandal, Ambady, Harizuka, & Kumar, 2004). Interestingly, Elfenbein and Ambady (2002a, 2002b) also reported an incidental observation of an out-group advantage in emotion recognition, such that ethnic minority individuals residing in multicultural societies exhibited greater accuracy in recognizing emotion expressions of majority group members. The minority out-group advantage is, however, not aligned well with accumulating evidence for the in-group advantage in the recent literature. The current study was conducted to investigate why the minority out-group advantage emerged among the majority and minority groups residing within the same national boundaries in Elfenbein and Ambady's review (2002a, 2002b). To address this question, we propose an alternative way of defining in-group and out-group advantage in emotion recognition and apply the new framework to previously reviewed and newly reported research evidence in an updated review. Next, we present data that support the in-group advantage among the majority and minority groups, but not a minority out-group advantage, using more ecologically valid study stimuli.

Social Status and Nonverbal Decoding Skills

One of the robust findings from the field of nonverbal communication research is the gender differences in nonverbal decoding skills (Brody & Hall, 2008; Hall, 1984). Although there is general agreement that women are better than men in this regard, there is little agreement on why women are good at decoding nonverbal expressions. One of the controversial accounts for the gender differences was proposed by Henley (1977), who attributed women's heightened decoding skills to their relative low social status and power. A core argument of this "subordination hypothesis" (LaFrance & Henley, 1994) is that individuals from the lower-power groups need to be more sensitive to nonverbal signals from members of the higher-power groups than the reverse for their better adjustment. A number of other writers also expressed similar views on this issue (Frieze & Ramsey, 1976; Goffman, 1979; Miller, 1986; Weitz, 1974).

Empirical support for the subordination hypothesis, however, is limited (Hall & Friedman, 1999; Hall, Halberstadt, & O'Brien, 1997; Hecht & LaFrance, 1998; Henley, 1977; Snodgrass, 1985, 1992; Snodgrass, Hecht, & Ploutz-Snyder, 1998). When subordination status is operationalized by indicators of socioeconomic status (e.g., education and income), multiple studies have revealed that higher social status is associated with better decoding skills (e.g., Hall, Halberstadt, & O'Brien, 1997; Izard, 1971. See Kraus, Côté, & Keltner, 2010, for empirical evidence inconsistent with the association). When subordination status was defined in terms of individual differences in traits like dominance and sex role ideology, results showed that more dominant individuals and women with more liberal sex role attitudes were advantaged in decoding nonverbal emotions (Hall, Halberstadt, & O'Brien, 1997). Finally, well-controlled experimental manipulations of social status under zero-acquaintance have failed to support the subordination hypothesis (Snodgrass, 1985, 1992; Snodgrass, Hecht, & Ploutz-Snyder, 1998).

Out-Group Advantage in Emotion Recognition

In this vein, it is notable that portions of the data from Elfenbein and Ambady's (2002a) influential meta-analysis seemed to provide support for a version of the subordination hypothesis. They analyzed data from 182 independent samples of cross-cultural groups derived from 97 separate studies to address the universality and cultural specificity of emotion recognition. Their main findings were that (1) emotions are universally recognized at better-than-chance levels, and (2) there exists an in-group advantage in emotion recognition, such that recognition accuracy is higher when emotions are both expressed and perceived by members of the same cultural group. Elfenbein and Ambady attributed the in-group advantage to cultural learning and expressive style shared by in-group members (Albas, McCluskey, & Albas, 1976; Scherer, Banse, & Wallbott, 2001).

The meta-analysis also revealed an exception to the in-group advantage. When emotion recognition studies were conducted with two different cultural groups residing within the same national boundary, minority group members (e.g., African Americans in the United States) were found to more accurately recognize emotional expressions of the majority group members (e.g., European Americans) than the reverse. The results held when they restricted their analyses only to data from balanced design studies (i.e., both the majority and minority groups were included and tested in the same study; $n = 11$). This effect was often so large that minorities actually recognized majority group expressions with greater accuracy than they classified the emotions of in-group members. This minority "out-group advantage" (Elfenbein & Ambady, 2002a, p. 230) was observed in seven of the 11 balanced-design studies (64%). Elfenbein and Ambady (2002a, 2002b) speculated that the asymmetric decoding skills of the majority and minority group members may be related to differences in power status or, more consistent with the cultural learning tenets, levels of exposure to out-group members across the groups.

Although this minority out-group advantage was an incidental observation emerging from the large-scale meta-analysis (Elfenbein & Ambady, 2002a, 2002b), it requires attention because if it exists, it would have profound implications for intergroup interactions in multicultural societies. It also raises a challenging question as to why the differences in power status or levels of intergroup exposure might serve as more influential factors for decoding emotions than shared learning experiences and expressive style among in-group members. Study 1 was therefore conducted to further probe the puzzling nature of the minority out-group advantage.

Study 1

The main purpose of Study 1 was to examine the balanced-design studies reviewed by Elfenbein and Ambady (2002a, 2002b), along with recent articles published after Elfenbein and Ambady's study, to understand under what conditions the minority out-group advantage is observed. Toward this goal, we review how the in-group advantage indicators were calculated and used in Elfenbein and Ambady's studies (2002a, 2002b). Then, we propose an alternative way to operationalize the in-group and out-group advantage and apply this

new framework to previously reviewed and newly reported studies exploring the emotion recognition accuracy across majority and minority groups within a single nation.

Method

Studies Included in the Meta-Analysis

A total of 17 balanced-design studies were analyzed in this study. Among them, 12 studies were reviewed by Elfenbein and Ambady (2002a, 2002b), and five new studies conducted since Elfenbein and Ambady's study (2002a) were added based on the following criteria: (1) An objective criterion for accuracy existed so that recognition accuracy scores could be computed, (2) a balanced design was used to explore emotion recognition accuracy between the majority and minority groups residing within the same societal boundary, and (3) participants were not members of clinical populations. The original 12 studies reviewed by Elfenbein and Ambady are presented in the top part of Table 1, and the new studies are listed after.

Table 1 also summarizes study characteristics, including the ethnicity of the majority and minority groups sampled, channel of expression (e.g., voice, facial photograph, silent video, or full), and method of eliciting emotional expressions for developing study stimuli (i.e., "posed" vs. "imitated"). "Posed emotional expressions" mean that the encoders in study stimuli were asked to pose particular emotional expressions such as sadness, happiness, or anger. "Imitated emotional expressions" mean that the encoders were instructed to imitate a pose by moving particular facial muscles in order to generate expressions based on Ekman and Friesen's emotion theory (1971) or the Facial Action Coding System (Ekman & Friesen, 1978). Four studies in Table 1 used the imitated expressions, and the other 13 studies adopted posed expressions.

Assessment of the In-Group Advantage

To compute the extent to which emotions were accurately recognized cross-culturally, percentage difference effect size was most frequently used in Elfenbein and Ambady's review (2002a) because percentage accuracy scores were commonly reported in the cross-cultural studies of emotion recognition. Because all the studies listed in Table 1 used a multiple-choice response format, the standard correction formula (Nunnally & Bernstein, 1994), which is $(\text{proportion correct} - (1/\text{number of choices})) / (1 - (1/\text{number of choices}))$, was applied for correcting chance guessing following Elfenbein and Ambady's procedures (2002a). Table 1 presents actual percentage accuracy reported in the 17 studies after correction for guessing.¹ After the guessing correction, Elfenbein and Ambady (2002a) calculated an index of an in-group advantage by subtracting the percentage accuracy score for the out-group stimuli from the percentage accuracy score for the in-group stimuli within one group.

For example, in Table 1, the percentage accuracy scores of Anglo Canadians for their in-group and out-group stimuli in the Albas, McCluskey, and Albas study (1976) were 72.78%

¹One exception was a study by Beaupré and Hess (2005). They reported unbiased hit rates based on a confusion matrix proposed by Wagner (1993), which are displayed in Table 1.

and 43.33%, respectively, after the guessing correction. The difference between these two percentages, 29.44% (72.78% – 43.33%), indicated the extent to which Anglo Canadians recognized emotions of their own group members more accurately than emotions of out-group members. In the same fashion, the percentage accuracy scores of Canadian Cree for their in-group and out-group stimuli were 71.67% and 44.44%, respectively, and the difference between the two percentages, 27.22%, was considered as an index of the in-group advantage demonstrated by Canadian Cree.

When the indicator of the in-group advantage for the minority group was examined across the first 11 studies in Table 1, seven of the 11 indicators have negative values (i.e., bold case in Table 1). Elfenbein and Ambady (2002a) interpreted these negative values to mean that the minority group members recognized the emotion expressions of the majority group members more accurately than the emotional expressions of their own group members.² For instance, African Americans in the Gitter, Black, and Mostofsky study (1972a) recognized the emotional expressions of Caucasian Americans more accurately (58.33%) than the emotional expressions of African Americans (52.50%). Based on these observations, Elfenbein and Ambady (2002a) stated that the minority group members residing in a multicultural society tend to show an out-group advantage.

Re-Evaluation of the In-Group Advantage Index

It is notable that the index of the in-group advantage was calculated by taking the difference between the percentage accuracy scores of in-group and out-group stimuli *within a group* in Elfenbein and Ambady's study (2002a, 2002b). This means that the percentage accuracy scores based on the two different sets of stimuli were subtracted from each other to generate an indicator for the in-group advantage.³ From our view, this *within-group difference* of the percentage accuracy scores can be taken as the in-group indicator only if the two different stimulus sets have "equivalent" test difficulty. If not, it is hard to interpret the meaning of the within-group difference because the within-group difference could be confounded with test difficulty.⁴

Given this concern, an interaction *F* test may provide an alternative indicator of the out-group advantage in balanced studies, which addresses test difficulty by controlling for the main effect of encoders when testing the significance of the encoders × decoders interaction effect. Elfenbein and Ambady (2002a) also examined the interaction *F* test and presented the results in their paper. Depending on the direction of the interaction effect, the *F* test

²Some of the percentage accuracy scores are slightly different from the values reported by Elfenbein and Ambady (2002a, 2002b) and by Wickline, Bailey, and Nowicki (2009), mainly because of rounding error (in the case of Buchman, 1973, and Wolfgang, 1980), minor computational error (in the case of Study 3a and 3b of Nowicki, Glanville, and Demertzis, 1998), or skipped responses (Wickline, Bailey, and Nowicki, 2009). All the discrepancies were resolved for the current study through communications between Dr. Elfenbein (H. Elfenbein, personal communication, July 5, 2007), Dr. Wickline (V. Wickline, personal communication, February 24, 2012) and the first author of the current article.

³Elfenbein and Ambady (2002a) chose to report the within-group difference, instead of the between-group difference, in the case of balanced-design studies to maintain statistical independence for their meta-analysis aggregating 187 samples from 97 studies (for more detailed descriptions, see footnote 3 on p. 208, in Elfenbein and Ambady, 2002a)

⁴It should be mentioned that the equivalence of test difficulty is not the same as the "stimulus equivalence" argued by Matsumoto (2002, 2007), as one of his requirements to test the in-group advantage. Whereas the stimulus equivalence suggests that the same facial muscles associated with emotional expression must be innervated with the same intensity levels across encoders from different cultural groups, the equivalence of test difficulty in this study simply means that two sets of study stimuli should have the equivalent mean score of percentage accuracy.

represents the extent to which in-group judgments were more accurate than out-group judgments, or vice versa. Elfenbein and Ambady (2002a) set up the contrast F test using weights of +1 for the in-group judgment and -1 for the out-group judgment and computed the associated effect size (r). Among the first 12 studies listed in Table 1, 9 studies reported data allowing Elfenbein and Ambady to compute the F test, and their original results (Table 5 in Elfenbein & Ambady, 2002a) are reproduced in Table 1 under the column heading of “ r_{contrast} .” A positive r_{contrast} supports the in-group advantage, and the magnitude of r_{contrast} denotes the effect size.

The r_{contrast} results revealed that only three of the nine studies (33%) showed the out-group advantage with small effect sizes (-.09, -.17, and -.05; mean effect size = -.10). The remaining six studies (67%) showed small to large effect sizes of the in-group advantage (.03 to .70; mean effect size = .25). These results can be compared with the observations that seven of the 11 balanced-design studies (64%) showed the out-group advantage (Elfenbein & Ambady, 2002a). The seemingly different outcomes between the r_{contrast} and the within-group difference of percentage accuracy scores can be attributed to the fact that the within-group difference is based only on the minority group but the r_{contrast} accounts for the performance by both the majority and minority groups.

Among the 5 newly added studies, three studies provided data allowing us to compute the r_{contrast} value (i.e., Pinkham et al., 2008; Tuminello & Davidson, 2011; Wickline, Bailey, & Nowicki, 2009), and their effect size estimates are listed in Table 1. With this additional information, the r_{contrast} results still show that more studies showed the in-group advantage (8 of 12 studies; 67%) than the out-group advantage (4 studies; 33%).

The r_{contrast} , however, has its own limitations as an index of the in-group advantage. Because the r_{contrast} is an overall index of in-group advantage, it does not discriminate which in-group advantage exists in a study. There are two different in-group advantages in a fully balanced design, which is the in-group advantage of the majority group and the in-group advantage of the minority group. The index of r_{contrast} could present one large in-group advantage or the combined effect of the two in-group advantages. For example, in the Nowicki, Gianville, and Demertzis' Study 3b (1998), there were both an in-group advantage of the majority group (16.81) and an out-group advantage of the minority group (-10.83), but the value of r_{contrast} (.22) implied the overall in-group advantage.

A New Way of Identifying the In-Group Advantage: Between-Groups Differences

Based on our review, we propose another alternative indicator of the in-group advantage involving the “between-groups differences.” Matsumoto (2002) argued in his commentary on the Elfenbein and Ambady's meta-analysis (2002a) that only balanced designs should be used to test the in-group hypothesis. To illustrate, he used an example of a 2×2 balanced design (2 levels of decoders and 2 levels of encoders) as in Table 2(a). If the performance by the majority group decoders (denoted W) is better than the performance by the minority group decoders (denoted X) in recognizing emotions expressed by the majority group encoders, this outcome alone is not sufficient to conclude an in-group advantage unless the performance by the minority group decoders (denoted Z) is also better than the performance by the majority group decoders (denoted Y) in recognizing emotions expressed by the

minority group decoders. In other words, data indicating $W > X$ can only be used as supporting evidence for the in-group advantage hypothesis when they are combined with the data indicating $Y < Z$. If $W > X$ is accompanied with $Y > Z$, this pattern may simply imply that majority group members have better decoding skills.

Notice that Matsumoto (2002) considered *between-groups differences* to test the in-group advantage hypothesis in this particular example. By comparing between-groups differences, a main focus is on examining decoding abilities between two cultural groups given a stimulus set. Therefore, cultural differences in encoding expressivity are not the main focus in this approach. Matsumoto (2002) also implied that the within-group differences (i.e., whether or not data indicate both $W > Y$ and $X < Z$) could be used as another way of testing the in-group advantage. In this approach, comparing encoding abilities between two cultural groups is the main interest because one cultural group's accuracy scores on two different tests are directly compared.

Both between- and within- group differences can be used to test cultural group differences in emotion recognition. Depending on researchers' interests, cultural differences in encoding or decoding abilities can be explored by choosing one or the other approach. They, however, have their own limitations that researchers should be aware of. As previously noted, the index of within-group difference could be confounded with test difficulty. Researchers adopting this approach need to show that the variance in perceived accuracy is explained by cultural differences in encoding ability per se, but not by using study stimuli with nonequivalent test difficulties. As for the index of between-groups difference, it could be confounded with a number of extraneous variables that may impact the cultural differences in decoding ability (e.g., group differences in age, gender, education, socioeconomic status, etc.). Those confounds, however, can be more efficiently controlled by recruiting cultural groups equivalent in those aspects (e.g., college students).

Thus, we used the index of between-groups difference, limiting our comparisons to between-groups differences within a 2×2 balanced design. As presented in Table 2, four different patterns of between-groups differences are expected. Table 2(a) illustrates the presence of in-group advantage by both the majority and minority groups (i.e., $W > X$ and $Y < Z$). We named this particular pattern the "mutual in-group advantage." Table 2(b) presents the "minority group advantage," in which the minority group decoders are not only good at recognizing emotions expressed by the majority group encoders but are also better at reading emotional expressions of their own group members (i.e., $W < X$ and $Y < Z$). This pattern implies that the minority group members have heightened decoding skills. In contrast, if majority group members display superior decoding skills overall, we would expect a "majority group advantage" (i.e., $W > X$ and $Y > Z$ in Table 2(c)). Finally, when both groups display an out-group advantage, this would be a "mutual out-group advantage" (i.e., $W < X$ and $Y > Z$ in Table 2(d)). One of the main goals of Study 1 was to apply this new frame of identifying in-group and out-group advantages to the 17 studies in Table 1 and explore how those 17 studies are assigned into the four patterns.

Results and Discussion

Classification of the 17 Balanced-Design Studies Into the Four Types

The results of classifying the 17 studies into the four types are presented under the headings of the “between-groups difference” and “Types of advantage” in Table 1. Among the 17 studies, there were three studies supporting a mutual in-group advantage (18%), five supporting a minority group advantage (29%), eight showing a majority group advantage (47%), and one representing a mutual out-group advantage (6%). Interestingly, there were more studies that showed the majority group advantage than the minority group advantage. When we reclassified the original 12 studies in Elfenbein and Ambady’s review (2002b), there were two studies supporting a mutual in-group advantage (17%), five supporting a minority group advantage (42%), four showing a majority group advantage (33%), and one representing a mutual out-group advantage (8%).

To understand why the four different patterns emerged across the 17 studies, we carefully reviewed those studies in terms of what methods were used to elicit emotional expressions and what presentation modes were used. We noticed that various ways of eliciting emotional expressions from encoders were used from hiring professional actors to portray discrete emotions to asking participants to move certain facial muscles. Diverse channels (e.g., content-filtered voice, facial photos, silent video, or full video) were also used to present the study stimuli to decoders in the previous studies. Even though there were a number of different combinations between methods of eliciting emotions and types of presentation modes, an interesting pattern was observed. In four studies (i.e., Beaupré & Hess, 2005; Mehta, Ward, & Strongman, 1992; Tuminello & Davidson, 2011; Wolfgang, 1980), imitated emotional expressions were presented through facial photos, and the majority group advantage was clearly observed.

In sum, our new analyses revealed that the majority group members were more likely to show the heightened decoding ability than the minority group members, which is somewhat different from the observation made by Elfenbein and Ambady (2002a). Our analyses also revealed that when imitated emotional expressions were presented through static photos, a majority group advantage emerged, implying that the emergence of the majority group advantage could be partially dependent on what types of emotion stimuli are used.

An Appropriate Test for the Subordination Hypothesis

In this vein, one critical question is what type of emotional stimuli is adequate for testing the minority out-group advantage (Elfenbein & Ambady, 2002a, 2002b) and how the study stimuli should be presented to decoders. An answer to this question was proposed by Henley, who put forward the subordination hypothesis a decade ago. Upon noticing that much of the evidence refuting the subordination hypothesis was drawn from studies using posed emotions, LaFrance and Henley (1994) maintained that the subordination hypothesis should be tested with spontaneous emotional expressions. However, none of the 17 studies listed in Table 1 used spontaneous emotional expressions. More importantly, there have been few attempts to examine an in-group or out-group advantage in emotion recognition using both spontaneous emotional expressions and a balanced design between the majority and

minority groups residing within the same societies.⁵ Study 2 was conducted to meet this need.

Study 2

The main purpose of Study 2 was to examine whether the minority out-group advantage would emerge when spontaneous emotional expressions were used as study stimuli. If the emergence of the in-group advantage is attributed to cultural learning and expressive style shared by in-group members (Elfenbein & Ambady, 2002a), the pattern of the mutual in-group advantage should be observed with spontaneous emotional expressions because spontaneous expressions are culturally defined and shaped (Elfenbein & Ambady, 2002; Marsh, Elfenbein, & Ambady, 2003, 2007). Imitated emotional expressions based on the Facial Action Coding System were also used in the current study to further test the association between the imitated emotional expressions and the majority group advantage found in our Study 1 review. If the majority group advantage emerges only with the imitated emotional expressions but not with spontaneous emotional expressions in this study, it would indicate that the majority group advantage could be an artifact of adopting the imitated emotion expressions as study stimuli.

Method

Participants

Decoders for the present study included 131 European American (38 men and 93 women) and 94 Asian American (31 men and 63 women) students between the ages of 17 and 25 years ($M = 19.46$, $SD = 1.52$) who were enrolled in introductory psychology courses at two large public universities on the West Coast. Participation in this study was limited to individuals who were born and raised in the United States to minimize the effects of varying degrees of acculturation levels on emotion recognition. The European American (EA) sample consisted of 71% women and the Asian American (AA) sample was composed of 67% women. Among the 94 self-identified AA participants, 36.2% were Chinese, 18.1% Filipino, 18.1% Korean, 13.8% Vietnamese, 6.4% Japanese, 3.2% Thai, 2.1% Cambodian, 1.1% Pacific Islander, and 1.1% other. While the mean generation status of EA students was 4.17 ($SD = 1.08$), the mean of AA students was 2.09 ($SD = .41$), which reflects the shorter history of immigration of Asian Americans in the United States.

Materials

Spontaneous emotional expressions.—The study stimuli for spontaneous emotional expressions of EA encoders were taken from a pool of interview tapes (Kang, 2012) that were originally created for the development of a new “thin-slice” measure (Ambady, Bernieri, & Richeson, 2000) of emotion recognition by adopting the empathy accuracy paradigm developed by Ickes and his colleagues (Ickes, Bissonnette, Garcia, & Stinson, 1990). Twenty-six EA college students (18 women and 8 men) were interviewed in

⁵Gray, Mendes, and Denny-Brown’s study (2008) was one example that explored the in-group advantage using spontaneous expressions with the majority and minority groups. This study, however, was not included in Table 1 as a result of their study not having an objective criterion for accuracy that allows us to compute recognition accuracy scores.

individual 25-min sessions in which they discussed their meaningful life experiences in a free-format interview. The interview session was videotaped with the participants' consent. Immediately after the interview, each interviewee was asked to review her or his own tape alone and was instructed to stop the tape at any point during which the interviewee remembered having had a specific emotion and record how she or he felt at that moment during the interview along with a time stamp of the segment. After the review, the interviewee gave consent for the investigator to use portions of the tape to develop a stimulus video for future studies. The interviewees were not told about this request until the review sessions were done to allow the interviewees to behave more naturally during the interview. Three interviewees refused to give their permission. Their interview tapes were immediately erased.

To extract the marked segments from the interview tapes, the interview tapes were edited with Adobe Premier 6.0 by the first author. While the reported time stamp served as the ending point of each clip, the starting point was determined on two considerations – (1) rendering decoders the minimum but sufficient amount of information so that they can identify the emotional experience of the interviewee given context and/or (2) choosing natural transition points in ongoing dialogues. To avoid any complications with calculating recognition accuracy scores later, only the segments associated with a single reported emotion were selected.

All the extracted segments were initially reviewed by the first author. One issue that emerged during this initial review was that in many cases, it was quite challenging for decoders to identify the emotions reported by the encoders because there were no clear clues available for the decoders to read the emotions. In other words, it seemed that only the experiencing individuals (i.e., the encoders) could report those emotions because they have direct access to her or his internal feelings. Thus, it was necessary to check whether the decoders could read reported feelings based on verbal and nonverbal information given context. Two EA judges (trained undergraduate students) independently reviewed the extracted clips to evaluate the clips and interviewees' written comments. The judges verified that each segment matched the interviewee's written comments on what emotions she or he experienced at the end point of the clip given the context.

From 36 segments marked by both judges, 18 clips were eliminated mainly because of sensitive or highly personal content. Despite permission from the encoders, those clips were not included to protect their privacy. A series of small-scale pilot studies were conducted with the remaining 18 clips to explore decoder accuracy. Based on the literature review (Trimboli & Walker, 1993), we set our criteria for exclusion as below 20% of the accuracy scores ("too difficult") or above 80% ("too easy") to make the final set of the clips have optimal range of recognition accuracy. The results of the pilot studies, however, showed that a half of the clips were too difficult (their accuracy scores were below 20%, which is equivalent to chance guessing of 17%) and the three clips describing a "happy" emotion turned out to be too easy to interpret (above 90%). Although the nine difficult items were dropped (four clips for anger, two clips for frustration, and three clips for sadness), the three clips describing a happy emotion were kept to make the stimulus inclusive of both positive

and negative emotions. Thus, no clips were removed from the pool for the fact that they were overly easy to interpret.

The final seven clips were selected from the remaining nine clips, based on the gender of interviewees (four women and three men) and the content of the story told in each clip (one angry, two frustrated, two happy, and two sad episodes). The overall mean accuracy score of the seven clips was 65.03% (ranging from 31.62% to 96.07%) without guessing correction in this study. All the encoders in the selected clips were born and raised in the United States, with the mean age of 18.57 ($SD = 0.79$).

Study clips for AA encoders were created by following the same procedure described above. Twenty-five Asian American college students (16 women and 9 men) were interviewed and asked to review their videotapes and to record the emotions they felt during the interview. One interviewee refused to give permission to use her/his tape for future studies. Three AA undergraduate judges independently reviewed the extracted clips to evaluate the clips and the comments for consistency. From 32 segments marked by the three judges, eight clips were eliminated to protect the encoders' privacy. Among the remaining 24 clips, 10 clips were dropped through a series of the pilot tests because they were too difficult to interpret (below 20%; three clips for anger, four clips for frustration, two clips for sadness, and one clip for surprise). Although five clips describing a happy emotion were quite easy to read (i.e., above 85%), they were not eliminated to ensure the stimulus set included positive emotion. Like the case of the EA clips, no AA clips were removed from the pool for the fact that they were overly easy to interpret.

The final seven AA clips were selected from the remaining 14 clips to match with the seven EA clips in terms of gender (four women and three men) and the content of the episodes (one angry, one frustrated, two happy, two sad, and one surprised emotions). The overall mean accuracy score of the 7 clips was 69.39% (ranging from 34.78% to 97.32%) without guessing correction in this study. Like the EA encoders, all the encoders in selected clips were born and raised in the United States, with the mean age of 19.29 ($SD = 1.11$). Of the seven AA encoders, two were Chinese, two were Vietnamese, one was Filipino, one was Japanese, and one was Thai.

Thus, the final set of study stimuli for the spontaneous expressions condition consisted of 14 discrete video clips (seven EA encoders and seven AA encoders). Each clip lasted from 12.25 to 41.07 seconds ($M = 25.69$ seconds and $SD = 7.34$ seconds). Because our main interest was in comparing the between-groups differences in accuracy scores rather than within-group differences, encoding differences between the two sets of the study stimuli (i.e., test difficulty) were not systematically controlled.

To present the edited clips to decoders, a computerized test platform was developed with Visual Basic by the first author. Using that platform, the 14 clips were presented one by one followed by the question, "What emotion has this person been experiencing throughout the clip?" on a computer screen. The decoders were asked to respond to each question by choosing one of six choices—angry, anxious, frustrated, happy, sad, and surprised—within 5 seconds. Anxious emotion was added to the response choices because it was the answer to

one of the five practice questions, which were given before the main test. Scores could range from 0 to 14 indicating the number of emotions correctly identified. It took around 20 minutes to complete, including reading the detailed instructions and answering the practice questions.

Imitated emotional expressions.—The study stimuli for imitated emotional expressions of both EA and AA encoders were taken from the Japanese and Caucasian Facial Expressions of Emotion (JACFEE) test (Matsumoto & Ekman, 1988). To present static photos taken from the JACFEE to the decoders and record their responses to the stimulus photos, a computerized test platform was developed with Visual Basic by the first author. Forty-eight photos were chosen from the JACFEE covering six basic emotions including angry, disgusted, fearful, happy, sad, or surprised. There were eight photos per emotion, including equal numbers of posers from two different ethnic groups (EA and AA) and of males and females within each ethnic group.

Before presenting the static stimulus photos, the decoders read through instructions about the task at a self-paced speed. Then, the six practice tests were administered to help decoders become familiar with how to take the computerized task before the main study stimuli were presented. The six photos were randomly selected from the 48 photos to cover the six basic emotions.

In the main test, the remaining 42 photos were presented for 1 second on a computer screen with a fixed 4-s interval between pictures. Participants were instructed to select one of the six buttons on the computer screen, labeled angry, disgusted, fearful, happy, sad, and surprised, within the 5-s period. All responses were recorded and scored with 42 points as the maximum score of this static emotion task. It took 10 minutes to complete the task.

Procedure

Decoders were invited to small-group sessions (one to three individuals per session) to take two computer tasks using an individual computer. After a decoder read and signed a consent form, she or he was asked to take the two computer tasks. After the computer tasks, the decoders were asked to fill out a questionnaire packet that included demographic information. The maximum number of participants per session was limited to three because they needed to be closely supervised by an experimenter throughout the session; whenever a participant began a new test, the experimenter briefly went over the test with the participant.

Results and Discussion

Testing the In-Group or Out-Group Advantages in Emotion Recognition

The average percentage accuracy scores of the EA and AA decoders on the two emotion recognition tests are presented in Table 3.⁶ The overall percentage accuracy scores of EA and AA decoders ranged from 54.41% to 87.05% with guessing corrections, which were

⁶The percentage accuracy scores with guessing correction (Nunnally & Bernstein, 1994) were used in this study instead of unbiased hit rates because of the small number of video clips used for decoding spontaneous emotional expressions (seven clips per encoder group). It was, however, possible to compute the unbiased hit rates for the imitated expressions condition. Thus, major analyses reported in the results section were repeated with the unbiased hit rates. The results showed that there were virtually no differences in

substantially above chance given that there were six choices per question (i.e., chance accuracy = 17%). To evaluate the in-group or out-group advantage in decoding emotions, a 2 (decoders) $\times$ 2 (encoders) $\times$ 2 (expression types) analysis of variance with repeated measures on the last two factors was conducted. The results of the mixed ANOVA test showed that several main and interaction effects were statistically significant, including the main effect of encoders, $F(1, 223) = 29.94, p < .001$, and the main effect of expression types, $F(1, 223) = 499.93, p < .001$. The significant main effect of encoders indicated that the emotional expressions of the AA encoders (estimated $M = 74.46, SE = .77$) were easier to recognize than the ones of the EA encoders overall (estimated $M = 69.40, SE = .70$). The results also revealed that the imitated emotional expressions were easier to recognize (estimated $M = 83.33, SE = .63$) than the spontaneous emotional expressions overall (estimated $M = 60.53, SE = .88$).

Besides these two main effects, the two-way interaction of encoders $\times$ decoders, $F(1, 223) = 5.68, p < .05$, and the three-way interaction effect of encoders $\times$ decoders $\times$ expression types, $F(1, 223) = 8.37, p < .01$, were found to be significant. We further analyzed the three-way interaction effect not only because it is the highest-order effect that should be interpreted first (Tabachnick & Fidell, 2007), but also because it directly tested our main hypotheses. To understand the nature of the three-way interaction effect, two-way interaction effects of decoders $\times$ encoders were examined within each level of expression types. As shown in Figure 1, there was no significant interaction effect of encoders $\times$ decoders in the imitated expressions condition, $F(1, 223) = .16, p > .05$, providing no support for an in-group advantage. Instead, there were significant main effects of encoders, $F(1, 223) = 5.71, p < .05$ and decoders, $F(1, 223) = 26.29, p < .01$. The significant main effect of encoders implied inequivalent test difficulty, with the emotional expressions of AA encoders being easier to decode than those of EA encoders (85.38% and 81.29%, respectively).⁷ The significant main effect of decoders suggests that the EA decoders were better at reading imitated emotions than the AA decoders (84.84% for EA decoders and 81.82% for AA decoders, respectively). The overall pattern of recognition accuracy in the imitated expressions condition thus conforms to *the majority group advantage*. This confirmed our observations in Study 1, showing that when imitated emotional expressions are presented through static photos, majority group members tend to outperform the minority group. Table 1 also shows the effect size of “ r_{contrast} ” as another indicator of an in-group advantage. It was $-.03$, implying no in-group advantage.

the outcomes with the percentage accuracy scores and with the unbiased hit rates. The resemblance between the two sets of the outcome was somewhat expected, given the strong correlations between the percentage accuracy scores and the unbiased hit rates for the imitated expressions condition ($r_s = .92$ for the EA stimuli and $.99$ for the AA stimuli, respectively).

⁷To address this issue further, the recognition accuracy data presented in the original JACFEE manual (Matsumoto & Ekman, 1988) were carefully reviewed. Overall, the accuracy scores of the AA stimuli tend to be higher than the ones of the EA stimuli in five of six basic emotions used in the current study (82.94% vs. 72.45% for fear, 94.50% vs. 91.38% for sadness, 93.98% vs. 92.65% for surprise, 98.40% vs. 97.56% for happiness, and 81.04% vs. 80.69% for disgust, respectively). The average intensity ratings of the AA stimuli were also higher than the ones of the EA stimuli in the five basic emotions (5.79 vs. 5.35 for fear, 6.11 vs. 5.79 for sadness, 5.62 vs. 5.44 for disgust, 5.11 vs. 4.97 for surprise, and 4.12 vs. 4.07 for sadness, respectively). This pattern was replicated in the current study—the AA stimuli were easier to read than the EA stimuli in the five emotions (68.18% vs. 55.22% for fear, 92.56% vs. 92.15% for sadness, 80.54% vs. 76.24% for surprise, 98.07% vs. 92.15% for happiness, and 73.11% vs. 70.05% for disgust, respectively). Higher accuracy scores were reported in the JACFEE manual, and this could be attributed to its longer exposure time (10 seconds for the studies cited in the JACFEE manual vs. 1 second for the current study).

The two-way interaction of decoders $\times$ encoders in the spontaneous expressions condition was examined next. As presented in Figure 2, there was a significant interaction effect of encoders $\times$ decoders in this condition, $F(1, 223) = 8.60, p < .01$, which implies an in-group advantage in decoding emotions. There was a significant main effect of encoders, $F(1, 223) = 14.03, p < .01$, meaning there was no equivalence in difficulty of the two sets of emotion stimuli, again with AA encoder expressions being easier to decode than the those of EA encoders (63.54% and 57.51%, respectively). There was, however, no significant main effect of decoders in the spontaneous emotion test, $F(1, 223) = .70, p > .05$. The pattern of *the mutual in-group advantage* emerged in this condition, as displayed in the bottom of Table 1. The effect size of “ r_{contrast} ” was .19, which also indicates an in-group advantage in decoding emotions.

Additional Analyses With Emotions Commonly Used Across Two Conditions

One of the issues that may limit the interpretation of our findings is the fact that emotions covered in the imitated and the spontaneous expressions conditions were not identical. For example, while six basic emotions were tested in the imitated expressions condition (angry, disgusted, fearful, happy, sad, and surprised), spontaneous expressions condition only covered five emotions including angry, frustrated, happy, sad, and surprised. Disgusted and fearful expressions were not included as study stimuli in the latter condition, mainly because none of the encoders reported those two emotions in the face-to-face interview settings. Instead, a range of frustrated feelings was frequently reported. Furthermore, in the spontaneous expressions condition the emotions expressed by the EA encoders (i.e., one angry, two frustrated, two happy, and two sad episodes) were not exactly matched with those expressed by the AA encoders (one angry, one frustrated, two happy, two sad, and one surprised emotions). Given a number of considerations to equate stimulus clips across EA and AA encoders in this condition (e.g., a gender ratio of the encoders and contents of experiences described in the clips), we had limited options in matching the emotions covered by the two stimulus sets.

To address those limitations, we reanalyzed the data with only the three emotions (angry, happy, and sad) that were common across all the stimulus sets. Another set of the 2 (decoders) $\times$ 2 (encoders) $\times$ 2 (expression types) ANOVA with repeated measures on the last two factors was conducted. The results of this mixed ANOVA test revealed two significant effects—the main effect of expression types $F(1, 223) = 532.59, p < .001$, and the three-way interaction effect of decoders $\times$ encoders $\times$ expression types, $F(1, 223) = 4.99, p < .05$. The significant main effect of expression types revealed that the imitated emotional expressions were easier to read (estimated $M = 93.60, SE = .57$) than the spontaneous emotional expressions overall (estimated $M = 66.73, SE = 1.06$), and the significant three-way interaction effect supported the main study hypothesis.

Further analyses of the three-way interaction effect were performed to examine a 2 (decoders) $\times$ 2 (encoders) interaction effect within each level of expression type. Again, there was no significant interaction effect of decoders $\times$ encoders in the imitated expressions condition, $F(1, 223) = .34, p > .05$, implying no in-group advantage. Further there were no significant main effects of encoders or decoders. The small effect size of r_{contrast} of $-.04$ also

did not support an in-group advantage. In the spontaneous expressions condition, however, a significant interaction effect of encoders $\times$ decoders was observed, $F(1, 223) = 4.24$, $p < .05$, suggesting an in-group advantage even with the limited number of emotions (the effect size of r_{contrast} was .14). There were no significant main effects in this condition.

General Discussion

Elfenbein and Ambady's meta-analysis study (2002a) demonstrated an in-group advantage in emotion recognition that was interpreted as evidence for better emotion perception among members of the same cultural group with shared cultural learning and expressive styles. They also reported an incidental observation that a minority out-group advantage emerged among the majority and minority groups residing within the same national boundary. The current study was conducted to further probe this intriguing observation by introducing an alternative approach to assessing the advantage using between-groups differences. This approach was applied in an updated review of balanced design studies of emotion decoding among minority and majority group respondents. This refined analysis actually revealed a more common pattern of majority group advantage. Next, in-group and out-group advantages were examined in a new study using both imitated and spontaneous emotional expressions. We hypothesized that if spontaneous emotional expressions were used as study stimuli, a mutual in-group advantage would be observed because spontaneous expressions are culturally defined and shaped. The results supported our hypothesis by showing that a pattern of the mutual in-group advantage emerged in the spontaneous expressions condition. In the imitated expressions condition, however, the majority group advantage emerged, replicating the findings from previous studies.

Implications and Significance

To our knowledge, this study is the first attempt to test the minority out-group advantage (Elfenbein & Ambady, 2002a, 2000b) in emotion recognition using both spontaneous emotional expressions and a balanced design. Our results showed that when spontaneous expressions were presented in ways that are more representative of interpersonal interactions in everyday life, the pattern of a mutual in-group advantage emerged (see also Gray, Mendes, & Denny-Brown, 2008). When imitated emotional expressions were presented through static photos, however, evidence supported the majority group advantage. The strong association between imitated emotional expressions and the majority group advantage seems to support the argument that the Facial Action Coding System was developed to meet "American norms" of emotional expressions (Elfenbein & Ambady, 2002b, p. 246; see also Elfenbein, Beaupré, Lévesque, & Hess, 2007, and Ricci Bitti, Brighetti, Garotti, & Boggi-Cavallo, 1989).

The current study provides additional support for a cultural in-group advantage in emotion recognition. Elfenbein and her colleagues (2007) have proposed the dialect theory of emotion, which maintains that cultural variation in emotional expressions are subtle enough to allow universal communication across people with different cultural backgrounds, yet substantive enough to generate intergroup miscommunication. Just as dialects influence verbal communication, emotional dialects (i.e., expressive styles) play a similar role in

emotional communication by providing in-group members both a sense of cultural belongingness and efficient tools for swiftly identifying out-group members (Marsh, Elfenbein, & Ambady, 2003, 2007).

Another contribution of the current study is that we offered new procedures for identifying an in-group and out-group advantage. We proposed that the “between-groups difference” in the percentage accuracy scores, rather than “within-group difference,” should be used to assess an in-group advantage, because the within-group difference can be confounded with nonequivalent test difficulty. When we analyzed the results from previous studies by comparing the between-groups differences from the majority and minority groups together, four different patterns of an in-group or out-group advantage emerged: a mutual in-group advantage, a minority group advantage, a majority group advantage, and a mutual out-group advantage. One strength of using the four patterns as the new indicator of the in-group advantage is that group performance is compared on each emotion task in the “cell mean level,” which provides necessary and complementary information on intergroup dynamics in emotion recognition that other global indicators of in-group advantage (e.g., r_{contrast}) do not convey.

Limitations and Suggestions for Future Studies

The results of the current study should be interpreted with caution because of a number of limitations. First of all, a relatively small number of emotion clips (14 clips) was used in the spontaneous expressions condition, mainly because of the complexity of stimulus generation and constraints in the original stimulus pool. This small number of emotion clips did not allow us to compute unbiased hit rates (Wagner, 1993) nor to explore an in-group or out-group advantage by each discrete emotion.

Another limitation of this study is that there were differences in the cultural backgrounds between AA encoders and AA decoders. Furthermore, there were differences in the backgrounds of AA encoders across the two emotion recognition task conditions. The AA encoders in the spontaneous expressions condition were drawn from various cultural backgrounds (i.e., Chinese, Vietnamese, Filipino, Japanese, and Thai). In contrast, the encoders in the imitated expressions condition were exclusively Japanese or Japanese Americans (Elfenbein & Ambady, 2002b), because these stimuli were drawn from the Japanese and Caucasian Facial Expressions of Emotion test (Matsumoto & Ekman, 1988). Because the decoders in this study were Asian Americans of varying ethnicity (i.e., Chinese, Korean, Filipino, Vietnamese, Japanese, Thai, Cambodian, and Pacific Islander), the ethnicities of AA encoders and decoders in the spontaneous expressions condition were more closely matched than in the imitated expressions condition. Although it is not known how much these mismatches in cultural backgrounds impacted the outcomes, it does represent a potential confound.

Related to the cultural background issue, it could be argued that the EA encoders and decoders in the spontaneous condition shared relatively similar cultural background as a result of their longer history of immigration to the United States, whereas the AA encoders did not have the same advantage because of their shorter immigration history. This may preclude the current study from being considered a truly balanced design.⁸ A more

methodologically rigorous test for the in-group advantage can be designed by recruiting AA encoders and decoders from one Asian culture (e.g., Chinese heritage) in future studies.

Finally, the current study provided support for a mutual in-group advantage in decoding emotions using more ecologically valid stimuli in which spontaneous emotional expressions were presented through full video channel. One intriguing question is whether the same pattern of the mutual in-group advantage would be obtained when spontaneous emotional expressions are presented in static photos (e.g., Matsumoto, Olide, & Willingham, 2009). If the mutual in-group advantage emerges with static photos between the majority and minority groups, it will highlight the importance of using spontaneous emotional expressions to test in-group advantage regardless of presentation mode. If the theorized pattern does not emerge, it may suggest that the presentation mode should more closely resemble genuine interpersonal interactions. Because video clips should deliver more dense and rich information about expressed emotions than static photos, future research could assess what minimum amount of information is needed to reveal an in-group advantage (e.g., 5-s clips vs. 20-s clips).

Closing Remarks

Although there has been accumulating support for the in-group advantage among cultural groups from different countries (e.g., Elfenbein et al., 2007; Elfenbein et al., 2004), there has been little empirical evidence for the in-group advantage among cultural groups within the same societal boundary. In fact, the influential meta-analysis by Elfenbein and Ambady (2002a) revealed some evidence of a minority out-group advantage in a stratified multicultural context, rather than an overall in-group advantage, implying that minority group members tend to have a heightened sensitivity to emotional expressions of majority group members. The current study demonstrated that when more ecologically valid stimuli are used, a pattern of the mutual in-group advantage emerges with no support for the minority out-group advantage.

The findings have multiple implications for social interactions among diverse cultural groups residing in multicultural societies. Notice that both encoders and decoders of Study 2 in the spontaneous expressions condition were limited to the participants who were born and raised in the United States. This underscores the influence of nonverbal dialects on emotional communication even among individuals with a lifetime of socialization experiences in the same society. The current study is a small step toward understanding the nonverbal communication among diverse cultural groups residing in a multicultural society.

Acknowledgments

We thank Jessica Tracy, Hillary Elfenbein, David Matsumoto, and an anonymous reviewer for their comments and suggestions on earlier versions of this paper. This research was supported in part by Award Number SC2MH087466 from the National Institute of Mental Health to the first author.

⁸We thank an anonymous reviewer for raising this point.

References

- Albas DC, McCluskey KW, & Albas CA (1976). Perception of the emotional content of speech: A comparison of two Canadian groups. *Journal of Cross-Cultural Psychology*, 7, 481–490. doi:10.1177/002202217674009
- Ambady N, Bernieri FJ, & Richeson JA (2000). Toward a histology of social behavior: Judgmental accuracy from thin slices of the behavioral stream In Zanna MP (Ed.), *Advances in experimental social psychology* (Vol. 32, pp. 201–271). San Diego, CA: Academic Press.
- Beaupré MG, & Hess U (2005). Cross-cultural emotion recognition among Canadian ethnic groups. *Journal of Cross-Cultural Psychology*, 36, 355–370. doi:10.1177/0022022104273656
- Brody LR, & Hall JA (2008). Gender and emotion in context In Lewis M, Haviland-Jones JM, & Barrett LF (Eds.), *Handbook of emotions* (3rd ed., pp. 395–408). New York, NY: Guilford Press.
- Buchman JS (1973). Nonverbal communication of emotions among New York City cultural groups. *Dissertation Abstracts International*, 34, 406–407.
- Ekman P, & Friesen WV (1971). Constants across cultures in the face and emotion. *Journal of Personality and Social Psychology*, 17, 124–129. doi:10.1037/h0030377 [PubMed: 5542557]
- Ekman P, & Friesen WV (1978). *Facial Action Coding System: A technique for the measurement of facial action*. Palo Alto, CA: Consulting Psychologists Press.
- Elfenbein HA, & Ambady N (2002a). 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 [PubMed: 11931516]
- Elfenbein HA, & Ambady N (2002b). Is there an in-group advantage in emotion recognition? *Psychological Bulletin*, 128, 243–249. doi:10.1037/0033-2909.128.2.243 [PubMed: 11931518]
- Elfenbein HA, Beaupré M, Lévesque 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 [PubMed: 17352569]
- Elfenbein HA, Mandal MK, Ambady N, Harizuka S, & Kumar S (2004). Hemifacial differences in the in-group advantage in emotion recognition. *Cognition and Emotion*, 18, 613–629. doi:10.1080/02699930341000257
- Frieze IH, & Ramsey SJ (1976). Nonverbal maintenance of traditional sex roles. *Journal of Social Issues*, 32, 133–141. doi:10.1111/j.1540-4560.1976.tb02602.x
- Gitter AG, Black H, & Mostofsky D (1972a). Race and sex in the communication of emotion. *The Journal of Social Psychology*, 88, 273–276. doi:10.1080/00224545.1972.9918684 [PubMed: 4639486]
- Gitter AG, Black H, & Mostofsky D (1972b). Race and sex in the perception of emotion. *Journal of Social Issues*, 28, 63–78. doi:10.1111/j.1540-4560.1972.tb00046.x
- Gitter AG, Mostofsky DI, & Quincy AJ (1971). Race and sex differences in the child's perception of emotion. *Child Development*, 42, 2071–2075. doi:10.2307/1127609 [PubMed: 5172421]
- Glanville DN, & Nowicki S (2002). Facial expression recognition and social competence among African American elementary school children: An examination of ethnic differences. *Journal of Black Psychology*, 28, 318–329. doi:10.1177/009579802237540
- Goffman E (1979). *Gender advertisements*. New York, NY: Harper and Row.
- Gray HM, Mendes BW, & Denny-Brown C (2008). An in-group advantage in detecting intergroup anxiety. *Psychological Science*, 19, 1233–1237. doi:10.1111/j.1467-9280.2008.02230.x [PubMed: 19121129]
- Hall JH (1984). *Nonverbal sex differences: Communication accuracy and expressive style*. Baltimore, MD: Jones Hopkins University Press.
- Hall JH, & Friedman GB (1999). Status, gender, and nonverbal behavior: A study of structured interactions between employees of a company. *Personality and Social Psychology Bulletin*, 25, 1082–1091. doi:10.1177/01461672992512002
- Hall JH, Halberstadt AG, & O'Brien CE (1997). 'Subordination' and nonverbal sensitivity: A study and synthesis of findings based on trait measures. *Sex Roles*, 37, 295–317. doi:10.1023/A:1025608105284

- Hecht MA, & LaFrance M (1998). License or obligation to smile: The effect of power and sex on amount and type of smiling. *Personality and Social Psychology Bulletin*, 24, 1332–1342. doi:10.1177/01461672982412007
- Henley NM (1977). *Body politics: Power, sex, and nonverbal communication*. Englewood Cliffs, NJ: Prentice-Hall.
- Ickes W, Bissonnette V, Garcia S, & Stinson L (1990). Implementing and using the dyadic interaction paradigm In Hendrick C, & Clark M (Eds.), *Review of personality and social psychology: Volume 11, research methods in personality and social psychology* (pp. 16–44). Newbury Park, CA: Sage.
- Izard CE (1971). *The face of emotion*. East Norwalk, CT: Appleton-Century-Crofts.
- Kang S (2012). Individual differences in recognizing spontaneous emotional expressions: Their implications in positive interpersonal relationships. Manuscript submitted for publication.
- Kraus MW, Côté S, & Keltner D (2010). Social class, contextualism, and empathic accuracy. *Psychological Science*, 21, 1716–1723. doi:10.1177/0956797610387613 [PubMed: 20974714]
- LaFrance M, & Henley NM (1994). On oppressing hypotheses: Or differences in nonverbal sensitivity revisited In Radtke HL, & Stam HJ (Eds.), *Power/gender: Social relations in theory and practice* (pp. 287–311). Thousand Oaks, CA: Sage Publications, Inc.
- Marsh AA, Elfenbein HA, & Ambady N (2003). Nonverbal ‘accents’: Cultural differences in facial expressions of emotion. *Psychological Science*, 14, 373–376. doi:10.1111/1467-9280.24461 [PubMed: 12807413]
- Marsh AA, Elfenbein HA, & Ambady N (2007). Separated by a common language: Nonverbal accents and cultural stereotypes about Americans and Australians. *Journal of Cross-Cultural Psychology*, 38, 284–301. doi:10.1177/0022022107300275
- Matsumoto D (2002). Methodological requirements to test a possible in-group advantage in judging emotions across cultures: Comment on Elfenbein and Ambady (2002) and evidence. *Psychological Bulletin*, 128, 236–242. doi:10.1037/0033-2909.128.2.236 [PubMed: 11931517]
- Matsumoto D (2007). Apples and oranges: Methodological requirements for testing a possible ingroup advantage in emotion judgements from facial expressions In Hess U, & Philippot P (Eds.), *Group dynamics and emotional expression* (pp. 140–181). New York, NY: Cambridge University Press. doi:10.1017/CBO9780511499838.008
- Matsumoto D, & Ekman P (1988). *Japanese and Caucasian facial expressions of emotion and neutral faces (JACFEE and JACNeuF) [Slides]*. San Francisco, CA: Intercultural and Emotion Research Laboratory, Department of Psychology, San Francisco State University.
- Matsumoto D, Olide A, & Willingham B (2009). Is there an in-group advantage in recognizing spontaneous expressed emotions? *Journal of Nonverbal Behavior*, 33, 181–191. doi:10.1007/s10919-009-0068-z
- Mehta SD, Ward C, & Strongman K (1992). Cross-cultural recognition of posed facial expressions of emotion. *New Zealand Journal of Psychology*, 21, 74–77.
- Miller JB (1986). *Toward a new psychology of women* (2nd ed.). Boston, MA: Beacon Press.
- Nowicki SR, Glanville D, & Demertzis A (1998). A test of the ability to recognize emotion in the facial expressions of African American adults. *Journal of Black Psychology*, 24, 335–350. doi:10.1177/00957984980243005
- Nunnally JC, & Bernstein IH (1994). *Psychometric theory* (3rd ed.). New York, NY: McGraw-Hill.
- Pinkham AE, Sasson NJ, Calkins ME, Richard J, Hughett P, Gur RE, & Gur RC (2008). The other-race effect in face processing among African American and Caucasian individuals with schizophrenia. *The American Journal of Psychiatry*, 165, 639–645. doi:10.1176/appi.ajp.2007.07101604 [PubMed: 18347000]
- Ricci Bitti PE, Brighetti G, Garotti PL, & Boggi-Cavallo P (1989). Is contempt expressed by pan-cultural facial movements? In Forgas JP, & Innes JM (Eds.), *Recent advances in social psychology: An international perspective* (pp. 329–339). Oxford, England: North-Holland.
- Ricci Bitti PE, Giovannini D, Argyle M, & Graham J (1979). La comunicazione di due dimensioni delle emozioni attraverso indici faciale e corporei [The communication of two dimensions of emotion expressed through the face and body]. *Giornale Italiano di Psicologia*, 6, 341–350.

- Ricci Bitti PE, Giovannini D, Argyle M, & Graham J (1980). La comunicazione delle emozioni attraverso indici facciali e corporei [The communication of emotion expressed through the face and body]. *Giornale Italiano di Psicologia*, 7, 85–94.
- Scherer KR, Banse R, & Wallbott HG (2001). Emotion inferences from vocal expression correlate across languages and cultures. *Journal of Cross-Cultural Psychology*, 32, 76–92. doi:10.1177/0022022101032001009
- Snodgrass SE (1985). Women's intuition: The effect of subordinate role on interpersonal sensitivity. *Journal of Personality and Social Psychology*, 49, 146–155. doi:10.1037/0022-3514.49.1.146
- Snodgrass SE (1992). Further effects of role versus gender on interpersonal sensitivity. *Journal of Personality and Social Psychology*, 62, 154–158. doi:10.1037/0022-3514.62.1.154
- Snodgrass SE, Hecht MA, & Ploutz-Snyder R (1998). Interpersonal sensitivity: Expressivity or perceptivity? *Journal of Personality and Social Psychology*, 74, 238–249. doi:10.1037/0022-3514.74.1.238 [PubMed: 9457785]
- Tabachnick BG, & Fidell LS (2007). *Using multivariate statistics* (5th edition). Boston, MA: Allyn and Bacon.
- Trimboli A, & Walker M (1993). The CAST test of nonverbal sensitivity. *Journal of Language and Social Psychology*, 12, 49–65. doi:10.1177/0261927X93121004
- Tuminello ER, & 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 [PubMed: 21444092]
- Wagner HL (1993). On measuring performance in category judgment studies on nonverbal behavior. *Journal of Nonverbal Behavior*, 17, 3–28. doi:10.1007/BF00987006
- Weitz S (1974). *Nonverbal communication: Readings with commentary*. Oxford England: Oxford University Press.
- Wickline VB, Bailey W, & Nowicki S (2009). Cultural in-group advantage: Emotion recognition in African American and European American faces and voices. *The Journal of Genetic Psychology*, 170, 5–29. doi:10.3200/GNTP.170.1.5-30 [PubMed: 19230518]
- Wolfgang A (1980). A multicultural project: The development of an interracial facial recognition test Phase III, a comparison between New Canadian West Indians' and Canadians' sensitivity to interracial facial expressions and social distance Unpublished manuscript. Toronto, Canada: Ontario Institute for Studies in Education.

Figure 1.

Mean plot of encoders $\times$ decoders on the percentage accuracy scores in the imitated expressions condition. EA = European American; AA = Asian American. * Denotes the marginal significance of the mean difference in the recognition accuracy between the EA and AA decoders, $t(223) = 1.94, p = .054$. ** Indicates the significant mean difference between the two decoder groups, $t(223) = 2.10, p = .037$. There was no significant interaction effect of encoder $\times$ decoders in this condition, $F(1, 223) = .16, p > .05$.

Figure 2.

Mean plot of encoders $\times$ decoders on the percentage accuracy scores in the spontaneous expressions condition. EA = European American; AA = Asian American. ** Indicates the significant mean difference between the two decoder groups, $t(223) = 2.43$, $p = .016$. There was a significant interaction effect of encoders $\times$ decoders in this condition, $F(1, 223) = 8.60$, $p < .01$.

Table 1

Summary of Studies of In-Group or Out-Group Advantage in Emotion Recognition Among Majority and Minority Groups in Multicultural Societies

Cultural groups			Percentage accuracy scores (%)					Types of advantage	Channel	Stimuli
Study	Majority (<i>n</i>) ^a	Minority (<i>n</i>)	Encoders	Decoders			Between-groups difference			
				Majority	Minority	Between-groups difference				
Albas, McCluskey, & Albas (1976)	Anglo Canadian (40)	Canadian Cree (40)	Majority	72.78 >	44.44	28.33	.70	Mutual in-group advantage	Voice	Posed
			Minority	43.33 <	71.67	28.33				
			Within-group difference	29.44	27.22	28.33				
Buchman (1973)	Caucasian American (30)	African American (30), Puerto Rican American (30)	Majority	35.00 >	33.75	1.25	-.09	Majority group advantage	Full video	Posed
			Minority	38.75 >	34.38	-4.38				
			Within-group difference	-3.75	0.63	-1.56				
Gitter, Black, & Mostofsky (1972a)	Caucasian American (24)	African American (24)	Majority	47.25 <	58.33	-11.08	-.17	Minority group advantage	Facial photo	Posed
			Minority	48.67 <	52.50	3.83				
			Within-group difference	-1.42	-5.83	-3.63				
Gitter, Black, & Mostofsky (1972b)	Caucasian American (80)	African American (80)	Majority	54.08 <	57.92	-3.83	.03	Minority group advantage	Facial photo	Posed
			Minority	48.83 <	53.83	5.00				
			Within-group difference	5.25	-4.08	0.58				
Gitter, Mostofsky, & Quincy (1971)	Caucasian American (40)	African American (40)	Majority	25.30 >	24.67	0.63	-.05	Majority group advantage	Facial photo	Posed
			Minority	38.70 >	30.00	-8.70				
			Within-group difference	-13.40	5.33	-4.03				
Mehta, Ward, & Strongman (1992)	Caucasian New Zealander (27)	New Zealand Maori (27)	Majority	38.13 >	23.00	15.13	.11	Majority group advantage	Facial photo	Imitated
			Minority	50.50 >	43.63	-6.88				
			Within-group difference	-12.38	20.63	4.13				
Nowicki, Gnanville, & Demertzis (1998), Study 3a	Caucasian American (86)	African American (43)	Majority	79.44 <	81.11	-1.67	.21	Minority group advantage	Facial photo	Posed
			Minority	57.08 <	68.75	11.67				
			Within-group difference	22.36	-12.36	5.00				

Cultural groups				Percentage accuracy scores (%)					r_{contrast}	Types of advantage	Channel	Stimuli
Study	Majority (n) ^a	Minority (n)	Encoders	Decoders		Between-groups difference						
				Majority	Minority							
Nowicki, Gnanville, & Demertzis (1998) Study 3b	Caucasian American (54)	African American (51)	Majority	77.22	<	81.67	-4.44	.24	Minority group advantage	Facial photo	Posed	
			Minority	60.42	<	70.83	10.42					
			Within-group difference	16.81		-10.83	2.99					
Ricci Bitti, Giovannini, Argyle, & Graham (1979)	Northern Italian (18)	Southern Italian (18)	Majority	46.63	<	49.88	-3.25		Mutual out-group advantage	Silent video	Posed	
			Minority	24.38	>	19.38	-5.00					
			Within-group difference	22.25		-30.50	-4.13					
Ricci Bitti, Giovannini, Argyle, & Graham (1980)	Northern Italian (18)	Southern Italian (18)	Majority	67.50	<	72.33	-4.83		Minority group advantage	Silent video	Posed	
			Minority	46.17	<	47.00	0.83					
			Within-group difference	21.3		-25.3	-2.00					
Wolfgang (1980), Study 2	Anglo Canadian (168)	West Indian Canadian (38)	Majority	65.00	>	58.00	7.00		Majority group advantage	Facial photo	Imitated	
			Minority	55.08	>	49.83	-5.25					
			Within-group difference	9.92		-8.17	0.88					
Ricci Bitti, Brighetti, Garotti, & Boggi-Cavallo (1989)	Northern Italian (40)	Southern Italian (40)	Majority	40.21	>	9.58	30.63	.22	Mutual in-group advantage	Facial photo	Posed	
			Minority	53.92	<	54.79	0.88					
			Within-group difference	-13.71		45.21	15.75					
Glanville & Nowicki (2002)	Caucasian American (37)	African American (37)	Majority	57.22	>	54.44	2.78		Majority group advantage	Facial photo	Posed	
			Minority	44.38	>	40.63	-3.75					
			Within-group difference	12.85		-13.82	-0.49					
Beaupré & Hess (2005) ^c	French Canadian (20)	Chinese Canadian (20), African Canadian (20)	Majority	53.33	>	44.83	8.50		Majority group advantage	Facial photo	Imitated	
			Minority	53.17	>	47.42	-5.75					
			Within-group difference	0.17		2.58	1.38					
Pinkham et al. (2008)	Caucasian American (135)	African American (135)	Majority	75.73	>	71.21	3.97	.08	Mutual in-group advantage	Facial photo	Posed	
			Minority	82.58	<	82.74	0.17					

Cultural groups			Percentage accuracy scores (%)					Types of advantage	Channel	Stimuli	
Study	Majority (<i>n</i>) ^a	Minority (<i>n</i>)	Encoders	Decoders			Between-groups difference				
				Majority	Minority	<i>r</i> _{contrast} ^b					
Wickline, Bailey, & Nowicki (2009)	Caucasian American (102)	African American (72)	Within-group difference	-7.40	11.54	2.07					
			Majority	76.53	>	69.56	6.96		Majority group advantage	Facial photo	Posed
			Minority	56.17	>	48.43	-7.73	.05			
			Within-group difference	20.36		-21.17	-0.38				
Tuminello & Davidson (2011)	Caucasian American (24)	African American (16)	Majority	60.00	>	49.50	10.50		Majority group advantage	Facial photo	Imitated
			Minority	65.50	>	54.00	-11.50				
			Within-group difference	-5.50		4.50	-0.50				
Current study	Caucasian American (131)	Asian American (94)	Majority	82.64	>	79.94	2.70		Majority group advantage	Facial photo	Imitated
			Minority	87.05	>	83.71	-3.34				
			Within-group difference	-4.41		3.77	-0.64				
Current study	Caucasian American (131)	Asian American (94)	Majority	60.61	>	54.41	6.20		Mutual in-group advantage	Full video	Spontaneous
			Minority	61.92	<	65.17	3.25				
			Within-group difference	-1.31		10.76	9.45				

Note. Percentage accuracy scores after guessing correction are presented in this table; *r*_{contrast} = an index of an interaction *F*-test; Channel = Channel that study stimuli are presented through; Stimuli = Method of eliciting emotional stimuli.

^aNumbers in parenthesis are a sample size.

^bThe first 9 values of the *r*_{contrast} were taken from Table 5 (p. 221) in the Effenbein and Ambady study (2002a).

^cUnbiased hit rates (Wagner, 1993), instead of percentage accuracy scores, are reported in this study.

Table 2

Four Possible Patterns of an In-Group or Out-Group Advantage Based on the Between-Group Differences in Percentage Accuracy Scores of the Majority and Minority Groups

(a) Mutual in-group advantage			(b) Minority group advantage		
Decoders			Decoders		
Encoders in study stimuli	Majority	Minority	Encoders in study stimuli	Majority	Minority
Majority	W	>	Majority	W	<
Minority	Y	<	Minority	Y	<
(c) Majority group advantage			(d) Mutual out-group advantage		
Decoders			Decoders		
Encoders in study stimuli	Majority	Minority	Encoders in study stimuli	Majority	Minority
Majority	W	>	Majority	W	<
Minority	Y	>	Minority	Y	>

Table 3

Percentage Accuracy Scores by Imitated vs. Spontaneous Expressions Condition

Imitated expressions				Spontaneous expressions			
Decoders				Decoders			
Encoders	EA (<i>n</i> = 131)	AA (<i>n</i> = 94)	Overall mean	EA (<i>n</i> = 131)	AA (<i>n</i> = 94)	Overall mean	
EA	82.64 (10.48)	79.94 (10.05)	81.29 (10.36)	60.61 (18.50)	54.41 (19.40)	57.51 (19.09)	
AA	87.05 (11.66)	83.71 (11.88)	85.38 (11.84)	61.92 (15.52)	65.17 (17.50)	63.54 (16.42)	
Overall mean	84.84	81.82	83.33	61.27	59.79	60.53	

Note. The percentage accuracy scores after guessing corrections are presented in this table. Numbers in parentheses are standard deviations.