

# Subjective, Behavioral, and Physiological Reactivity to Ethnically Matched and Ethnically Mismatched Film Clips

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This study examined whether individuals from 4 major ethnic groups within the United States (African American, Chinese American, European American, and Mexican American) showed greater subjective, behavioral, and physiological responses to emotional film clips (amusement, sadness, and disgust) with actors from their own ethnic group (*ethnically matched*) compared with actors from the other 3 ethnic groups (*ethnically mismatched*). Evidence showed greater responsivity to ethnically matched films for African Americans and European Americans, with the largest effect for African Americans. These findings were consistent across both sex and level of cultural identification. Findings of ethnic difference notwithstanding, there were many areas in which ethnic differences were not found (e.g., little or no evidence was found of greater response to ethnically matched films in Chinese-American or Mexican-American participants). These findings indicate that the emotional response system clearly reacts to stimuli of diverse ethnic content; however, the system is also amenable to subtle “tuning” that allows for incrementally enhanced responding to members of one’s own ethnic or cultural group.

*Keywords:* emotional experience, behavior, physiology, ethnicity, film stimuli

Research on emotional judgments suggests that individuals are more attuned to those perceived as similar to oneself than as different. For example, studies of empathic accuracy have found that individuals are better able to detect what another person is feeling and are more likely to show emotion-congruent affective displays when observing targets who are of the same sex or ethnicity as the participant (Feshbach & Roe, 1968; Freeman, 1984). The emotional tone of content-filtered speech has been found to be perceived more easily when the speech is from one’s own ethnic group (Albas, McCluskey, & Albas, 1976), and multiple studies of recognition of facial expressions have found that individuals show greater speed and accuracy when judging expressions posed on faces of the same ethnicity as the participant (e.g., Ducci, Arcuri, Georgis, & Sineshaw, 1982; Elfenbein & Ambady, 2003b; Kilbride & Yarczower, 1980). These findings of differential responding to “ethnically matched” and “ethnically mismatched” emotional stimuli have been described as an “in-group advantage” for emotional communication (Elfenbein & Ambady, 2003a).

Other studies have found that individuals tend to report more confidence in their judgments of ethnically matched than ethnically mismatched emotional stimuli, regardless of the accuracy with which they judge these stimuli. This research suggests that individuals experience a greater sense of attunement when observing ethnically similar others. For example, Kilbride and Yarczower (1983) found that students from the United States and Zambia reported feeling greater certainty in their judgments of emotional facial expressions when the expression was posed by someone of their own ethnic group compared with the other ethnic group, regardless of recognition accuracy. Paralleling these findings, Beaupré and Hess (2006) found that, independent of recognition accuracy, African, Chinese, and French-Canadian individuals were more confident in their judgments of emotional facial expressions posed by in-group members. Research with Africans and Europeans found that participants were better at remembering faces from their own ethnic group, suggesting greater salience for in-group stimuli (Shepherd, Deregowski, & Ellis, 1974).

In addition, extensive research by Brewer and colleagues has demonstrated that individuals rate members of their own group more favorably than out-group members on dimensions such as trustworthiness, obedience, friendliness, and honesty (Brewer, 1979, 1999, 2001; Brewer & Campbell, 1976; Brewer & Gardner, 1996; Brewer & Weber, 1994; Brewer, Weber, & Carini, 1995). This in-group favoritism has been observed in naturalistic groups (e.g., one’s ethnic group; Tajfel, 1982) and experimentally manipulated groups (Brewer et al., 1995). Similarly, Beaupré and Hess (2003) found that Canadians of European, African, and Asian descent were more likely to attribute smiles to a protagonist in a vignette when that individual was an in-group member. Thus, individuals seem to be more attuned to, and feel more affectively positive toward, ethnically similar others.

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## Emotional Responses to Ethnically Similar and Dissimilar Stimuli

Although the tendency to report greater emotional understanding when perceiving others similar to oneself has been found fairly consistently for emotional *judgments*, at present the question of whether there is a similar effect for individuals' emotional *responses* (i.e., the subjective, behavioral, and physiological changes that occur when the person is in the throes of an emotion) has received much less attention. Among the studies that exist, Brown, Bradley, and Lang (2001) presented African Americans and European Americans with positive and negative emotional slides containing images of Black targets, White targets, and neutral animals and objects. Participants from both groups saw all slides, and measures of physiology (heart rate and skin conductance) and self-reported emotion (pleasantness and arousal) were collected. The authors predicted that individuals would show an in-group favorability bias, in that they would respond more positively to pictures of their own ethnic group. Results indicated that African Americans showed greater skin conductance responses to both pleasant and unpleasant pictures of Black targets compared with pictures of White targets. Also, European-American participants showed a trend toward responding with the greatest skin conductance during unpleasant pictures with White targets (Brown et al., 2001). Thus, findings from this study did not necessarily support the hypothesized in-group favorability bias but did suggest that individuals respond more strongly to members of their own group.<sup>1</sup>

A series of studies conducted by Vrana and Rollock (1996, 1998, 2002) investigated the emotional responses of African American and European American participants during real and imagined interactions with individuals from their own and the other ethnic group. Participants displayed more positive emotional behavior when imagining or greeting someone from their own ethnic group and showed greater physiological reactivity when imagining or interacting with someone from the other ethnic group. These findings were particularly pronounced for African American men. African American participants also reported more negative emotions during imagined interactions with White targets than during imagined interactions with Black targets. These findings indicate that individuals respond more positively to ethnically matched stimuli (i.e., in-group members) and that there also may be a stronger negative emotional response to the out-group.<sup>1</sup>

Taken together, results from previous research point to differential emotional responses to in-group versus out-group stimuli, with some support for the idea that in-group stimuli may elicit more positive emotional responses. There is also some evidence to suggest that the in-group versus out-group distinction is more pronounced for African Americans.

### Overview of the Study

This study examined the emotional responses of 168 United States-born college students between the ages of 18 and 30 years. Participants from four ethnic groups (African American, Chinese American, European American, and Mexican American) watched 12 film clips that were selected to elicit amusement, sadness, and disgust. For each of these three "target" emotions, 4 film clips were shown, each depicting actors from one of four ethnic groups

(African American, Chinese American, European American, and Mexican American). Thus, participants viewed both film clips that were ethnically matched (i.e., actors in films were of the same ethnicity as the participant) and ethnically mismatched (i.e., actors in films were of an ethnicity different from the participant). To assess emotional responding, autonomic and somatic nervous system physiology and facial behavior were monitored continuously during film viewing, and self-reports of subjective emotional experience were collected after each film.

### Hypotheses and Research Questions

In line with previous work suggesting that individuals are more emotionally attuned to those perceived as similar to oneself than different, we expected individuals would be more emotionally responsive to film clips with actors who were of the same ethnicity as the participant. Specifically, we hypothesized that participants would demonstrate greater (a) self-reported emotional experience, (b) displays of emotional facial behavior, and (c) physiological activation when watching film clips of actors of the same ethnicity as the participant (ethnically matched film clips) compared with film clips of actors of an ethnicity different from the participant (ethnically mismatched film clips). As a secondary consideration, on the basis of previous research indicating greater positive emotional responses to members of one's own group (Beaupré & Hess, 2003; Vrana & Rollock, 1996, 1998, 2002), we wanted to explore the extent to which affective valence moderates the effects of ethnic match versus mismatch by comparing participants' subjective, behavioral, and physiological emotional responses when viewing the amusement film clips compared with when viewing the sadness and disgust film clips.

### Strengths of the Study

This study builds on and extends previous research in several ways. First, careful consideration was given to the selection of participants. We sampled participants from three ethnic minority groups and one ethnic majority group (rather than the more typical comparisons of one minority group and one majority group). Requirements for inclusion went considerably beyond self-identification (e.g., describing oneself as "Asian American") to ensure consistency in the criteria for ethnic grouping (see details below). Specifically, ethnic group criteria aimed to ensure that ethnic minority participants—particularly those from the two recent immigrant groups (Chinese Americans and Mexican Americans)—had a moderate amount of exposure to the practices and beliefs of their culture of origin, as well as to mainstream American culture. Second, this study assessed actual emotional responses *in vivo*. Retrospective or prospective reports of emotion (i.e., what participants remembered feeling in past situations or would expect to feel in future ones) may not adequately reflect how participants actually respond in an emotionally evocative situation (Sims, 2000). Third, multiple components of the emotional response were measured: subjective experience, expressive behavior, and multiple physiological indicators. This kind of multimethod assessment of emotion is particularly important when

<sup>1</sup> See also Brown, Bradley, and Lang (2006).

studying ethnicity and emotion, because the effects of ethnicity (i.e., ethnic match or mismatch) may exert differential effects on different aspects of the emotion system (Levenson, Soto, & Pole, in press).

## Method

### Participants

**Sample demographics.** Seventy-two men and 96 women between the ages of 18 and 30 years ( $M = 20.7$ ,  $SD = 2.5$  years) and enrolled in college full-time participated in this study. Participants were born in the United States and were from four ethnic groups: African American (16 men, 24 women), Chinese American (16 men, 24 women), European American (24 men, 24 women), and Mexican American (16 men, 24 women). More European American men were included in the study because, for data analysis, this "cell" reached the target sample size, but there were difficulties recruiting the remaining number of ethnic minority male participants. Most participants attended college at the University of California, Berkeley (90%), and the remaining participants attended neighboring colleges; there were no ethnic differences in college attended,  $\chi^2(15, N = 167) = 23.88$ , *ns*. Most participants (96%) were single; there were no ethnic differences in marital status,  $\chi^2(9, N = 168) = 12.74$ , *ns*. Mexican Americans and African Americans were significantly older than Chinese Americans (21.5 and 21.4 years compared with 19.4 years),  $F(3, 164) = 6.53$ ,  $p < .01$ , and were more likely to be working for income while attending school (14.7 and 13.3 hr per week compared with 4.2 hr per week),  $F(3, 163) = 8.89$ ,  $p < .01$ . Compared with the other ethnic groups, Mexican Americans had attended significantly more years of college (3.1 years compared with 2.4, 2.3, and 1.8 years),  $F(3, 159) = 6.30$ ,  $p < .01$ , and were raised in homes of lower socioeconomic status (scores of 1.9 compared with 2.8, 3.0, and 3.2, where 1 = lower income and 5 = upper income),  $F(3, 163) = 18.92$ ,  $p < .01$ . Mexican Americans also were less likely than the other ethnic groups to identify with and engage in practices common to mainstream American culture, and African Americans and European Americans were most likely to identify with and engage in American culture (General Ethnicity Questionnaire—American version scores of 219.0, 177.2, 131.7, and 127.4 for Mexican Americans, Chinese Americans, European Americans, and African Americans, respectively, where lower scores indicate greater identification with American culture),  $F(3, 164) = 155.62$ ,  $p < .01$ .

**Recruitment.** Participants were recruited by several methods. Flyers were posted on San Francisco Bay Area college campuses, advertisements were placed in local newspapers, and announcements were made in college classrooms and during meetings of student organizations. The research project was described as a study of ethnicity and emotion, during which participants would earn \$60 as compensation for watching a series of film clips.<sup>2</sup>

**Inclusion criteria.** Inclusion criteria for this study were developed through consultation with anthropologists, psychologists, and sociologists who had expertise with the four ethnic groups represented in this study. Inclusion criteria were designed to achieve a balance between exposure to mainstream American culture and to participants' ethnic group of origin. All participants had to have been born and raised and currently attending college in the United States. To help ensure a sufficient level of exposure to in-group members, participants had to have at least 50% of their close friends during childhood (ages 1–12) and/or adolescence (ages 13–17) and at least 10% of their neighbors during childhood and/or adolescence from their own ethnic group. For African Americans and European Americans, participants had to have been raised in a predominantly Christian background and their parents and all four grandparents had to have been born and raised in the United States. For Chinese Americans, participants' parents and all four grandparents had to have been born and raised in China, Taiwan, or Hong Kong, and Chinese (Mandarin, Cantonese, Taiwanese, or another Chinese dialect) had to have been spoken in the home

at least 50% of the time. For Mexican Americans, participants had to have been raised in a predominantly Catholic background, their parents and all four grandparents had to have been born and raised in Mexico, and Spanish had to have been spoken in the home at least 50% of the time.

### Stimulus Films

Participants viewed 16 short film clips (ranging from 1 to 5 min), 12 of which were used for analysis in the study (in the remaining 4 film clips, 2 neutral and 2 disgust, actor ethnicity was not manipulated). Film clips were selected from popular movies and were piloted during group screenings with an ethnically diverse sample of undergraduate college students (with procedures developed by Gross and Levenson, 1995). The final set of film clips had actors from the four ethnic groups of interest (African American, Chinese American, European American, and Mexican American, respectively) and yielded self-report ratings of relatively specific emotional states: amusement, sadness, or disgust. For each of these three emotions, 4 film clips were selected, each having actors from only one of the four ethnic groups. The four film clips for each target emotion were selected to have similar emotional themes and elicited similar self-report emotion rating profiles. Specifically, the four amusement clips (taken from *I'm Gonna Get You Sucka*, *Rumble in the Bronx*, *When Harry Met Sally*, and *Born in East L.A.*) were scenes with sexual overtones and characters in embarrassing or surprising situations. Clips of this nature have been found in previous research to elicit high ratings of amusement (Gross & Levenson, 1995). The four sad clips (taken from *The Color Purple*, *Joy Luck Club*, *Steel Magnolias*, and *American Me*) were scenes depicting the loss of a loved one (i.e., because of separation or death), which has been cited as the primary antecedent for sadness (Ekman, 1999; Frijda, 1987). The four disgust clips (taken from *What's Love Got to Do with It?*, *Heaven and Earth*,<sup>3</sup> *The Accused*, and *Erendira*) were scenes of a woman being raped, which has been found to evoke a sense of "moral injustice" corresponding to disgust (Rozin, Lowery, & Imada, 1999). Although disruptions to bodily integrity (e.g., scenes of gore) typically have been used in previous emotion research to elicit disgust (e.g., Gross & Levenson, 1993), we used rape scenes in this study because it was necessary to find four comparable films with substantive content and with actors from the ethnic groups of interest. As discussed below, these clips primarily elicited disgust but also elicited high ratings of anger.

### Procedure

**Telephone screening and home questionnaires.** Individuals who expressed interest in participating in the study were contacted and given a brief telephone screening to determine whether they met inclusion criteria. Four hundred forty-two initial contacts led to 276 eligible participants. Eligible participants were scheduled for two laboratory visits, and a packet of questionnaires (e.g., demographic characteristics and acculturation questionnaires) was mailed to their home to be completed before their first experimental session. The 168 participants included in the analyses returned their questionnaire packet, were still eligible based on their questionnaire responses (i.e., responses on the questionnaires were consistent with responses during the phone screening), and completed both laboratory sessions without technical difficulties and within the specified time frame.

<sup>2</sup> Although the study was described as a study of "ethnicity and emotion," participants were not informed about the ethnically varied nature of the film clips. In addition, any effects of describing the study in this manner would be presumed to result in more cultural differences (e.g., due to the salience of cultural "schemas" about emotion [Tsai, Chentsova-Dutton, Freire-Bebeau, & Przymus, 2002]). However, we found more similarities than differences and thus do not believe describing the study in this way unduly affected the findings.

<sup>3</sup> *Heaven and Earth* featured both Chinese American and Vietnamese American actors.

**Laboratory sessions.** The laboratory portion of this study consisted of two 1.5- to 2.5-hr sessions that were scheduled within a 15-day period. Both sessions followed a similar procedure.

On arrival at the laboratory, the participant was greeted by a laboratory research assistant of the same sex and ethnicity as the participant. This was to avoid potential biases in emotional responding that could occur in the presence of an unfamiliar, ethnically mismatched experimenter (Anderson, 1989; Murphy, Alpert, Willey, & Somes, 1988; Vrana & Rollock, 1998). The participant was seated in a chair in a 3 m × 6 m room. A general consent form and brief health behavior questionnaire (e.g., to screen for recent use of caffeine and medication) were administered. The laboratory assistant then attached physiological sensors (see below) and administered a baseline self-report emotion inventory.

For the remainder of the experiment, all instructions were presented in text form on a video monitor. Participants viewed 7 film clips during the first experimental session and 9 film clips during the second experimental session. The 12 film clips relevant to this investigation (described above) were presented in one of four counterbalanced orders. Two-minute resting baseline periods preceded and followed each film clip. During these rest periods, participants were asked to relax and stare at a letter X that appeared on the video monitor. After each postfilm rest period, participants were instructed to complete a self-report emotion inventory.<sup>4</sup> At the end of the experiment, the laboratory assistant detached the physiological sensors, paid and debriefed the participant, and answered any questions.

### Measures and Apparatus

**Self-reported emotion inventories.** After each film clip, participants completed an inventory (adapted from Ekman, Friesen, & Ancoli, 1980) that measured self-reported subjective emotional experience. Participants used 9-point Likert-type scales (anchored by 0 = *not at all*, 4 = *moderately*, and 8 = *very much*) to rate how strongly they felt each of 16 specific emotions (e.g., amusement, disgust) while watching the film.

**Audiovisual recordings.** Participants received instructions and film stimuli on a 48-cm color video monitor placed on a table 1.25 m in front of the participant's chair. Two remotely controlled high-resolution video cameras, which were embedded in a bookshelf and partially concealed behind darkened glass, were used to obtain unobtrusively (a) a frontal view of the participant's face and upper torso and (b) a view of what the participant was watching on the video monitor. These images were combined into a single split-screen image with a video special-effects generator and were recorded on a VHS videocassette recorder.

**Expressive behavior coding system.** An ethnically diverse team of trained research assistants coded participants' expressive behavior from videotapes of each participant's face and upper torso using a modified version of Gross and Levenson's (1993) Emotional Expressive Behavior coding system. This coding system was designed for rating videotapes of individuals watching film clips, with the goal of providing a sensitive measure of a broad range of expressive behaviors (Gross & Levenson, 1993). It involves using specific facial cues (e.g., nose wrinkles) to detect general emotional expressions (e.g., disgust), and it also relies on coders' intuitive judgments of facial expressions (e.g., coders need to perceive a face as angry, in addition to learning that lips are pressed together and eyebrows are furrowed in anger). Training involves a didactic component (e.g., reading and discussing *Unmasking the Face* [Ekman & Friesen, 1975]) and a practical component (e.g., reviewing and coding practice tapes) to achieve reliability.

Coders were not provided with any information about the clips, namely the movies from which the clips were drawn or the targeted emotional content of the clips. Coding was done without sound and with the section of the screen with the inset video monitor obscured so that coders would be blind as to which film clips the participants were viewing. Coders rated each of several specific emotions during a period beginning 15 s before and ending 20 s after each film clip. When an emotional expression was observed, coders rated the intensity of the expression using a 4-point scale

(0 = *none*, 1 = *slight*, 2 = *moderate*, and 3 = *strong*). The following specific emotions were coded: anger, disgust, fear, happiness/amusement, sadness, and surprise.<sup>5</sup> Codes were input with the use of Windows-based software developed by one of the authors (RWL).

Twenty percent of the sample was double-coded, and intraclass correlations were used to compute intercoder reliability for each code and for each film emotion category (i.e., the four amusement films, the four sad films, and the four disgust films). Reliability was highest for target emotional behaviors during each film. Specifically, expressions of happiness/amusement were coded with 85% reliability (i.e.,  $\alpha = .85$ ) during the amusement films; expressions of sadness were coded with 69% reliability during the sad films; and expressions of disgust were coded with 92% reliability during the disgust films.<sup>6</sup>

**Physiological recordings.** Eleven physiological measures, sampled from the cardiovascular, respiratory, electrodermal, and somatic systems, were collected continuously throughout the experiment. Measures were selected that would enable physiological data to be obtained from participants continuously and fairly unobtrusively. Taken together, these measures provided a broad sampling of autonomic nervous system functioning and skeletal muscle activity. In previous research, these measures have proven useful in detecting individuals' general levels of arousal and in differentiating emotional states (e.g., positive or negative emotion; Fredrickson & Levenson, 1998).

The specific measures collected were as follows: (a) For cardiac interbeat interval, Beckman miniature electrodes with Redux paste were placed in a bipolar configuration on opposite sides of the participant's chest. Interbeat interval was computed by measuring the time in milliseconds between successive R waves of the electrocardiogram (EKG). (b) Finger pulse amplitude and (c) pulse transmission time to the finger: A photoplethysmograph was placed on the distal phalanx of the second finger on the participant's nondominant hand. Finger pulse amplitude was measured in units that indicated the amount of blood in the vasculature at the tip of the finger. Pulse transmission time was calculated in milliseconds by measuring the time interval between the R-wave on the EKG and the arrival of the pulse pressure wave at the fingertip (recorded by the photoplethysmograph). (d) Pulse transmission time to the ear was measured by clipping a photoplethysmograph to the participant's right ear lobe to record the volume of blood in the ear. Pulse transmission time was calculated by measuring in milliseconds the time interval between the R wave on the EKG and the arrival of the pulse pressure wave at the ear. (e) Systolic blood pressure and (f) diastolic blood pressure were measured by placing an inflatable cuff containing a photoplethysmographic volume transducer on the fourth finger of the participant's nondominant hand. An Ohmeda 2300 Finapres blood pressure monitor (Ohmeda Medical, Laurel, MD) recorded systolic blood pressure (the contraction phase of the heart) and diastolic blood pressure (the relaxation phase of the heart) in millimeters of mercury. (g) Respiratory intercycle interval and (h) respiration depth were measured by stretching a pneumatic bellows around the thoracic region of the participant's

<sup>4</sup> Although collecting immediate self-report ratings would have been beneficial from the standpoint of improving accuracy of emotional reports, collecting uninterrupted physiological "recovery" data was necessary for questions that will be addressed in future studies. The physiological data collected during the 2-min postfilm rest periods are not relevant to the analyses reported in this article and therefore are not discussed.

<sup>5</sup> *Interest*, *confusion*, and *sleepiness* were coded initially but were excluded from the present analyses because in this study they appeared to reflect attentiveness or concentration, rather than emotion per se. The code *happiness/amusement* captured positive emotional facial displays of both happiness and amusement.

<sup>6</sup> The relatively lower reliability of codings of sadness may reflect the lower base rate of this code and the fact that facial features reflecting expressions of sadness (e.g., downturned lip corners, eyebrows in and up) are more difficult to detect than facial features reflecting disgust (e.g., nose wrinkle) or happiness/amusement (e.g., smiles; Ekman & Friesen, 1975).

abdomen. Intercycle interval was computed by measuring the time in milliseconds between successive inspirations. Respiration depth was calculated by subtracting the point of maximum expiration from the point of maximum inspiration. (i) To measure finger temperature a Thermistor was taped to the palmar surface of the distal phalanx of the fourth finger of the participant's nondominant hand. Finger temperature was measured in degrees Fahrenheit. (j) To measure skin conductance level, Beckman regular electrodes with an electrolyte of sodium chloride in Unibase were attached to the palmar surface of the bottom phalanges of the first and second fingers of the participant's nondominant hand. A constant-voltage device was used to pass a small voltage between these electrodes. Skin conductance level was measured in micromhos. (k) General somatic activity was measured by attaching an electromechanical transducer to a platform under the participant's chair. The transducer generated an electrical signal proportional to the amount of movement in any direction. Somatic activity was measured in arbitrarily designated units. In addition to the transducers used to collect these 11 measures, a grounding clip filled with Redux paste was placed on the participant's left ear.

Physiological measures were collected continuously with a 12-channel Grass Model 7 polygraph and were input into a microcomputer system equipped with analog-to-digital conversion hardware. Software written by one of the authors (RWL) provided second-by-second averages of each measure.

*Demographic and acculturation questionnaires.* Participants completed a packet of questionnaires before participating in the laboratory sessions. The questionnaires relevant to the study reported here provided demographic information and information about participants' ethnic and cultural background. Specifically, participants completed a questionnaire that collected general demographic information, including age, current college and number of years of college completed, income level, parents' and grandparents' occupational status and income level, birthplace, place of rearing, religion, and percentage of friends and neighbors during childhood and adolescence of the same ethnicity as the participant and of different ethnicities. To assess how strongly participants identified with and engaged in practices associated with mainstream American culture, all participants received a General Ethnicity Questionnaire—American version. This measure was compiled by Tsai and Levenson (Tsai, 1996; Tsai & Levenson, 1997)<sup>7</sup> and used a 5-point scale (ranging from 1 = *extremely/exclusively/all the time* to 5 = *not at all*) to assess ethnic identification, engagement in cultural practices, social affiliation, and language use and preferences. In addition to this questionnaire, ethnic minority group participants completed a group-specific acculturation scale: African American participants completed the African American Acculturation Scale (Landrine & Klonoff, 1996), Chinese American participants completed the Suinn-Lew Asian Self-Identity Acculturation Scale (Suinn, Rickard-Figueroa, Lew, & Vigil, 1987), and Mexican American participants completed the Acculturation Rating Scale for Mexican Americans (Cuellar, Harris, & Jasso, 1980). To minimize demand characteristics, in participants' questionnaire packets each of these ethnic-specific acculturation measures was labeled as the *Personal History Questionnaire*.

### Data Reduction

*Self-reported subjective emotional experience.* For this study, we examined participants' ratings of the target emotion for each film clip, namely ratings of amusement in response to the amusement film clips, ratings of sadness in response to the sad film clips, and ratings of disgust in response to the disgust film clips. These ratings were of greatest relevance to our hypotheses and also received the highest intensity ratings compared with the other emotions rated.<sup>8</sup> Two approaches were used to check for biases in the profile of self-report ratings among the four ethnic groups. First, to determine whether there were systematic differences in scale usage tendencies, *z* scores were computed with the mean and standard deviation of each participant's emotion ratings across all 12 film clips and across all 16 emotion terms. Analyses were recomputed with these *z* scores, and the pattern of effects was similar, with one exception: When using *z* scores, an interaction between participant ethnicity and emotion of film emerged that was not present when using raw scores; however, none of the

follow-up comparisons were statistically significant. Second, weighted means of the target emotion (coded as 15) compared with the nontarget emotions (each coded as -1) were computed and summed, and *t* tests were used to compare these scores among the four ethnic groups for each emotion category (Furr & Rosenthal, 2003). We found that there were no significant differences among ethnic groups in their reporting of the target emotion compared with the nontarget emotions, with one exception: European Americans and Mexican Americans differed in their pattern of self-reported sadness, with Mexican Americans reporting more sadness relative to the other emotions than European Americans.

*Expressive behavior.* For each behavioral measure (e.g., facial displays of disgust), intensity codes were averaged into scores for the last 15 s of the prefilm baseline period and for the entire film period. To account for differences in prefilm levels of expressivity, reactivity scores were computed for each behavioral code by subtracting mean levels of the code during the 15-s prefilm baseline period from mean levels of the code during the film period. Reactivity scores were examined for the target emotional behavior, namely displays of happiness/amusement in response to the amusement films, displays of sadness in response to the sad films, and displays of disgust in response to the disgust films.<sup>9</sup> These behaviors were of greatest relevance to our hypotheses and also were coded most frequently and with the highest reliability.

*Physiology.* For each physiological measure, second-by-second data were averaged for each 2-min prefilm baseline period and for each film period. Reactivity scores were computed by subtracting mean levels of physiology during the 2-min prefilm baseline period from mean levels of physiology during the film period.<sup>10</sup> Physiological composite scores were computed by standardizing each of the 11 physiological measures (based on the mean and standard deviation across all 12 film clips, so as to retain the effects of the specific film clips), scaling measures such that greater physiological activation was in the positive direction (i.e., multiplying cardiac interbeat interval, finger pulse transit time, ear pulse transit time, finger pulse amplitude, and respiratory intercycle interval by -1), and summing these scores. Of note, the findings based on analyses of these composite scores were highly consistent with those based on analyses with

<sup>7</sup> The General Ethnicity Questionnaire was adapted by Tsai and Levenson (1997; Tsai, 1996) from measures including the Suinn-Lew Asian Self-Identity Scale (Suinn et al., 1987), Behavioral Acculturation Scale (Szapocznik, Scopetta, Kurtines, & de los Angeles Aranalde, 1978), The Acculturation Rating Scale for Mexican Americans (Cuellar, Harris, & Jasso, 1980), and Cultural Life Styles Inventory (Mendoza, 1989).

<sup>8</sup> Mean ratings of the nontarget emotions are available on the corresponding author's Web site (<http://www.west.asu.edu/narobert/>).

<sup>9</sup> Of note, there were no ethnic group differences in displays of the target emotional behavior during the baselines before the film clips.

<sup>10</sup> Change scores have been used previously in psychophysiological research to operationalize emotional reactivity and to account for individual differences in baseline physiology (Manuck, Kasprovicz, Monroe, Larkin, & Kaplan, 1989; Rogosa & Willett, 1983). Of note, there were significant ethnic differences in baseline physiology for five measures: finger pulse amplitude, finger temperature, skin conductance level, pulse transmission time to the ear, and diastolic blood pressure. (These differences were found when physiological responses across the 12 prefilm baselines were averaged, as well as when each prefilm baseline was examined separately. Across participants, there were no significant differences among the 12 prefilm baselines.) We recomputed our primary analyses using mean levels of physiology rather than change scores and also recomputed these analyses using residualized scores rather than change scores, and the pattern of significant main effects and interactions remained the same. Change scores are reported here because of their relative ease of interpretability (Kring & Neale, 1996; Llabre, Spitzer, Saab, Ironson, & Schneiderman, 1991).

the individual physiological measures. To simplify the presentation, we present the results of the latter analyses only when they differed from those based on the composite scores.<sup>11</sup>

*Ethnic and cultural identification.* To assess participants' extent of identification with American culture, items on the General Ethnicity Questionnaire—American version were summed to create one total score. To assess ethnic minority participants' identification with their culture of origin, items on the African American Acculturation Scale, the Suinn—Lew Asian Self-Identity Acculturation Scale, or the Acculturation Rating Scale for Mexican Americans, were summed to create one total score.

### Data Analysis

To test our a priori hypothesis that participants would show greater emotional responses to film clips of ethnically matched actors compared with film clips of ethnically mismatched actors, planned in-group (ethnically matched actors) and out-group (ethnically different actors) contrasts were computed for each ethnic group.<sup>12</sup> Following a method described in Furr and Rosenthal (2003), we multiplied means of each dependent measure by weighted coefficients that reflected each in-group/out-group contrast (e.g., African Americans' responses to clips with African American actors were assigned a weight of 3, and African Americans' responses to clips of actors from the other three ethnic groups were each assigned weights of -1). These weighted means were summed and compared by one-sample *t* tests (Furr & Rosenthal, 2003). Effect sizes for each contrast ( $r_{\text{contrast}}$ ) were computed with the formula specified in Furr and Rosenthal (2003).

For examining other nonhypothesized results, we conducted a 4 (participant ethnicity—African American, Chinese American, European American, Mexican American)  $\times$  4 (actor ethnicity—African American, Chinese American, European American, Mexican American)  $\times$  3 (emotion of film—amusement, sadness, disgust) analysis of variance for each dependent measure (i.e., self-reported subjective experience of the target emotion, behavioral displays of the target emotion, and physiological reactivity). In these analyses, participant ethnicity was treated as a between-subjects factor and actor ethnicity and emotion of film were treated as within-subject repeated measures. Significant main effects and interactions were explored further with a posteriori contrasts using Bonferroni corrections to correct for Type I error. For all significant effects, the partial  $\eta^2$  representing the proportion of explained variance in the dependent variable is reported. Small (.10), medium (.25), and large (.40) effect sizes (*f*) correspond with the following  $\eta^2$  values, respectively:  $\eta^2$ 's = .01, .06, and .14 (Cohen, 1988).

## Results

### Efficacy of Stimulus Films

We first determined whether the film clips were effective in eliciting the targeted emotion in self-report and facial display and in eliciting physiological activation. On the basis of self-report emotion inventories, for all 12 film clips the target emotion received the highest mean self-report rating and relatively low ratings of other emotions, with one exception: Although the disgust films primarily elicited reports of disgust, they also elicited high amounts of anger (this blend of disgust and anger is consistent with the theme of moral injustice depicted; Frijda, 1987). Analyses examining an average of disgust and anger ratings revealed a pattern of significant findings similar to that presented here. In terms of emotional facial behavior, the target emotion was coded with the greatest combined frequency and intensity in 10 of the 12 film clips. The exceptions were as follows: For the sad film clip with Mexican American actors, disgust was greater than sadness, and for the disgust film clip with Chinese American actors, sadness was

greater than disgust. For all 12 film clips, participants showed significant physiological reactivity (i.e., significant change from baseline, as determined by *t* tests) in most of the physiological measures. In addition, as described below, there were different patterns of physiological change depending on the emotion category and the specific clip being viewed. Mean ratings of the target emotion, mean amounts of target facial behavior coded, and mean physiological reactivity across participants are included in Table 1.<sup>13</sup>

### Emotional Responding as a Function of Participant Ethnicity, Actor Ethnicity, and Emotion of Film

As indicated earlier, our primary analyses consisted of (a) planned in-group and out-group contrasts and (b) overall analyses of the effects for participant ethnicity, actor ethnicity, emotion of film, and their interactions. The results of these analyses are presented for self-reported subjective emotional experience (target emotion), emotional behavior (target emotion), and physiological reactivity (physiological composites). Means and standard deviations are presented in Table 1.

*Self-reported subjective emotional experience: In-group and out-group.* Planned comparisons revealed that African Americans and European Americans each reported more of the target emotion to the ethnically matched clips,  $t(39) = 3.94, p < .01, r_{\text{contrast}} = .53$ , and  $t(47) = 2.12, p < .05, r_{\text{contrast}} = .30$ , respectively. Chinese Americans did not differ significantly in self-reports of the target emotion to clips of ethnically matched compared with ethnically mismatched actors,  $t(39) = 0.75, r_{\text{contrast}} = .12$ , and Mexican Americans did not differ significantly in self-reports of the target emotion to clips of ethnically matched compared with ethnically mismatched actors,  $t(39) = 0.75, r_{\text{contrast}} = .12$ . The Participant Ethnicity  $\times$  Actor Ethnicity interaction relevant to these contrasts was significant,  $F(9, 462) = 3.20, p < .01, \eta_p^2 = .06$ . Thus, in self-reported emotional experience, our hypothesis of greater emotional response for in-group than for out-group conditions was supported for African Americans and European Americans, but not for Chinese Americans and Mexican Americans.

*Self-reported subjective emotional experience: Other effects.* For self-reports of the target emotion, the three-way interaction of participant ethnicity, actor ethnicity, and emotion of film was not significant,  $F(18, 924) = 1.01, \eta_p^2 = .02$ . The main effect of the emotion of the film was not significant,  $F(2, 308) = 0.61, \eta_p^2 = .00$ , indicating that ratings of the target emotion were equally strong for each of the three emotion categories (i.e., ratings of amusement for the amusement films, ratings of sadness for the sad films, and ratings of disgust for the disgust films). The main effect of participant ethnicity was not significant,  $F(3, 154) = 1.04, \eta_p^2 = .02$ , nor was the interaction of participant ethnicity and emotion of film,  $F(6, 308) = 2.01, \eta_p^2 = .04$ . There was a main effect of actor

<sup>11</sup> Analyses with individual physiological measures are available on the corresponding author's Web site (<http://www.west.asu.edu/narobert/>).

<sup>12</sup> Furr and Rosenthal (2003) discussed the advantages of direct hypothesis testing in complex multivariate designs, rather than only following up on significant omnibus interactions as with a traditional hierarchical analysis strategy.

<sup>13</sup> Mean self-report ratings and emotional facial behavior for each emotion rated or coded (i.e., target and nontarget emotions) are available on the corresponding author's Web site (<http://www.west.asu.edu/narobert/>). Mean reactivity scores for each physiological measure also are available on that site.

Table 1  
*Mean Emotional Response by Participant Ethnicity, Actor Ethnicity, and Emotion of Film*

Actor ethnicity	Participant ethnicity				
	African Americans	Chinese Americans	European Americans	Mexican Americans	All Participants
Amusement films					
African American					
Self-report	<b>6.10 (2.42)</b>	5.48 (1.78)	4.85 (2.11)	4.83 (2.37)	5.29 (2.22)
Behavior	<b>0.64 (0.63)</b>	0.44 (0.42)	0.48 (0.42)	0.43 (0.35)	0.50 (0.47)
Physiology	<b>0.20 (0.54)</b>	-0.01 (0.40)	0.22 (0.48)	-0.09 (0.29)	0.08 (0.45)
Chinese American					
Self-report	5.03 (2.30)	<b>5.58 (2.04)</b>	4.79 (2.05)	4.68 (2.68)	5.01 (2.27)
Behavior	0.23 (0.35)	<b>0.41 (0.41)</b>	0.26 (0.31)	0.22 (0.28)	0.28 (0.34)
Physiology	-0.04 (0.46)	<b>-0.05 (0.31)</b>	-0.03 (0.45)	-0.11 (0.34)	-0.05 (0.40)
European American					
Self-report	6.13 (1.88)	5.78 (1.70)	<b>5.50 (2.23)</b>	5.18 (2.15)	5.63 (2.03)
Behavior	0.39 (0.39)	0.53 (0.41)	<b>0.55 (0.51)</b>	0.57 (0.39)	0.51 (0.43)
Physiology	0.08 (0.33)	-0.01 (0.36)	<b>0.10 (0.48)</b>	-0.06 (0.42)	0.03 (0.41)
Mexican American					
Self-report	4.50 (2.51)	4.85 (2.17)	5.21 (2.08)	<b>5.00 (2.47)</b>	4.90 (2.30)
Behavior	0.21 (0.30)	0.23 (0.28)	0.35 (0.32)	<b>0.41 (0.34)</b>	0.30 (0.32)
Physiology	-0.13 (0.28)	-0.12 (0.33)	0.02 (0.40)	<b>-0.01 (0.42)</b>	-0.06 (0.36)
Sad films					
African American					
Self-report	<b>5.69 (2.39)</b>	5.63 (1.88)	4.71 (2.63)	5.85 (1.85)	5.43 (2.26)
Behavior	<b>0.06 (0.17)</b>	0.04 (0.13)	0.11 (0.26)	0.11 (0.26)	0.08 (0.21)
Physiology	<b>0.02 (0.36)</b>	-0.12 (0.46)	-0.02 (0.34)	-0.12 (0.33)	-0.06 (-0.38)
Chinese American					
Self-report	4.98 (2.51)	<b>6.18 (2.14)</b>	5.17 (2.44)	6.13 (1.77)	5.59 (2.29)
Behavior	0.05 (0.15)	<b>0.03 (0.08)</b>	0.14 (0.45)	0.08 (0.18)	0.08 (0.27)
Physiology	-0.11 (0.29)	<b>-0.12 (0.35)</b>	-0.08 (0.36)	-0.10 (0.26)	-0.10 (0.32)
European American					
Self-report	4.13 (2.56)	4.93 (2.47)	<b>4.13 (2.44)</b>	4.58 (2.33)	4.42 (2.45)
Behavior	0.03 (0.14)	0.02 (0.07)	<b>0.11 (0.31)</b>	0.03 (0.09)	0.05 (0.19)
Physiology	-0.07 (0.35)	-0.10 (0.27)	<b>-0.08 (0.30)</b>	-0.20 (0.33)	-0.11 (0.31)
Mexican American					
Self-report	5.18 (2.43)	5.54 (1.90)	4.81 (2.57)	<b>5.63 (2.14)</b>	5.26 (2.30)
Behavior	0.02 (0.07)	0.01 (0.06)	0.06 (0.20)	<b>0.01 (0.05)</b>	0.03 (0.12)
Physiology	-0.08 (0.35)	0.02 (0.41)	0.16 (0.46)	<b>0.05 (0.36)</b>	0.04 (0.40)
Disgust films					
African American					
Self-report	<b>5.25 (2.91)</b>	5.85 (2.20)	5.08 (2.39)	4.85 (2.99)	5.25 (2.63)
Behavior	<b>0.01 (0.08)</b>	0.02 (0.04)	0.11 (0.26)	0.07 (0.24)	-0.06 (0.19)
Physiology	<b>0.06 (0.35)</b>	0.08 (0.35)	0.09 (0.46)	-0.10 (0.40)	0.04 (0.40)
Chinese American					
Self-report	4.30 (2.82)	<b>5.00 (2.54)</b>	4.17 (2.61)	4.70 (2.40)	4.52 (2.60)
Behavior	0.03 (0.09)	<b>0.02 (0.04)</b>	0.06 (0.17)	0.05 (0.10)	0.04 (0.11)
Physiology	-0.12 (0.32)	<b>-0.10 (0.34)</b>	-0.07 (0.27)	-0.27 (0.38)	-0.14 (0.33)
European American					
Self-report	5.70 (2.40)	5.95 (2.30)	<b>5.67 (2.22)</b>	5.45 (2.62)	5.69 (2.37)
Behavior	0.11 (0.34)	0.07 (0.20)	<b>0.12 (0.34)</b>	0.06 (0.13)	0.09 (0.27)
Physiology	0.20 (0.37)	0.32 (0.54)	<b>0.23 (0.39)</b>	0.05 (0.33)	0.20 (0.42)
Mexican American					
Self-report	4.47 (2.98)	5.43 (2.33)	4.60 (2.48)	<b>5.23 (2.57)</b>	4.92 (2.60)
Behavior	0.08 (0.18)	0.06 (0.21)	0.07 (0.24)	<b>0.12 (0.26)</b>	0.08 (0.22)
Physiology	0.08 (0.37)	0.27 (0.46)	0.10 (0.46)	<b>-0.03 (0.39)</b>	0.11 (0.44)

Note. Values in parentheses are standard deviations. Self-report values are ratings of the target emotion on a 9-point scale (anchored by 0 = *not at all*, 4 = *moderately*, and 8 = *very much*). Behavior codes are of the target emotion and reflect a combination of frequency and intensity; values reported are difference scores (film period minus baseline period). Physiology values are physiological composite scores (based on standardized change scores, scaled so increased arousal is in the positive direction). In-group values are highlighted in bold.

ethnicity,  $F(3, 462) = 4.21, p < .01, \eta_p^2 = .03$ . Follow-up comparisons revealed that participants (collapsed across participant ethnicity) reported more of the target emotion in response to film clips with African American actors ( $M = 5.4, SD = 0.1$ ) than to clips with Chinese American ( $M = 5.1, SD = 0.1$ ) and Mexican American ( $M = 5.0, SD = 0.1$ ) actors (clips of European American actors:  $M = 5.2, SD = 0.1$ ). There was an interaction of actor ethnicity and emotion of film,  $F(6, 924) = 15.41, p < .01, \eta_p^2 = .09$ . Follow-up comparisons revealed that participants reported less sadness to the sad clip with European American actors than to the other three sad clips, more disgust to the disgust clip with European American actors than to the other three disgust clips, and more amusement to the amusing clip with European American actors than to the amusing clips with Chinese American or Mexican American actors. Participants also reported more disgust to the disgust clip with African American actors than to the disgust clip with Chinese American actors (refer to means in Table 1).

*Emotional behavior: In-group and out-group.* Planned comparisons revealed that African Americans displayed more target emotional behavior to the ethnically matched clips,  $t(38) = 3.83, p < .01, r_{\text{contrast}} = .53$ , and European Americans displayed more target emotional behavior to the ethnically matched clips,  $t(47) = 3.02, p < .01, r_{\text{contrast}} = 0.40$ . Chinese Americans did not differ significantly in their displays of the target emotion to clips with ethnically matched compared with ethnically mismatched actors,  $t(39) = -0.38, r_{\text{contrast}} = .06$ , and Mexican Americans did not differ significantly in their displays of the target emotion to clips of ethnically matched compared with ethnically mismatched actors,  $t(39) = 0.21, r_{\text{contrast}} = .03$ . The Participant Ethnicity  $\times$  Actor Ethnicity interaction relevant to these contrasts was significant,  $F(9, 468) = 2.49, p < .01, \eta_p^2 = .05$ . Thus, in emotional behavior, our hypothesis of greater emotional response for in-group compared with out-group conditions was supported for African Americans and European Americans, but not for Chinese Americans and Mexican Americans.

*Emotional behavior: Other effects.* There was a significant three-way interaction of participant ethnicity, actor ethnicity, and emotion of film for target emotional behavior,  $F(18, 936) = 4.36, p < .01, \eta_p^2 = .08$ . Follow-up comparisons revealed that African Americans displayed more happiness/amusement facial behavior in response to the amusement film clip with African American actors than to the amusement film clips with actors from the other three ethnic groups,  $t(39) = 4.83, p < .01, r_{\text{contrast}} = .61$ , and European Americans displayed more happiness/amusement facial behavior in response to the amusement film clip with European American actors than in response to the amusement film clips with actors from the other three ethnic groups,  $t(47) = 3.30, r_{\text{contrast}} = .43$ . Mexican Americans displayed more disgust to the disgust clip with Mexican American actors than to the other disgust clips,  $t(39) = 2.04, p < .05, r_{\text{contrast}} = .31$ , and African Americans displayed less disgust to the disgust clip with African American actors than to the other disgust clips,  $t(39) = -2.36, p < .05, r_{\text{contrast}} = .35$ . Of note, these findings for the disgust clips did not retain statistical significance when we applied a Bonferroni correction for multiple comparisons. Mexican Americans displayed less sadness to the sad clip with Mexican American actors than to the other sad clips,  $t(39) = -3.26, p < .01, r_{\text{contrast}} = .46$ . There was a significant main effect of emotion of film,  $F(2, 312) = 168.96, p < .01, \eta_p^2 = .52$ ; target emotional behavior was coded

with greater combined intensity and frequency for the amusement films ( $M = 0.40, SD = 0.03$ ) than for the sad films ( $M = 0.06, SD = 0.01$ ) or the disgust films ( $M = 0.07, SD = 0.01$ ). The main effect of participant ethnicity was not significant,  $F(3, 156) = 1.06, \eta_p^2 = .02$ , and the interaction of participant ethnicity and emotion of film was not significant,  $F(6, 312) = 0.25, \eta_p^2 = .01$ . There was a significant main effect of actor ethnicity,  $F(3, 468) = 24.61, p < .01, \eta_p^2 = .14$ . Follow-up comparisons revealed that target emotional behavior was coded with greater combined intensity and frequency for film clips with African American actors ( $M = 0.21, SD = 0.02$ ) and European American actors ( $M = 0.22, SD = 0.02$ ) than with Chinese American actors ( $M = 0.13, SD = 0.01$ ) and Mexican American actors ( $M = 0.10, SD = 0.01$ ). There was a significant interaction of actor ethnicity and emotion of film,  $F(6, 936) = 21.85, p < .01, \eta_p^2 = .12$ . Follow-up comparisons revealed that participants displayed more happiness/amusement to the amusement clips with European American and African American actors than to the amusement clips with Chinese American and Mexican American actors, more sadness to the sad clip with African American actors than to the sad clip with Mexican American actors, and more disgust to the disgust clip with Mexican American actors than to the disgust clip with Chinese American actors (refer to means in Table 1).

*Physiological reactivity: In-group and out-group.* Planned comparisons revealed that African Americans showed greater physiological activation to the ethnically matched clips,  $t(39) = 3.27, p < .01, r_{\text{contrast}} = .46$ , and Mexican Americans showed greater physiological activation to the ethnically matched clips,  $t(39) = 3.71, p < .01, r_{\text{contrast}} = .51$ . Chinese Americans showed less physiological activation to the ethnically matched clips,  $t(39) = -3.89, p < .01, r_{\text{contrast}} = .53$ . European Americans did not differ significantly in their physiological responses to the ethnically matched and ethnically mismatched clips,  $t(47) = 1.22, r_{\text{contrast}} = .18$ . The Participant Ethnicity  $\times$  Actor Ethnicity interaction relevant to these contrasts was significant,  $F(9, 477) = 3.14, p < .01, \eta_p^2 = .06$ . Thus, in physiological reactivity, our hypothesis of greater emotional response for in-group compared with out-group conditions was supported for African Americans and Mexican Americans, but not for European Americans. Chinese Americans showed differential physiological responding to the in-group clips but in the direction opposite from what we predicted.

*Physiological reactivity: Other effects.* For physiological reactivity, the three-way interaction of Participant Ethnicity  $\times$  Actor Ethnicity  $\times$  Emotion of Film was not significant,  $F(18, 954) = 1.05, \eta_p^2 = .02$ .<sup>14</sup> There was a significant main effect of emotion of film,  $F(2, 318) = 17.65, p < .01, \eta_p^2 = .10$ . Follow-up comparisons indicated that participants showed the greatest phys-

<sup>14</sup> When examining individual physiological measures, the three-way interaction of participant ethnicity, actor ethnicity, and emotion of film was significant for two physiological measures: Cardiac interbeat interval,  $F(18, 954) = 1.70, p < .05, \eta_p^2 = .03$ , and systolic blood pressure,  $F(18, 912) = 1.82, p < .05, \eta_p^2 = .04$ . Follow-up comparisons for these two measures revealed one significant effect: Chinese Americans showed greater increases in cardiac interbeat interval (indicating decreases in physiological activation) when watching the disgust film with ethnically matched actors than when watching the other disgust films,  $F(1, 39) = 10.56, p < .01$ . The other comparisons were not statistically significant (nor did they yield marginally significant trends).

iological activation to the disgust clips ( $M = 0.05$ ,  $SE = 0.02$ ) and the least activation to the sad clips ( $M = -0.06$ ,  $SE = 0.02$ ), with activation to the amusement clips falling in between ( $M = -0.00$ ,  $SE = 0.02$ ). There was a nonsignificant trend of participant ethnicity,  $F(3, 159) = 2.45$ ,  $p = .066$ ,  $\eta_p^2 = .04$ . Follow-up comparisons using Bonferroni corrections indicated that European Americans showed more physiological activation than Mexican Americans (European Americans:  $M = 0.06$ ,  $SE = 0.03$ ; African Americans,  $M = 0.01$ ,  $SE = 0.04$ ; Chinese Americans,  $M = 0.00$ ,  $SE = 0.04$ ; Mexican Americans,  $M = -0.08$ ,  $SE = 0.04$ ). There was a significant interaction of participant ethnicity and emotion,  $F(6, 318) = 3.67$ ,  $p < .01$ ,  $\eta_p^2 = .07$ . Follow-up comparisons revealed significant ethnic differences in physiological reactivity in response to the disgust clips, with Chinese Americans and European Americans showing greater physiological activation than Mexican Americans (Chinese Americans,  $M = 0.14$ ,  $SE = 0.05$ ; European Americans,  $M = 0.09$ ,  $SE = 0.04$ ; African Americans,  $M = 0.06$ ,  $SE = 0.05$ ; Mexican Americans,  $M = -0.08$ ,  $SE = 0.05$ ). There was a significant main effect of actor ethnicity,  $F(3, 477) = 20.93$ ,  $p < .01$ ,  $\eta_p^2 = .12$ . Follow-up comparisons indicated that participants showed relatively less physiological activation to clips with Chinese American actors than to clips with actors from other ethnicities (Chinese American actors,  $M = -0.10$ ,  $SE = 0.02$ ; African American actors,  $M = 0.02$ ,  $SE = 0.03$ ; Mexican American actors,  $M = 0.03$ ,  $SE = 0.02$ ; European American actors,  $M = 0.04$ ,  $SE = 0.02$ ). There was a significant interaction of actor ethnicity and emotion of film,  $F(6, 954) = 13.63$ ,  $p < .01$ ,  $\eta_p^2 = .08$ . Follow-up comparisons indicated that participants showed greater physiological activation to the amusement clip with African American actors than to the amusement clips with Chinese American or Mexican American actors, greater physiological activation to the sad clip with Mexican American actors than to the other three sad clips, greater physiological activation to the disgust clip with European American actors than to the other three disgust clips, and less physiological activation to the disgust clip with Chinese American actors than to the other disgust clips (refer to means in Table 1).

### Effects of Actor Expressivity

Given that previous research has found differences in judgments of ethnically diverse emotional faces as a result of the intensity of the expression posed (see Beaupré & Hess, 2005), we conducted exploratory analyses to determine whether actors of different ethnicities differed in their degree of emotional expressivity. To explore this possibility, 11 male and female research assistants from the four ethnic backgrounds represented in the study coded the clips to provide an indication of the emotional expressivity of the actors. Ratings for actor expressivity were made on a scale of 0 to 3, where 0 = *not at all expressive/intense*, 1 = *slightly expressive/intense*, 2 = *moderately expressive/intense*, and 3 = *strongly expressive/intense* (this was the same scale used for coding the intensity of participants' facial behavior). Ratings were averaged across coders (see Waldinger, Schulz, Hauser, Allen, & Crowell, 2004). Ratings of actor expressivity were compared for each actor ethnicity (averaging across emotion of film). We found that coders rated African American and European American actors as more emotionally expressive than Chinese American and Mexican American actors.<sup>15</sup>

To test whether participants were responding more to clips of emotionally expressive actors, we conducted additional analyses for each ethnic group to compare participants' responses to clips of African American and European American actors compared with clips of Chinese American and Mexican American actors (using the weighted coefficient method described above and weighting coefficients as 1, 1, and -1, -1, respectively). Findings revealed that participants from all four groups showed more emotional behavior to the clips of African American and European American actors than to the clips of Chinese American and Mexican American actors. In addition, African Americans reported more emotion and showed greater physiological activation, and European Americans showed greater physiological activation, to the clips of African American and European American actors compared with Chinese American and Mexican American actors.<sup>16</sup>

### Effects of Participant Sex and Degree of Ethnic and Cultural Identification

We conducted follow-up analyses to examine two potentially important individual differences variables: (a) participant sex and (b) degree of ethnic and cultural identification (as measured by participants' scores on the ethnic group-specific acculturation inventories and on the General Ethnicity Questionnaire—American version). Specifically, for measures for which we found significant interactions of participant ethnicity and actor ethnicity (or of participant ethnicity, actor ethnicity, and emotion of film), we recomputed the analyses of variance and included participant sex as an additional between-subjects factor. In addition, for each instance where participants showed greater emotional reactivity to an ethnically matched film clip, the magnitude or intensity of participants' emotional response was correlated with scores on the acculturation inventories. (We also conducted these analyses using a median split to compare individuals high and low in acculturation.) Neither participant sex nor degree of reported ethnic and cultural identification moderated the relations between participant ethnicity and actor ethnicity.

### Discussion

Researchers are increasingly recognizing that the match or mismatch between the ethnicity of a perceiver and the ethnicity of a

<sup>15</sup> Mean ( $SD$ ) ratings of actor expressivity based on actor ethnicity were as follows: African American actors,  $M = 2.6$ ,  $SD = 0.1$ ; European American actors,  $M = 2.5$ ,  $SD = 0.1$ ; Mexican American actors,  $M = 2.2$ ,  $SD = 0.2$ ; Chinese American actors,  $M = 2.0$ ,  $SD = 0.1$ ; African American compared with Chinese American actors,  $t(10) = 5.59$ ,  $p < .01$ ; African American compared with Mexican American actors,  $t(10) = 4.89$ ,  $p < .01$ ; European American compared with Chinese American actors,  $t(10) = 3.83$ ,  $p < .01$ ; European American compared with Mexican American actors,  $t(10) = 2.52$ ,  $p < .05$ .

<sup>16</sup> Responses to clips of African American/European American actors compared with Chinese American/Mexican American actors were as follows: African Americans: self-report,  $t(39) = 4.37$ ,  $p < .01$ ; behavior,  $t(39) = 4.75$ ,  $p < .01$ ; physiology,  $t(39) = 5.38$ ,  $p < .01$ ; European Americans: self-report,  $t(47) = 1.59$ , *ns*; behavior,  $t(47) = 4.93$ ,  $p < .01$ ; physiology,  $t(47) = 2.37$ ,  $p < .03$ ; Chinese Americans: self-report,  $t(39) = 1.41$ , *ns*; behavior,  $t(39) = 4.31$ ,  $p < .01$ ; physiology,  $t(39) = 1.41$ , *ns*; Mexican Americans: self-report,  $t(39) = -0.28$ , *ns*; behavior,  $t(39) = 3.10$ ,  $p < .01$ ; physiology,  $t(39) = -0.30$ , *ns*.

target can influence emotional judgments (Albas et al., 1976; Beaupré and Hess, 2006; Freeman, 1984; Kilbride & Yarczower, 1983). The evidence as to whether this in-group/out-group difference extends to actual emotional responding is less clear (Brown et al., 2001; Vrana & Rollock, 2002). This study examined this latter issue with a design using four ethnic groups, strict ethnic group membership criteria, multiple emotions, and a comprehensive assessment of subjective, behavioral, and physiological aspects of emotional responding.

### *Ethnic Similarities and Differences*

When data were collapsed across all film clips and all actor ethnicities, virtually no ethnic differences in emotional reactivity were found. This finding is consistent with a general view (e.g., Levenson et al., in press) that in the realm of emotional responding to stimuli that elicit simple emotions, such as disgust, sadness, and amusement, there is far more similarity than difference across ethnic groups. This conclusion may be particularly true when the ethnic group members being studied are students attending colleges in the United States who share many common experiences associated with age, place, and time. Staunch cultural constructivists may believe otherwise, but for those who, like us, endorse more evolutionary and biological views of emotion, it would seem unreasonable to expect that cultural experience would have the power to dramatically "rewire" the essential organization of emotional responding. Rather, we would expect the influences of culture to be more subtle and to assert themselves most strongly under particular conditions (e.g., when cultural cues are present; Levenson et al., in press).

The presence of others who are of the same ethnicity clearly represents a situation conducive to the activation of cultural schemas. The findings of advantages in identifying emotions in cultural in-group members compared with out-group members may reflect this activation as well as other factors (Elfenbein & Ambady, 2003a; Thibault, Bourgeois, & Hess, in press). Again, it is important to note that this is a fairly subtle advantage associated with cultural similarity. It would be quite problematic if people could read the emotions of only members of their own ethnic group; fortunately, that is not the case.

In the realm of emotional responding, comparing films with actors from the ethnic in-group with those from the out-group, we again found a great deal more that was similar than different. However, there were signs that cultural factors could produce discernible influences (for some groups and for some aspects of responding), even when considering these very basic aspects of emotion. Specifically, in the realms of emotional experience and emotional behavior, African Americans and European Americans showed greater emotional responding to the in-group clips. Moreover, African Americans showed a similar pattern of greater responding to in-group clips in the realm of physiology, as did Mexican Americans. Again, we note that there were more findings revealing a lack of in-group/out-group differences than the presence of a distinct in-group advantage (and even one finding suggested diminished responding to the in-group, with Chinese Americans showing less physiological activation to films with in-group actors). However, because we are arguably dealing with more elemental aspects of emotion (i.e., emotional responding) than is the case with studies of emotion judgments, and because we are

studying ethnic groups who shared a number of common experiences that could act to homogenize cultural differences, it is important not to minimize the significance of the cultural in-group advantages that we found. Stated more simply, this study provided a very conservative test of cultural in-group differences.

### *Greatest In-Group Responding for African Americans and European Americans*

The evidence we found in support of greater emotional responding to in-group films was strongest for African American and European American participants. In the realm of emotional behavior, these findings were particularly pronounced for the amusement clips. Given that the African American and European American participants in our sample had multigenerational histories in the United States (at least three generations, per our selection criteria), spoke English as their language of origin, and reported identifying most strongly with American culture (compared with Chinese Americans and Mexican Americans), film clips from the popular media may have been more reflective of in-group stimuli for members of these two groups. It was interesting that there was some indication that African Americans and European Americans showed heightened responsivity to film clips with actors of each other's ethnicity, thus lending additional indirect support for the possible influence of their shared multigenerational history of living in the United States.

### *African Americans Viewing African Americans*

To some extent, the in-group advantage was most pervasive for African Americans. They were the only group to respond with greater emotional responding in self-reported experience, behavior, and physiology to in-group films. These findings are consistent with previous research suggesting that ethnicity may be particularly salient for African Americans (Helms, 1990; Landrine & Klonoff, 1996). The "significant others" in an African American child's life (e.g., teachers, peers) tend to be African American, and the development of African American identity often involves immersing oneself in Black culture before reintegrating aspects of White culture into one's sense of self (Helms, 1990; Ramseur, 1989, p. 228). African American culture in particular has been described as one that values honest emotional expression (Hecht, Collier, & Ribeau, 1993). Thus, it may be speculated that African American college students may have a particularly strong attunement to the emotions of in-group members.

### *Greatest Emotional Responses to African American and European American Actors*

Participants from all four ethnic groups showed more emotional behavior consistent with the target emotion when watching clips of African American and European American actors compared with clips of Chinese American and Mexican American actors. We hesitate to make a great deal of these findings because the film clips in no way constituted a representative sample of films with actors from these ethnic groups. Moreover, consistent with previous research, these findings indicate that there may have been differences in the nature and amount of emotional behavior in the

films with actors of the different ethnicities (Beaupré & Hess, 2005).

### Generality Across Sex and Cultural Identification

Patterns of emotional responding to one's own and other ethnic groups were similar for men and women. This is consistent with previous studies of emotion that have not found significant interactions of sex and ethnicity (Gross et al., 1997; Tsai & Levenson, 1997). We also expected that participants who identified more strongly with their culture of origin, and/or less strongly with American culture, might show relatively greater emotional responses to ethnically matched than ethnically mismatched film clips (e.g., consistent with previous findings that acculturation influenced culturally consistent moderation of self-reported emotional experience; Soto, Levenson, & Ebling, 2005). However, participants' reports of ethnic and cultural identification were not related to the magnitude of their emotional response to ethnically matched film clips (and, at the group level, the most acculturated groups showed the most in-group/out-group differences). Both of these findings suggest that the findings concerning in-group responses generalize across the sexes and are influenced more by ethnicity per se than by the extent of cultural identification.

### Limitations and Future Directions

We have already mentioned that the use of United States college students creates a very conservative test of cultural differences because of shared common experiences associated with age, time, and place. Samples that are more diverse in age and socioeconomic status as well as those that are living outside the United States would provide additional important tests of in-group and out-group effects. In addition, all of our film stimuli came from commercial films produced in the United States and presented in English. In future work it would be important to include films that were made in participants' countries of origin and that are presented in their native languages. Moreover, our film clips were selected to portray emotions very clearly and without ambiguity. The most commonly offered explanation for in-group advantage is familiarity with the culture-specific cues used in emotional expression. Thus, our selection procedures may have worked against including films that were rich in these kinds of cues. Cultural differences may be more likely to emerge in response to films in which the emotions are more subtle, more embedded in culturally relevant themes and contexts, and more richly imbued with culture-specific expressive cues.

### Conclusions

Our findings provide some support for greater emotional responding to films with actors of the same ethnicity compared with those of different ethnicities. However, these differences primarily were found for African Americans and European Americans, and there were many instances where no cultural differences were found. These findings suggest that the in-group advantage previously demonstrated for emotional judgments may be less robust in the realm of actual emotional responding, although as noted, a manipulation of culture-specific expressive cues would be important in testing this claim. Nonetheless, where we did find evidence

of greater emotional responses to the in-group, these differences were consistent across sex and level of acculturation, suggesting that even with film stimuli selected in ways that may have maximized cross-cultural similarity, an in-group advantage, albeit subtle and small in magnitude, is present. From an evolutionary perspective, there are great advantages in designing the emotional response system in ways that allow responding to members of the in-group and out-group alike. Providing a way that systems responsible for emotional responding (as well as those responsible for emotion detection) can be fine-tuned to provide incrementally greater response to members of the immediate cultural group may be very important in promoting group cohesion and integrity.

### References

- Albas, D. C., McCluskey, K. W., & Albas, C. A. (1976). Perception of the emotional content of speech: A comparison of two Canadian groups. *Journal of Cross-Cultural Psychology, 7*, 481-490.
- Anderson, N. B. (1989). Racial differences in stress-induced cardiovascular reactivity and hypertension: Current status and substantive issues. *Psychological Bulletin, 105*, 89-105.
- Beaupré, M. G., & Hess, U. (2003). In my mind, we all smile: A case of in-group favoritism. *Journal of Experimental Social Psychology, 39*, 371-377.
- Beaupré, M. G., & Hess, U. (2005). Cross-cultural emotion recognition among Canadian ethnic groups. *Journal of Cross-cultural Psychology, 36*, 355-370.
- Beaupré, M. G., & Hess, U. (2006). An in-group advantage for confidence in emotion recognition judgments: The moderating effect of familiarity with the expressions of outgroup members. *Personality and Social Psychology Bulletin, 32*, 16-26.
- Brewer, M. B. (1979). In-group bias in the minimal intergroup situation: A cognitive-motivational analysis. *Psychological Bulletin, 86*, 307-324.
- Brewer, M. B. (1999). The psychology of prejudice: Ingroup love or outgroup hate? *Journal of Social Issues, 55*, 429-444.
- Brewer, M. B. (2001). The many faces of social identity: Implications for political psychology. *Political Psychology, 22*, 115-125.
- Brewer, M. B., & Campbell, D. T. (1976). *Ethnocentrism and intergroup attitudes: East African evidence*. Beverly Hills, CA: Sage.
- Brewer, M. B., & Gardner, W. (1996). Who is this "We"? Levels of collective identity and self representations. *Journal of Personality and Social Psychology, 71*, 83-93.
- Brewer, M. B., & Weber, J. G. (1994). Self-evaluation effects of interpersonal versus intergroup social comparison. *Journal of Personality and Social Psychology, 66*, 268-275.
- Brewer, M. B., Weber, J. G., & Carini, B. (1995). Person memory in intergroup contexts: Categorization versus individuation. *Journal of Personality and Social Psychology, 69*, 29-40.
- Brown, L. M., Bradley, M. M., & Lang, P. J. (2001, October). *Investigating ethnic differences in affective reaction to pictures*. Poster presented at the annual meeting of the Society for Psychophysiological Research, Montreal, Quebec, Canada.
- Brown, L. M., Bradley, M. M., & Lang, P. J. (2006). Affective reactions to pictures of ingroup and outgroup members. *Biological Psychology, 71*, 303-311.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Cuellar, I., Harris, L., & Jasso, R. (1980). An acculturation scale for Mexican American normal and clinical populations. *Hispanic Journal of Behavioral Sciences, 2*, 199-217.
- Ducci, L., Arcuri, L., Georgis, T., & Sineshaw, T. (1982). Emotion recognition in Ethiopia: The effect of familiarity with Western culture on accuracy of recognition. *Journal of Cross-Cultural Psychology, 13*, 340-351.

- Ekman, P. (1999). Basic emotions. In T. Dalgleish & M. J. Power (Eds.), *Handbook of cognition and emotion* (pp. 45–60). Chichester, England: Wiley.
- Ekman, P., & Friesen, W. V. (1975). *Unmasking the face: A guide to recognizing emotions from facial clues*. New York: Prentice-Hall.
- Ekman, P., Friesen, W. V., & Ancoli, S. (1980). Facial signs of emotional experience. *Journal of Personality and Social Psychology*, 39, 1125–1134.
- Elfenbein, H. A., & Ambady, N. (2003a). Universals and cultural differences in recognizing emotions of a different cultural group. *Current Directions in Psychological Science*, 12, 159–164.
- Elfenbein, H. A., & Ambady, N. (2003b). When familiarity breeds accuracy: Cultural exposure and facial emotion recognition. *Journal of Personality and Social Psychology*, 85, 276–290.
- Feshbach, N. D., & Roe, K. (1968). Empathy in six- and seven-year-olds. *Child Development*, 39, 133–145.
- Fredrickson, B. L., & Levenson, R. W. (1998). Positive emotions speed recovery from the cardiovascular sequelae of negative emotions. *Cognition and Emotion*, 12, 191–220.
- Freeman, E. B. (1984). The development of empathy in young children: In search of a definition. *Child Study Journal*, 13, 235–245.
- Frijda, N. H. (1987). Emotion and emotional expression. *Ricerche di Psicologia*, 11, 5–33.
- Furr, R. M., & Rosenthal, R. (2003). Evaluating theories efficiently: The nuts and bolts of contrast analysis. *Understanding Statistics*, 2, 45–67.
- Gross, J. J., Carstensen, L. L., Pasupathi, M., Tsai, J. L., Skorpen, C. G., & Hsu, A. (1997). Emotion and aging: Experience, expression, and control. *Psychology and Aging*, 12, 590–599.
- Gross, J. J., & Levenson, R. W. (1993). Emotional suppression: Physiology, self-report, and expressive behavior. *Journal of Personality and Social Psychology*, 64, 970–986.
- Gross, J. J., & Levenson, R. W. (1995). Emotion elicitation using films. *Cognition and Emotion*, 9, 87–108.
- Hecht, M. L., Collier, M., & Ribeau, S. A. (1993). *African American communication: Ethnic identity and cultural interpretation*. Thousand Oaks, CA: Sage.
- Helms, J. E. (1990). *Black and white racial identity: Theory, research, and practice*. New York: Greenwood Press.
- Kilbride, J. E., & Yarczower, M. (1980). Recognition and imitation of facial expressions: A cross-cultural comparison between Zambia and the United States. *Journal of Cross-Cultural Psychology*, 11, 281–296.
- Kilbride, J. E., & Yarczower, M. (1983). Ethnic bias in the recognition of facial expressions. *Journal of Nonverbal Behavior*, 8, 27–41.
- Kring, A. M., & Neale, J. M. (1996). Do schizophrenic patients show a disjunctive relationship among expressive, experiential, and psychophysiological components of emotion? *Journal of Abnormal Psychology*, 105, 249–257.
- Landrine, H., & Klonoff, E. A. (1996). *African American acculturation: Deconstructing race and reviving culture*. Thousand Oaks, CA: Sage Publications, Inc.
- Levenson, R. W., Soto, J., & Pole, N. (in press). Emotion, biology, and culture. In S. Kitayama & D. Cohen (Eds.), *Handbook of cultural psychology*.
- Llabre, M. M., Spitzer, S. B., Saab, P. G., Ironson, G. H., & Schneiderman, N. (1991). The reliability and specificity of delta versus residualized change as measures of cardiovascular reactivity to behavioral challenges. *Psychophysiology*, 28, 701–711.
- Manuck, S. B., Kasprowicz, A. L., Monroe, S. M., Larkin, K. T., & Kaplan, J. R. (1989). Psychophysiological reactivity as a dimension of individual differences. In N. Schneiderman, S. M. Weiss, & P. G. Kaufmann (Eds.), *Handbook of research methods in cardiovascular behavioral medicine* (pp. 365–382). New York: Plenum Press.
- Mendoza, R. H. (1989). An empirical scale to measure type and degree of acculturation Mexican-American adolescents and adults. *Journal of Cross-Cultural Psychology*, 20, 372–385.
- Murphy, J. K., Alpert, B. S., Willey, E. S., & Somes, G. W. (1988). Cardiovascular reactivity to psychological stress in healthy children. *Psychophysiology*, 25, 144–152.
- Ramseur, H. P. (1989). Psychologically healthy black adults: A review of theory and research. In R. L. Jones (Ed.) *Black adult development and aging* (pp. 215–241). Berkeley, California: Cobb & Henry.
- Rogosa, D., & Willett, J. B. (1983). Demonstrating the reliability of the difference score in the measurement of change. *Journal of Educational Measurement*, 20, 335–343.
- Rozin, P., Lowery, L., & Imada, S. (1999). The CAD triad hypothesis: A mapping between three moral emotions (contempt, anger, disgust) and three moral codes (community, autonomy, divinity). *Journal of Personality and Social Psychology*, 76, 574–586.
- Shepherd, J. W., Deregowski, J. B., & Ellis, H. D. (1974). A cross-cultural study of recognition memory for faces. *International Journal of Psychology*, 9, 205–211.
- Sims, R. C. (2000). Cultural differences in the display of emotion. *Dissertation Abstracts International*, 60, 3623. (UMI No. AEH9936802)
- Soto, J. A., Levenson, R. W., & Ebling, R. (2005). Cultures of moderation and expression: Emotional experience, behavior, and physiology in Chinese Americans and Mexican Americans. *Emotion*, 5, 154–165.
- Suinn, R. M., Rickard-Figueroa, K., Lew, S., & Vigil, P. (1987). The Suinn–Lew Asian Self-Identity Acculturation Scale: An initial report. *Educational and Psychological Measurement*, 47, 401–407.
- Szapocznik, J., Scopeta, M. A., Kurtines, W., & de los Angeles Aranalde, M. D. (1978). Theory and measurement of acculturation. *Revista Interamericana de Psicología*, 12, 113–130.
- Tajfel, H. (1982). Social psychology of intergroup relations. *Annual Review of Psychology*, 33, 1–39.
- Thibault, P., Bourgeois, P., & Hess, U. (in press). The effect of group-identification on emotion recognition: The case of cats and basketball players. *Journal of Experimental Social Psychology*.
- Tsai, J. L. (1996). *Cultural and contextual influences on the emotional responding of Chinese American and European American couples during conflict*. (Doctoral dissertation, University of California, Berkeley, 1996). *Dissertation Abstracts International*, 58, 1026.
- Tsai, J. L., Chentsova-Dutton, Y., Freire-Bebeau, L., & Przymus, D. (2002). Emotional expression and physiology in European Americans and Hmong Americans. *Emotion*, 2, 380–397.
- Tsai, J. L., & Levenson, R. W. (1997). Cultural influences on emotional responding: Chinese American and European American dating couples during interpersonal conflict. *Journal of Cross-Cultural Psychology*, 28, 600–625.
- Vrana, S. R., & Rollock, D. (1996). The social context of emotion: Effects of ethnicity and authority/peer status on the emotional reports of African American college students. *Personality and Social Psychology Bulletin*, 22, 296–305.
- Vrana, S. R., & Rollock, D. (1998). Physiological response to a minimal social encounter: Effects of gender, ethnicity, and social context. *Psychophysiology*, 35, 462–469.
- Vrana, S. R., & Rollock, D. (2002). The role of ethnicity, gender, emotional content, and contextual differences in physiological, expressive, and self-reported emotional responses to imagery. *Cognition and Emotion*, 16, 165–192.
- Waldinger, R. J., Schulz, M., Hauser, S., Allen, J., & Crowell, J. (2004). Reading others' emotions: The role of intuitive judgments in predicting marital satisfaction, quality, and stability. *Journal of Family Psychology*, 18, 58–71.

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