

# Self-Focused Attention and Emotional Reactivity: The Role of Culture

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Research conducted with European Americans suggests that attention to the individual self intensifies emotional reactivity. We propose, however, that cultural models of the self determine which aspect of the self (individual vs. relational), when attended to, intensifies emotional reactivity. In 3 studies, we predicted and observed that attention to individual aspects of the self was associated with levels of emotional reactivity that were greater in individuals from European American contexts (which promote an independent model of the self) than in individuals from Asian American contexts (which promote an interdependent model of the self). In contrast, attention to relational aspects of the self was associated with levels of emotional reactivity that were similar or greater in individuals from Asian American than in individuals from European American contexts. These findings highlight the importance of considering cultural and situational factors when examining links between the self and emotion.

*Keywords:* emotional reactivity, culture, Asian Americans, expression norms, self-focus

What happens when you notice your reflection in a shop window or describe yourself on a job application? How do these moments of self-awareness influence your emotional state? Research suggests that these actions draw attention to the self and consequently intensify people's emotional reactions to coincident or subsequent stimuli, in particular those that elicit negative emotions such as sadness or interpersonal disgust (e.g., Mor & Winquist, 2002; Scheier & Carver, 1977; Scheier, Carver, & Gibbons, 1979; but also see Duval, Silvia, & Lalwani, 2001). For example, in a classic study conducted in the United States, an interviewer gave participants either favorable or unfavorable feedback about their personalities (Fenigstein, 1979). Participants who received this feedback in the presence of a cue that drew attention to the self (i.e., a mirror positioned above the interviewer) reported experiencing more-intense emotion than did those who received the same feedback in the absence of this cue. The effect of the cue, however, was greater in response to the unfavorable (vs. the favorable)

feedback, suggesting that focusing on the self has a particularly strong effect on negative emotion. These findings illustrate the intimate connection between the self and emotion.

One important question, however, is whether this relationship holds in cultural contexts that promote different views of the self. Despite significant research demonstrating that models of the self vary significantly across cultures (Kashima et al., 1995; Markus & Kitayama, 1991; Singelis & Sharkey, 1995), most studies examining the links between self-focused attention and emotional reactivity have been conducted on European American samples. These individuals live in a culture that promotes an independent model of the self, or one that emphasizes the uniqueness of each individual and the importance of individual aspects of the self, such as personal goals, values, and preferences. No studies of self-focus and emotions have included individuals from contexts that promote an interdependent model of the self, in other words, one that emphasizes the continuity between the individual self and others and the importance of relational aspects of the self, such as others' needs and preferences. In three studies, we examine cultural<sup>1</sup> differences in the effects of attending to individual versus relational aspects of the self on emotional reactivity.

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## The Emotion Association Hypothesis

Several mechanisms have been proposed to account for the effects of self-focused attention on positive and negative emotional reactivity. Initially, researchers argued that self-focused attention increased awareness and salience of one's positive and negative emotional states (Scheier, 1976; Scheier & Carver, 1977). More recently, others have argued that attention to the self triggers concern with relevant environmental standards and expectations for one's behavior, such as experimenter demand (Silvia, 2002a) or standards regarding emotionality (Silvia, 2002b). Consequently,

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<sup>1</sup> The term *culture* in this article is used to refer to widely shared systems of ideas, values, symbols, and behavioral customs shared by members of a particular culture (Betancourt & Lopez, 1993).

self-focus may motivate people to comply with standards and expectations, especially when those standards and expectations are within reach (Duval et al., 2001; Duval & Wicklund, 1972; Scheier & Carver, 1983).

Another possibility, however, is that self-focused attention influences emotional reactivity by priming chronically accessible concepts of emotion. Because representations of the self and emotions are repeatedly coactivated (Beck, 1967; Higgins, 1987), thinking about one's self may trigger thinking about one's feelings (see Smith & Neumann, 2005). When people think about themselves, they may think about times when they felt happy or sad, or about personal characteristics that involve emotion (e.g., "I am a cheerful person"). Indeed, studies have found that having depressed individuals think about themselves activates thoughts about their negative emotions (e.g., Pyszczynski & Greenberg, 1997). How might this occur? Previous research suggests that situational cues can direct attention to and activate chronically accessible constructs (Bargh, Lombardi, & Higgins, 1988; Fazio, 2001; Higgins & Brendl, 1995; also see Wheeler, DeMarree, & Petty, 2007, for a review), which in turn influence the processing of subsequent stimuli (e.g., Anderson, 1983; Bargh & Thein, 1985; Fazio, 1986; Higgins, King, & Mavin, 1982). In the case of emotion, situational cues that draw attention to the self may activate chronically accessible associations between the self and emotion. This activation may prepare individuals to detect, recognize, attend to, and process emotional stimuli as well as changes in their emotional states (see Feldman Barrett, 2006; Lambie & Marcel, 2002, for the importance of these processes to the experience of emotion).

### The Role of Culture

The chronically accessible associations between the self and emotion, however, vary across cultures. Although the self encompasses both individual (e.g., traits and individual goals) and relational (e.g., one's identity as a family member) aspects across cultures, cultures differ in the extent to which they emphasize these aspects of the self. For example, as described above, Western (particularly North American) cultural contexts foster an independent model of the self that is relatively bounded, unique, and autonomous from others. In contrast, East Asian cultural contexts foster an interdependent model of the self that emphasizes continuity between individuals and members of their ingroup, such as family members (Cousins, 1989; Fiske, Kitayama, Markus, & Nisbett, 1998; Heine, 2001; Kanagawa, Cross, & Markus, 2001).

These different models of the self are associated with different conceptions of emotion. Across cultures, most emotions are associated with both individual (e.g., thoughts of individual successes or failures) and relational (e.g., maintenance or loss of close relationships) antecedents and concerns (Gehm & Scherer, 1988; Lazarus, 1991). Only a handful of emotions (e.g., core disgust) are not strongly associated with thoughts about either the individual self or family relationships (e.g., Rozin, 2007). However, a growing body of literature suggests that the degree to which emotions are associated with individual versus relational concerns and antecedents varies across cultures. For example, East Asians are more likely to characterize emotions by their relational (vs. individual) features (Kitayama, Markus, & Kurokawa, 2000), associate emotions with relational (vs. individual) cues (Uchida, No-

rasakkunkit, & Kitayama, 2004), perceive emotions to be influenced by the relational context (Masuda et al., 2008), experience emotions in response to relational (vs. individual) concerns (Mesquita & Karasawa, 2002; Scherer, Matsumoto, Wallbott, & Kudoh, 1988; Suh, Diener, Oishi, & Triandis, 1998), and feel emotions for close others (Stipek, 1998) than are European Americans.

These data suggest that independent conceptions of the self and individual-oriented conceptions of emotion are more chronically accessible in Western than in East Asian cultures, whereas interdependent conceptions of the self and relationship-oriented conceptions of emotion are more chronically accessible in East Asian cultures than in Western cultures. Because the effects of chronically accessible constructs are particularly pronounced when situational cues activate these constructs (Bargh et al., 1988; Domke, Shah, & Wackman, 1998; Higgins & Brendl, 1995), we predict that situational cues will amplify emotional reactivity when they are consistent with dominant cultural models of the self. Thus, individual cues should be associated with higher levels of emotional reactivity for European Americans (individuals who have greater exposure to European American culture) than for Asian Americans (individuals who have greater exposure to East Asian culture). Similarly, relational cues should be associated with higher levels of emotional reactivity for Asian Americans than for European Americans. In contrast, situational cues that are not consistent with dominant cultural models of the self may compete for individuals' attention and dampen their emotional responses.

### The Present Research

We tested the emotion association hypothesis in three studies. In addition to their comparing groups of individuals exposed to cultures that emphasize different aspects of the self (European Americans and Asian Americans), these studies contribute to the extant literature on self-focused attention and emotional reactivity in several ways. First, whereas previous studies have focused on self-reports of emotions, these studies examine whether the emotion association hypothesis extends to other components of emotional reactivity (i.e., emotional facial behavior and physiological reactivity). Second, whereas previous studies used interpersonal tasks and images to elicit emotions, these studies examine whether the emotion association hypothesis holds for different types of positive and negative emotion elicitors (i.e., films and music). Finally, whereas previous studies examined only attention to the individual self, these studies explicitly compare the effects of attention to individual versus relational aspects of the self on emotional reactivity.

### Study 1

In Study 1, we manipulated attention to individual (thoughts of the self) versus relational (thoughts of family) aspects of the self and examined the effects of this manipulation on emotional reactivity to an amusing film clip for European Americans and Asian Americans. We used a positive emotional elicitor because prior research has documented pronounced cultural differences in the association of positive emotions, such as happiness, with individual and relational concerns (see Kitayama & Markus, 2000;

Uchida et al., 2004) and because less research has focused on the relationship between self-focused attention and positive emotion.

## Method

**Participants.** Thirty European American and 30 Asian American college students between the ages of 16 and 30 years were recruited through a psychology participant pool to participate in the study. Students received course credit for their participation. We used the following inclusion criteria: Asian American participants were required to (a) have been born and raised in the United States or in an East Asian country, (b) have parents who were born and raised in East Asian countries, and (c) report identifying with East Asian cultures (based on participants' open-ended description of their cultural identification). European American participants were required to (a) have been born and raised in the United States, (b) have parents who were born and raised in the United States, and (c) have ancestors of European descent. Nearly half (43.3%) of Asian American participants were born overseas; these individuals spent an average of 14.75 ( $SD = 6.66$ ) years in the United States. The rest of the sample was born and raised in the United States. Forty-five percent of Asian Americans were Chinese and Taiwanese, 38% were Korean, 14% were Vietnamese, and 3% were Japanese. Biracial individuals were not included in the study. There were no significant cultural group differences in gender composition or age (see Table 1 for demographic characteristics of the sample). Although European Americans reported higher levels of family socioeconomic status than did Asian Americans,  $F(1, 56) = 9.05$ ,  $p < .01$ ,  $h_p^2 = .14$ , controlling for this difference did not affect the results. All participants were proficient in English.

**Film-viewing task.** The amusing film clip was a slapstick comedy of an African American comedian describing his visit to the dentist. The film was selected and pretested for this study using the criteria outlined by Gross and Levenson (1995) with a separate pilot sample that included European Americans and Asian Americans. Pilot data ( $N = 67$ ) suggested that this film elicited moderate levels of positive emotions (an aggregate of amusement, excitement, and happiness;  $M = 3.78$ ,  $SD = 1.49$ , on a 9-point Likert

scale ranging from 0 [*not at all*] to 8 [*the most in my life*]) and did not elicit significant levels of other emotions (e.g., love, pride, surprise) or of thoughts of the self or family members for either European Americans or Asian Americans.

**Procedure.** Upon arrival at the laboratory, participants completed demographic questionnaires. They then rested and cleared their minds of "all thoughts, feelings and memories" while focusing on a blank screen with a fixation cross for 3 min. This rest period provided a baseline against which to compare the effects of the amusing film. Immediately afterward, participants reported how they felt during the rest period.

Participants were then randomly assigned to one of two conditions. In the individual cue condition, they were asked to think about themselves, write a few sentences describing their personality, and list four recent events in their lives. In the family cue condition, they were asked to think of a family member, write a few sentences describing that family member's personality, and list four recent events in that family member's life.<sup>2</sup> This task was based on individual/relational priming tasks used by Trafimow, Triandis, and Goto (1991) and Pyszczynski, Hamilton, Herring, and Greenberg (1989). The experimenter left the room during this time to ensure that her presence did not make participants self-conscious, thereby increasing attention to the self (Carver & Scheier, 1978). Participants then viewed the amusing film clip. Immediately after the film clip, participants reported how they felt during the film. Finally, participants completed a measure of activation of individual and relational aspects of the self as a manipulation check. All instructions appeared on the television screen; during the rest and film periods, we videorecorded participants' facial behavior.

**Measures.** The following measures were used in Study 1:

**Emotional facial behavior.** Facial behavior was assessed with Ekman and Friesen's (1978) Facial Action Coding System (FACS). FACS identifies visually distinguishable and anatomically based units of facial muscle movements (action units, or AUs). Scoring involves identifying AUs that are associated with emotional facial expressions. A primary certified FACS coder, who was blind to the films that participants were watching, scored the frequency of the target AUs that occurred during baseline and during the film. The specific AUs that were coded included markers of social smiling ("non-Duchenne" smiles [AU 12]), markers of felt enjoyment (also known as "Duchenne" smiles [AUs 6 and 12]), and instances of laughter. These behavioral units were selected because they are associated with the expression of amusement (Ekman & Friesen, 1975). Interrater reliability was established using a second coder who was extensively trained to identify the target AUs. On the basis of standards set by Montgomery, Graham, Evans, and Fahey (2002), interrater reliability was substantial for non-Duchenne

Table 1  
Sample Characteristics for the Three Studies on Emotional Reactivity

Study and variable	European American	Asian American
Study 1		
Proportion female (%)	53.3	66.7
Mean age ( $SD$ ) in years	19.43 (1.44)	19.43 (2.58)
Household SES <sup>a</sup>	3.90* (0.55)	3.37* (0.85)
Study 2		
Proportion female (%)	50.90	67.40
Mean age ( $SD$ ) in years	20.87 (3.29)	21.52 (4.44)
Household SES <sup>a</sup>	3.74* (1.04)	3.00* (1.03)
Study 3		
Proportion female (%)	67.40	57.90
Mean age ( $SD$ ) in years	19.93 (1.50)	20.37 (2.45)
Household SES <sup>a</sup>	3.98* (0.61)	3.11* (0.88)

Note. SES = socioeconomic status.

<sup>a</sup> Measured on a 1–5 scale, with higher scores indicating higher SES levels (a score of 3 is equivalent to middle class household income).

\*  $p < .05$ .

<sup>2</sup> The content of the individual cue and family cue manipulations did not differ for European Americans and Asian Americans. Trained coders provided a qualitative judgment of the valence of the descriptions of personality and recent events that were generated by the participants. There were no significant main effects or interactions involving cultural group or condition in the valence of descriptions in Studies 1 and 3. In Study 2, participants in the neutral cue condition produced less positive descriptions than did participants in the individual cue and family cue conditions. Controlling for this difference did not affect the results.

smiles (*intraclass correlation* [ $ICC$ ] = .71), and high for Duchenne smiles ( $ICC$  = .94) and laughter ( $ICC$  = .97). Due to equipment failure, we could not code two participants' emotional facial behavior.

**Self-reports of emotion.** After the rest and film periods, participants completed a self-report inventory that asked them to indicate how intensely they experienced 23 emotions, using a 9-point Likert scale ranging from 0 (*not at all*) to 8 (*the most in my life*). We calculated the mean rating of the four terms for positive emotions (*amusement, happiness, interest, satisfaction*); the remaining emotion terms were fillers. The internal consistency of this aggregate was adequate for the baseline ( $\alpha$  = .80) and the film ( $\alpha$  = .84).

**Activation of individual and relational aspects of the self.** We administered, as a manipulation check, a modified version of the Self-Focus Sentence Completion Scale (SFSCS; Exner, 1973).<sup>3</sup> This measure has been widely used to assess attention to the individual aspects of the self (Carver & Scheier, 1978; Panayiotou & Vrana, 1998). In this study, we assessed spontaneous references to individual and familial aspects of the self.<sup>4</sup> The scale provides participants with sentence stems (e.g., "If only I could . . .") and instructs them to complete these stems in any way they choose.

Two trained coders used Exner's (1973) scoring criteria to determine whether responses fell in the individual or familial categories. For example, in response to "If only I could . . .," ". . . do what I want" was coded as an individual response and ". . . make my parents happy" was coded as a familial response. The number of individual and familial responses served as a measure of activation of individual and relational aspects of the self, respectively. Interrater reliability was high for individual ( $ICC$  = .87), and substantial for familial ( $ICC$  = .73) responses.

## Results

**Effectiveness of the attention manipulation task.** To examine whether the manipulation was successful, we conducted 2 (condition: individual cue, family cue)  $\times$  2 (cultural group: European American, Asian American) analyses of variance (ANOVAs) on individual and familial responses to the SFSCS. There was a significant main effect of cultural group,  $F(1, 56) = 6.00, p < .05, h_p^2 = .10$ , for familial responses: Across conditions, Asian Americans ( $M = 4.82, SD = 2.33$ ) were more likely to refer to their family members than were European Americans ( $M = 3.61, SD = 1.93$ ). Analyses also revealed a significant main effect of condition for individual responses,  $F(1, 56) = 5.63, p < .05, h_p^2 = .09$ : Across cultural groups, participants in the individual cue condition ( $M = 17.03, SD = 4.76$ ) provided more individual responses than did participants in the family cue condition ( $M = 13.70, SD = 6.05$ ). There was also a significant main effect of condition for familial responses,  $F(1, 56) = 14.81, p < .01, h_p^2 = .21$ : Across cultural groups, participants in the family cue condition ( $M = 3.27, SD = 1.87$ ) provided more familial responses than did participants in the individual cue condition ( $M = 5.17, SD = 2.13$ ). The Condition  $\times$  Cultural Group interaction, however, was not significant,  $F(1, 57) = 1.53, ns$ . These results suggest that across cultural groups, the manipulation was effective in

directing participants' attention to thoughts of themselves or their family members.

**Testing the emotion association hypothesis: Emotional reactivity to the amusing film.** To test the emotion association hypothesis, we conducted 2 (condition: individual cue, family cue)  $\times$  2 (cultural group: European American, Asian American) analyses of covariance (ANCOVAs) on self-reports of emotion and emotional facial behavior, controlling for baseline levels of these variables (see Table 2). Analyses yielded no significant main effects of condition for any measures of emotional reactivity ( $F$  values  $< 1.52, ns$ ). However, consistent with the emotion association hypothesis, there were significant Condition  $\times$  Cultural Group interactions for reports of positive emotions,  $F(1, 55) = 8.86, p < .01, h_p^2 = .14$ , and for the frequency of non-Duchenne smiles,  $F(1, 53) = 7.76, p < .01, h_p^2 = .13$  (see Table 2). Planned comparisons revealed that in the individual cue condition, European Americans reported experiencing significantly more-intense positive emotions ( $p = .02$ ) and showed marginally more non-Duchenne smiles ( $p = .07$ ) than did Asian Americans. In contrast, in the family cue condition, European Americans reported marginally less-intense emotions ( $p = .07$ ) and showed significantly fewer non-Duchenne smiles ( $p = .04$ ) than did Asian Americans. Contrary to the emotion association hypothesis, the Condition  $\times$  Cultural Group interaction was not significant for the frequency of Duchenne smiles or laughing ( $F$  values  $< 0.65, ns$ ).

## Discussion

This study provides the first experimental evidence that the effects of self-focused attention on emotional reactivity vary as a function of culture. Self-focused attention intensified emotional reactivity only when the aspect of the self that was attended to matched the culturally dominant model of the self (i.e., attention to individual aspects of the self for European Americans and attention to relational aspects of the self for Asian Americans). These findings are consistent with data suggesting that emotions are more individually embedded in mainstream European American cultural contexts and are more relationally embedded in East Asian cultural contexts.

Predicted differences in facial behavior emerged for non-Duchenne smiles (social smiles) but not for laughter or Duchenne smiles (felt smiles). Non-Duchenne smiles were emitted primarily between the comedian's jokes, when participants may have been recalling a previous joke or anticipating a future joke, whereas Duchenne smiles and laughter were emitted primarily directly in response to the comedian's jokes. Because recalled and anticipated positive emotions tap generalized beliefs about one's ability to experience these emotions (see Robinson & Kirkeby, 2005), it is possible that the observed differences reflect cultural differences in beliefs about one's positive emotions. Because social smiles are

<sup>3</sup> One of the original items was judged by the institutional review board to be too intrusive to be included in this study and was therefore omitted during administration.

<sup>4</sup> Pilot testing of European American ( $n = 124$ ) and Asian American ( $n = 50$ ) individuals revealed that European Americans are more likely to provide individual responses and less likely to provide family responses than are Asian Americans in the absence of focus of attention manipulation.

Table 2  
Means (and Standard Deviations) for Measures of Emotional Reactivity (Studies 1 and 2)

Study and variable	European American			Asian American		
	Individual	Family	Neutral	Individual	Family	Neutral
Study 1						
Report	4.73 (0.78) <sub>a</sub>	3.63 (1.04) <sub>b</sub>		3.60 (1.95) <sub>b</sub>	4.67 (1.22) <sub>b</sub>	
ND smile	10.21 (6.31) <sub>a,b</sub>	6.93 (5.34) <sub>a</sub>		6.79 (3.45) <sub>a</sub>	10.93 (5.23) <sub>b</sub>	
D smile	18.21 (7.05) <sub>a</sub>	13.13 (10.43) <sub>a</sub>		13.57 (11.24) <sub>a</sub>	12.07 (8.21) <sub>a</sub>	
Laughter	11.36 (14.24) <sub>a</sub>	4.73 (8.27) <sub>a</sub>		10.93 (12.80) <sub>a</sub>	8.33 (7.22) <sub>a</sub>	
Study 2						
Report	4.80 (0.90) <sub>a</sub>	3.33 (1.42) <sub>b</sub>	4.46 (1.76) <sub>a</sub>	3.85 (1.69) <sub>b</sub>	4.93 (1.55) <sub>a</sub>	4.14 (1.88) <sub>a,b</sub>

Note. Means with different subscripts are different at  $p < .05$ . Report = self-report of positive emotions; ND smile = non-Duchenne smile; D smile = Duchenne smile.

under greater voluntary control than are felt smiles, it is also possible that they are more culturally or situationally malleable than felt smiles.

Despite its strengths, the study had a number of limitations. First, we used a film clip featuring a comedian to elicit amusement. Because attention to individual cues can enhance one's ability to take the perspective of others (Stephenson & Wicklund, 1983), it is possible that observed differences in emotional reactivity were caused by different levels of engagement and identification with the comedian. Second, because there was not a neutral condition, it was unclear whether the observed group differences were due to the individual or the family cues. Finally, this study did not directly examine whether cultural differences in emotion associations mediated cultural differences in emotional reactivity.

## Study 2

As in Study 1, in Study 2 we tested the emotion association hypothesis by assessing the emotional reactivity of European Americans and Asian Americans in the individual and family cue conditions. In addition, in Study 2 we addressed the limitations of Study 1 by eliciting positive emotion through music, adding a neutral cue condition, and assessing the degree to which participants' emotion associations were individually versus relationally oriented.

## Method

**Participants.** Fifty-two European American and 46 Asian American adults between the ages of 18 and 37 years participated in the study. Participants were recruited through the psychology participant pool and through community advertisements, and they received either course credit or a small monetary compensation for their participation. Inclusion criteria were identical to those used in Study 1. More than half (65.20%) of Asian Americans were born overseas; these individuals had spent an average of 9.02 ( $SD = 7.06$ ) years in the United States. Sixty-two percent of Asian Americans were Chinese and Taiwanese, 17.8% were Korean, 15.6% were Vietnamese, and 4.4% were Japanese. There were no significant cultural group differences in gender composition or age (see Table 1). European Americans reported higher levels of family socioeconomic status than did Asian Americans,  $F(1, 92) =$

11.77,  $p < .01$ ,  $h_p^2 = .11$ ; however, controlling for this difference did not affect the results.

**Music-listening task.** Participants listened to a 2-min pleasant musical clip in a room by themselves and then rated how they had felt while listening to it. The clip was a selection from David Byrne's *Beleza Tropical: Brazil Classics 1*. This clip has been used to elicit a pleasant mood in prior studies (Erber, Wegner, & Thierrault, 1996; Green & Sedikides, 1999). Pilot testing revealed that this clip elicited moderate levels of excitement, happiness, and pleasant feelings (aggregate  $M = 4.83$ ,  $SD = 1.67$ , on a 0–8 Likert scale) in a culturally diverse sample ( $N = 20$ ).

**Procedure.** The procedure was similar to that in Study 1. Participants came in for a study of music perception. Upon arrival at the laboratory, they rested for 3 min. Participants were then randomly assigned to one of three conditions. The individual cue and family cue conditions were identical to those used in Study 1. In the neutral cue condition, participants were asked to write about the path from their home to the post office. Pilot testing ( $N = 17$ ) indicated that this task did not activate individuals' thoughts of themselves or their family members and was emotionally neutral.

**Measures.** The following measures were used in Study 2:

**Emotional facial behavior.** As in Study 1, we videotaped participants' facial behavior; unfortunately, because most participants spontaneously looked downward while listening to the music, we were unable to code their facial behavior.

**Self-reports of emotion.** After the rest period and music task, participants rated how intensely they experienced 16 emotions using a 9-point Likert scale. The inventory included the terms *excitement*, *happiness*, and *pleasure*; ratings of these items were averaged to calculate a positive emotion aggregate (internal consistency of the aggregate was adequate during baseline [ $\alpha = .72$ ] and the pleasant music clip [ $\alpha = .88$ ]). The remaining emotion terms were fillers.

**Activation of individual and relational aspects of the self.** As in Study 1, we administered the SFSCS as a manipulation check. Two trained research assistants coded the responses. Interrater reliability was substantial for individual ( $ICC = .78$ ) and familial ( $ICC = .80$ ) responses.

**Emotion associations.** To assess the degree to which participants endorsed individual and relational associations with emotional words, we used a procedure developed by Szalay and Deese (1978). This procedure has been used to study meanings of emo-

tion words across cultures (Kim & Hupka, 2002). Participants generated up to 10 associations to several emotion words, including *happiness* (associations with sadness, anger, suffering, and pity were assessed for another, unrelated study). Participants were encouraged to list the associations that first came to mind and to stop when they had listed 10 associations or felt that they could not generate any more with ease. Participants' responses were coded by trained research assistants for references to the individual self (e.g., "Me!" and "The joy in my life") and to family members (e.g., "Spending time with my sister," "My family"). Two research assistants were reliable in their coding ( $ICC = 1.00$ ). Because responses were not normally distributed in this sample, we calculated binary scores indicating the presence or absence of individual and family associations.

## Results

**Effectiveness of attention manipulation task.** We conducted a 3 (condition: individual cue, family cue, neutral cue)  $\times$  2 (cultural group: European American, Asian American) ANOVA on individual and familial responses to the SFSCS. The main effect of condition was marginally significant for individual responses,  $F(2, 92) = 2.55, p = .08, h_p^2 = .05$ . Planned comparisons revealed that across cultures, participants in the individual cue condition ( $M = 9.90, SD = 3.48$ ) provided more individual responses than did participants in the family cue condition ( $M = 8.24, SD = 2.86, p < .05$ ); participants in the neutral cue condition fell in between the other two groups ( $M = 9.35, SD = 3.14$ ). The main effect of condition was also significant for familial responses,  $F(2, 93) = 11.76, p < .01, h_p^2 = .20$ . Across cultural groups, participants in the family cue condition ( $M = 1.73, SD = 1.08$ ) provided more familial responses than did participants in the individual cue condition ( $M = 0.72, SD = 1.03, p < .01$ ) or the neutral cue condition ( $M = 0.67, SD = 1.00, p < .01$ ). Thus, the manipulation was effective in directing participants' attention to individual versus relational aspects of the self.

**Cultural differences in emotion associations.** To assess whether there were cultural differences in the degree to which European Americans and Asian Americans endorsed individual and familial associations with the concept of happiness, we conducted chi-square analyses. Although European Americans (35.8%) and Asian Americans (32.6%) did not differ in the likelihood of producing individual associations,  $\chi^2(1, N = 98) = 0.12, ns$ , European Americans (39.1%) were significantly less likely to produce familial associations for the word *happiness* than were Asian Americans (60.9%),  $\chi^2(1, N = 98) = 4.10, p < .05$ .

**Testing the emotion association hypothesis: Emotional reactivity to pleasant music.** We conducted a 3 (condition: individual cue, family cue, neutral cue)  $\times$  2 (cultural group: European American, Asian American) ANCOVA on self-reports of positive emotion, controlling for baseline levels of this variable (see Table 2). Consistent with the results in Study 1, the main effects of condition and cultural group ( $F$  values  $< 0.17, ns$ ) were not significant; however, the Condition  $\times$  Cultural Group interaction was,  $F(2, 92) = 7.21, p < .01, h_p^2 = .14$ . Planned comparisons revealed that, consistent with the emotion association hypothesis, European Americans reported more-intense positive emotion in the individual cue condition ( $p < .05$ ) and less-intense positive emotion in the family cue condition ( $p < .01$ ) compared with the

positive emotions reported by Asian Americans. The two cultural groups did not differ in the neutral cue condition ( $p = .66$ ).

**Are differences in emotional reactivity mediated by emotion associations?** To test whether the cultural differences in emotional reactivity in response to the individual and familial cues were due to cultural differences in emotion associations, we conducted mediational analyses using the bootstrap method (Shrout & Bolger, 2002). Analyses revealed that in the individual cue condition, individual or family associations with the concept of happiness were not predictive of self-reports of positive emotion (absolute  $B$  values  $< 0.09, ns$ ) and, therefore, did not mediate the effect of cultural group on self-reports of positive emotions. In the family cue condition, however, the presence of family associations partially mediated cultural differences in self-reports of positive emotion. Mediation was demonstrated by significant relationships between (a) cultural group and self-reports of positive emotion ( $B = 1.20, SE B = 0.52, \beta = .70, t(38) = 2.32, p < .05$ ); (b) cultural group and the presence of family associations ( $B = 0.33, SE B = 0.15, \beta = .33, t(38) = 2.14, p < .05$ ); (c) the presence of family associations and self-reports of positive emotion ( $B = 1.69, SE B = 0.48, \beta = .99, t(38) = 3.50, p = .01$ ); and (d) a significant indirect effect of cultural group on self-reports of positive emotions via the family associations (indirect effect  $B = 0.33, SE B = 0.03, \beta = .33$ , bootstrap 95% confidence interval based on 1,000 resamples = 0.03–1.17, effect proportion mediated  $P_m = .47$ ). Thus, consistent with the emotion association hypothesis, cultural group differences in the family cue condition were partly due to associations between happiness and thoughts of family members.

## Discussion

Findings from this study provide additional support for the emotion association hypothesis: Thinking about chronically accessible aspects of the self (individually focused for European Americans, relationally focused for Asian Americans) increased participants' self-reports of positive emotion in response to pleasant music. Self-reports of positive emotions did not differ across cultural groups when participants thought about a neutral cue, suggesting that these cultural differences were due to specific situational cues involving the self.

Consistent with the emotion association hypothesis, individual differences in the tendency to associate the construct of happiness with thoughts of family members partially accounted for cultural differences in self-reports of positive emotion in the family cue condition. Contrary to the emotion association hypothesis, however, European Americans and Asian Americans in this study did not differ in the number of the individual associations with the concept of happiness, perhaps because both groups were oriented to American culture. Despite this, we did observe cultural group differences in self-reports of emotion in the individual cue condition. One reason may be that the measure we used did not adequately capture participants' individual associations. Although the family associations tended to be specific in nature (e.g., "family vacations"), individual responses were more vague. Moreover, many responses provided by European Americans may have been individually oriented but were not specific enough to be coded as such (e.g., "free time," "relaxing"). Therefore, in the next study, we encouraged participants to describe their associations in greater detail.

Although Study 2 addressed the limitations of Study 1, a number of questions remained unanswered. First, because Studies 1 and 2 focused on positive emotion, it remained unclear whether the emotion association hypothesis holds for negative emotions that are associated with thoughts of the self and others. Second, both self-reports of emotion and emotional facial behavior are under some voluntary control; it would be important to assess whether the emotion association hypothesis holds for components of emotional reactivity that are under less voluntary control (e.g., physiological reactivity).

### Study 3

To address the limitations of Studies 1 and 2, we conducted a final study. In Study 3, we tested the emotion association hypothesis for negative emotions. To identify the boundary conditions for the effects of self-focused attention on emotional reactivity, we sampled negative emotions that typically involve (i.e., sadness) or do not involve (i.e., core disgust) the individual or relational self (Keltner & Haidt, 2001; Lazarus, 1991; Scherer et al., 1988). Core disgust is an emotional reaction to body products or potentially contaminated food and therefore differs from interpersonal disgust, which is an emotional reaction to the presence or actions of other people (Rozin, 2007). Although Scheier and Carver (1977) examined interpersonal disgust elicited by photographs of victims of atrocities, to our knowledge no previous studies of self-focused attention have examined core disgust. We expected that attention to dominant aspects of the self would affect responses to stimuli that elicited sadness but not to those that elicited core disgust. We also obtained cardiac, electrodermal, and respiratory measures to examine whether the emotion association hypothesis generalized to physiological responses, which are under less voluntary control than are self-reports of emotion or emotional facial behavior.

### Method

**Participants.** Forty European American and 24 Asian American adults between the ages of 18 and 27 years participated in the study. They either received course credit or a small monetary compensation for their participation. Inclusion criteria were identical to those used in Studies 1 and 2. About half of the Asian Americans (47.8%) were born overseas; these individuals had spent an average of 7.11 ( $SD = 6.73$ ) years in the United States. Fifty-four percent of Asian Americans were Chinese and Taiwanese, 41.7% were Korean, and 4.2% were Japanese. There were no significant cultural group differences in gender composition or age (see Table 1). European Americans reported higher levels of family socioeconomic status than did Asian Americans,  $F(1, 58) = 20.32, p < .01, \eta_p^2 = .26$ ; however, controlling for this difference did not affect the results.

**Film-viewing task.** Participants viewed four films. The neutral film clip was always presented first, followed by the amusing, sad, and disgusting film clips, presented in random order to minimize fatigue and carryover effects. The neutral film clip portrayed a nature scene (Rottenberg, Ray, & Gross, 2007) and was used to acclimate participants to the laboratory setting. The amusing film clip was the same clip used in Study 1. The sad film clip was from *My Girl* and portrayed a young girl crying over her friend's death. We used this clip rather than others that have been widely used in

previous research (e.g., a clip from *The Champ*) because we did not want to use a clip that involved familial relationships. The sad film clip was pretested using the criteria outlined by Gross and Levenson (1995) and elicited reports of moderate levels of sadness (i.e., sadness and gloominess,  $\alpha = .82$ ) in a pilot sample ( $N = 27$ , aggregate  $M = 4.03, SD = 1.82$ , on a 0–8 Likert scale). The clip did not elicit other positive or negative emotions or thoughts of the individual self or of family members. The disgusting film clip was from *Trainspotting* and portrayed a young man using a dirty toilet. This clip has effectively elicited core disgust in prior research (Schnall, Haidt, Clore, & Jordan, 2008). All films were approximately 2 min long and were presented in English.

**Procedure.** Upon arrival at the laboratory, participants were informed by the experimenter that they were going to watch several film clips, that they would be videotaped, and that their physiological responses would be monitored. Physiological sensors were attached to participants' hands and torso. Once the sensors were attached, the procedure for this study was identical to the one employed in Study 1, including the rest period (baseline), random assignment to the individual or family cue condition, and the film-viewing task. Because the manipulation was effective in Studies 1 and 2, we did not assess its effectiveness in Study 3.

**Measures.** The following measures were used in Study 3:

**Emotional facial behavior.** Facial expressive behavior was coded using the Noldus FaceReader software (den Uyl & van Kuilenburg, 2005; Truong, van Leeuwen, & Neerinx, 2007). This software significantly reduces the time and labor needed for behavioral coding without compromising the quality of behavioral data. It uses face models synthesized from facial emotional behavior prototypes (Ekman & Friesen, 1975) of European Americans and Asian Americans. FaceReader identifies facial features of participants in digital video files and uses locations of 55 key points and the texture of the face to monitor intensity of emotional expressions, including positive emotional states, sadness, and disgust. This software has shown high convergent validity with ratings made by human FACS experts (den Uyl & van Kuilenburg, 2005; Noldus Information Technologies, 2008). One limitation, however, is that FaceReader does not distinguish between Duchenne and non-Duchenne smiles when coding positive facial behavior. As is the case with human FACS coders, FaceReader cannot assess participants' facial expressions when significant parts of their faces are obstructed (e.g., when a participant touches or covers her face with a hand or lowers her head) or when the video image has low contrast due to lighting or to participants' skin tone. Thus, in cases in which participants obstructed the view of their faces, FaceReader could not successfully code their facial expressions. As a result, the sample size for facial behavior data was smaller than that for self-reports of emotion.

**Self-reports of emotion.** The self-report inventory was similar to the one used in Studies 1 and 2 but included 24 emotion terms, including *amusement, happiness, interest, satisfaction, sadness, gloominess, and disgust*; the remaining emotion terms served as fillers. The inventory was administered after baseline and after each film. We calculated a positive emotion aggregate (i.e., mean rating of *amusement, happiness, satisfaction*) for the amusing film and a sadness aggregate (i.e., mean rating of *sadness, gloominess*) for the sad film. Internal consistency of these aggregates was substantial for the baseline ( $\alpha = .74$  and  $.89$ , respectively) and for

the target films ( $\alpha = .81$  and  $.82$ , respectively). For the disgusting film clip, a single-item rating of disgust was used.

**Physiological measures.** A system consisting of a computer, Acqknowledge 3.9.1 software (Biopac Systems, 2009), and bio-amplifiers (Biopac Systems) was used to obtain continuous recording of participants' physiological reactivity. We sampled the cardiac (heart rate), electrodermal (skin conductance level), and respiratory (respiratory rate) systems because they are important aspects of emotional reactivity (Boiten, Frijda, & Wientjes, 1994; Levenson, 2003) and because they have been previously used to assess emotional reactivity in European American and Asian American samples (Frazier, Strauss, & Steinhauer, 2004; Tsai & Levenson, 1997; Tsai, Levenson, & Carstensen, 2000; Tsai, Levenson, & McCoy, 2006).

To measure heart rate, electrodes were placed in a bipolar configuration on opposite sides of the chest. Heart rate was measured in beats per minute. To measure skin conductance level, a constant-voltage device passed a small voltage between electrodes attached to the palmar surface of the middle phalanges of the first and third fingers of the nondominant hand. Skin conductance level was measured in microsiemens. To measure respiratory rate, a respiration belt was placed around the upper torso. Respiratory rate was measured in respirations per minute. Higher levels of heart rate, skin conductance level, and respiratory rate indicate higher levels of physiological reactivity. Acknowledge software extracted raw data and produced wave-form transformations, peak detection, and graphic display for each channel. Trained research assistants removed movement artifacts and calculated period averages for the baseline and for each film. We could not use participants' data that contained substantial movement artifacts or poor signal-to-noise ratio, and therefore, the sample size for analyses of physiological responses was smaller than that for self-reports of emotion.

**Emotion associations.** We used the same procedure as in Study 2 to assess individual and family associations with the emotions happiness, sadness, and disgust. Two research assistants were reliable in their coding of emotion associations ( $ICC = 1.00$ ).

## Results

**Cultural differences in emotion associations.** A chi-square analysis conducted on participants' responses to the emotion association task revealed that European Americans (55.0%) were more likely than Asian Americans (29.2%) to produce individual associations for the word *happiness*,  $\chi^2(1, N = 64) = 4.04, p < .05$ . However, contrary to our expectations and results of Study 2, European Americans (67.5%) and Asian Americans (70.8%) in this sample did not differ in the likelihood of producing family associations for *happiness*,  $\chi^2(1, N = 64) = 0.08, ns$ . There were also no significant cultural group differences in the likelihood of individual (*sadness*—European American: 20%; Asian American: 37.5%; *disgust*—European American: 12.2%; Asian American: 17.4%) or family (*sadness*—European American: 24.4%; Asian American: 33.3%; *disgust*—European American: 2.4%; Asian American: 4.3%) associations with the emotions sadness or disgust ( $\chi^2$  values  $< 2.37, ns$ ). As expected, thoughts of disgust were not commonly associated with thoughts of the individual self or family members. Although sadness was more commonly associated with these concerns, European Americans and Asian Americans in this sample did not differ in their associations. We predicted that, on

the basis of these findings, cultural differences in emotional reactivity would be most pronounced in the individual cue condition during the amusing film clip.

**Testing the emotion association hypothesis: Emotional reactivity to positive and negative emotional films.**

**Amusing film.** We conducted 2 (condition: individual cue, family cue)  $\times$  2 (cultural group: European American, Asian American) ANCOVAs for self-reports of emotion, emotional facial behavior, and physiological measures, controlling for baseline levels of these variables. Analyses revealed a significant main effect of cultural group for self-reports of positive emotion,  $F(1, 59) = 6.79, p < .01, h_p^2 = .10$ , and skin conductance levels,  $F(1, 58) = 9.11, p < .01, h_p^2 = .14$ , with European Americans reporting more-intense positive emotions and showing higher levels of electrodermal activity than did Asian Americans. However, the main effect of cultural group was not significant for the other measures of emotional reactivity ( $F$  values  $< 0.88, ns$ ). Moreover, the main effect of condition was not significant for any measures of emotional reactivity ( $F$  values  $< 2.71, ns$ ).

Consistent with the emotion association hypothesis, however, the Cultural Group  $\times$  Condition interactions were significant for self-reports of positive emotion,  $F(1, 59) = 10.74, p < .01, h_p^2 = .15$ ; positive facial behavior,  $F(1, 46) = 4.16, p < .05, h_p^2 = .08$ ; and heart rate,  $F(1, 50) = 5.37, p < .05, h_p^2 = .10$  (see Table 3). Planned comparisons revealed that in the individual cue condition, European Americans reported more-intense positive emotions ( $p < .01$ ) and showed marginally more-intense positive facial behavior ( $p = .09$ ) and higher heart rate levels ( $p < .05$ ) than did Asian Americans. In contrast, in the family cue condition, European Americans and Asian Americans did not significantly differ for any of these measures ( $p$  values  $> .25$ ). Contrary to the emotion association hypothesis, the Condition  $\times$  Cultural Group interaction was not significant for skin conductance level or respiratory rate ( $F$  values  $< 1.10, ns$ ).

In sum, findings for the individual cue condition during the amusing film were consistent with the emotion association hypothesis. There were no cultural differences in family associations for the concept of happiness; hence, it was not surprising that we did not observe cultural differences in positive emotional reactivity in the family cue condition.

**Sad film.** Analyses revealed significant main effects of cultural group in sad facial behavior,  $F(1, 46) = 10.01, p < .01, h_p^2 = .18$ , and skin conductance levels,  $F(1, 58) = 5.05, p < .05, h_p^2 = .08$ , with Asian Americans showing more-intense sad facial behavior but less intense electrodermal activity than did European Americans. There were no significant main effects of cultural group for self-reports of emotion, heart rate, or respiratory rate ( $F$  values  $< 3.49, ns$ ). Analyses also revealed no significant main effects of condition for any component of emotional reactivity to the sad film ( $F$  values  $< 2.65, ns$ ).

Consistent with the emotion association hypothesis, the Cultural Group  $\times$  Condition interaction was significant for self-reports of sadness,  $F(1, 59) = 4.57, p < .05, h_p^2 = .07$  (see Table 3). Planned comparisons revealed that European Americans reported more-intense sadness ( $p < .01$ ) than did Asian Americans in the individual cue condition; however, European Americans and Asian Americans did not differ in self-reports of sadness ( $p = .83$ ) in the family cue condition. The interaction was not significant for sad

Table 3  
Means (and Standard Deviations) for Measures of Emotional Reactivity (Study 3)

Film type and measure	European American		Asian American	
	Individual cue	Family cue	Individual cue	Family cue
<b>Amusing film</b>				
Report	4.85 (0.87) <sub>a</sub>	3.29 (1.34) <sub>b</sub>	3.06 (1.75) <sub>b</sub>	3.28 (1.46) <sub>b</sub>
Facial behavior	0.26 (0.15) <sub>a</sub>	0.11 (0.13) <sub>b</sub>	0.12 (0.23) <sub>a,b</sub>	0.20 (0.32) <sub>a,b</sub>
Heart rate	74.62 (9.01) <sub>a</sub>	72.37 (12.21) <sub>a,b</sub>	71.05 (7.16) <sub>b</sub>	72.90 (10.92) <sub>a,b</sub>
Skin conductance level	2.33 (1.63) <sub>a,b</sub>	2.87 (2.49) <sub>a</sub>	2.18 (1.55) <sub>a,b</sub>	1.09 (0.90) <sub>b</sub>
Respiratory rate	13.61 (2.03) <sub>a</sub>	15.50 (2.18) <sub>b</sub>	14.24 (3.19) <sub>a,b</sub>	14.63 (2.83) <sub>a,b</sub>
<b>Sad film</b>				
Report	5.03 (1.18) <sub>a</sub>	3.48 (1.76) <sub>b</sub>	3.42 (2.35) <sub>b</sub>	3.58 (2.20) <sub>b</sub>
Facial behavior	0.02 (0.04) <sub>a</sub>	0.02 (0.03) <sub>a</sub>	0.14 (0.17) <sub>a</sub>	0.25 (0.26) <sub>b</sub>
Heart rate	71.45 (9.93) <sub>a</sub>	69.63 (11.75) <sub>a</sub>	71.73 (7.57) <sub>a</sub>	70.54 (10.94) <sub>a</sub>
Skin conductance level	2.42 (1.84) <sub>a,b</sub>	2.84 (1.53) <sub>a</sub>	2.16 (1.53) <sub>a,b</sub>	1.23 (0.95) <sub>b</sub>
Respiratory rate	15.64 (2.25) <sub>a</sub>	16.04 (2.34) <sub>a</sub>	15.26 (3.09) <sub>a</sub>	15.55 (2.88) <sub>a</sub>
<b>Disgusting film</b>				
Report	6.33 (1.03) <sub>a</sub>	5.23 (2.14) <sub>b</sub>	5.92 (2.11) <sub>a,b</sub>	6.08 (1.51) <sub>a,b</sub>
Facial behavior	0.22 (0.14) <sub>a</sub>	0.33 (0.23) <sub>a,b</sub>	0.61 (0.26) <sub>b</sub>	0.64 (0.29) <sub>b</sub>
Heart rate	76.56 (13.10) <sub>a</sub>	70.96 (12.70) <sub>b</sub>	70.38 (6.91) <sub>b</sub>	69.78 (12.27) <sub>b</sub>
Skin conductance level	2.41 (1.88) <sub>a,b</sub>	2.95 (2.68) <sub>a</sub>	2.41 (2.05) <sub>a,b</sub>	1.04 (0.91) <sub>b</sub>
Respiratory rate	14.86 (2.35) <sub>a</sub>	15.90 (1.67) <sub>a</sub>	15.10 (3.39) <sub>a</sub>	15.25 (1.92) <sub>a</sub>

Note. Means with different subscripts are different at  $p < .05$ . Report = self-report of emotions.

facial behavior, heart rate, skin conductance level, or respiratory rate ( $F$  values  $< 2.92$ ,  $ns$ ).

**Disgusting film.** There were significant main effects of cultural group for facial behavior,  $F(1, 46) = 8.74$ ,  $p < .01$ ,  $h_p^2 = .16$ , and skin conductance level,  $F(1, 58) = 6.21$ ,  $p < .05$ ,  $h_p^2 = .10$ , with Asian Americans showing more-intense expressions of disgust and lower levels of electrodermal activity than did European Americans. However, there were no significant main effects of cultural group for self-reports of disgust, heart rate, or respiration rate ( $F$  values  $< 1.34$ ,  $ns$ ). There were also no significant main effects of condition ( $F$  values  $< 1.47$ ,  $ns$ ) and no significant Cultural Group  $\times$  Condition interactions ( $F$  values  $< 2.24$ ,  $ns$ ) for any of the components of emotional reactivity.

**Are differences in emotional reactivity due to emotion associations?** We conducted mediation analyses to assess whether individual emotion associations accounted for cultural group differences in emotional reactivity in response to the amusing film. Contrary to the emotion association hypothesis, individual emotion associations did not predict self-reports of positive emotions (absolute  $\beta$  values  $< .20$ , absolute  $t$  values  $< 1.38$ ,  $ns$ ) and, therefore, did not mediate the cultural differences in self-reports of positive emotion, positive facial behavior, or heart rate in the individual cue condition during the amusing film.

## Discussion

In line with the results of Studies 1 and 2, the results of Study 3 showed that the individual cue condition produced more-intense positive emotional reactivity for European Americans than for Asian Americans. The findings were consistent across different components of emotional reactivity: self-reports of positive emotion, facial behavior, and heart rate. Thus, the observed pattern of results cannot be attributed to a mere self-presentation strategy. Interestingly, the findings observed for heart rate did not hold for electrodermal reactivity and respiration. Relative to skin conduc-

tance level and respiratory rate, heart rate is an index of emotional reactivity that reflects parasympathetic activation and is less influenced by voluntary control (Cacioppo, Tassinary, & Berntson, 2007). Thus, it is possible that heart rate was more sensitive to automatic processes driven by parasympathetic activation.

Unlike the patterns observed in Studies 1 and 2, European American and Asian American participants in the family cue condition did not differ in their emotional reactivity in Study 3. This pattern may have reflected the lack of cultural group differences in familial associations with emotion for this sample of participants.

Although we observed that cultural group differences in emotional reactivity varied by condition for both amusing and sad films, the pattern was less pronounced for the latter. During the amusing film, cultural differences emerged in self-reports of positive emotion, facial behavior, and heart rate, whereas during the sad film, differences in the individual cue condition emerged in self-reports of sadness but not in facial behavior or physiological reactivity. In part, this may be due to the fact that although the sad film used in this study did not focus on family relationships, it was relational (death of a friend). Therefore, the film itself may have primed relational associations for both cultural groups. It is also possible that cultural differences in emotion associations are more pronounced for positive emotions relative to sadness. Indeed, much of the research examining cultural differences in concepts of emotions has focused on positive emotions (e.g., Suh et al., 1998; Uchida et al., 2004).

Consistent with our hypothesis, self-focused attention did not affect emotional reactivity to the film that elicited core disgust. As expected, few participants associated this type of disgust with thoughts of themselves or family members. These data are consistent with the idea that cultural differences in emotional reactivity under self-focusing conditions emerge in cases when culturally dominant aspects of the self are associated with the emotional

categories. Future research should systematically examine the effects of self-focused attention on emotional states that are more likely to be associated with the individual (e.g., pride) versus relational (e.g., compassion) aspects of the self.

This study yielded, in addition to significant Cultural Group  $\times$  Condition interactions, cultural group differences in emotional reactivity to the amusing, sad, and disgusting films. European Americans and Asian Americans showed differences in their electrodermal and facial behavioral responses that were not qualified by self-focusing condition. Cultural differences in positive emotional reactivity have been observed in prior research (Tsai, Chentsova-Dutton, Freire-Bebeau, & Przymus, 2002) and are consistent with cultural norms regarding the experience and expression of positive emotions (Eid & Diener, 2001; Kotchemidova, 2005; Tsai, Knutson, & Fung, 2006; Wierzbicka, 1999). In contrast, cultural differences in disgust and sadness observed in this study (i.e., Asian Americans showing more-intense negative facial behavior and lower skin conductance in response to the sad and disgusting film clips than did European Americans) are novel and require further replication.

### General Discussion

Although many researchers have hypothesized that cultural differences in models of the self shape emotional reactivity (Heine, 2001; Markus & Kitayama, 1991), no studies have demonstrated this experimentally. The emotion association hypothesis predicts that because conceptions of emotions are part of the self-relevant behavioral and conceptual repertoire, activating culturally dominant aspects of the self should enhance emotional reactivity. Indeed, the present studies provide empirical support for this hypothesis. Moreover, we found this to be the case across different emotions (positive emotions and sadness), different types of emotional elicitors (films and music), and different components of emotional reactivity (self-reports of emotion, facial emotional behavior, and heart rate). If replicated, these findings have the potential to broaden our understanding of the effects of self-focused attention on emotion (Duval et al., 2001; Mor & Winquist, 2002) by highlighting the importance of cultural differences in dominant aspects of the self.

Consistent with the emotion association hypothesis, the tendency of individuals to associate emotions with thoughts of family members partially accounted for the observed cultural group differences in emotional reactivity in the family cue condition in Study 2. In Study 3, European American and Asian American participants did not differ in their tendency to associate thoughts of happiness and sadness with family members. Thus, in the family cue condition, they showed no cultural group differences in positive and negative emotional reactivity. Although Asian American participants' reports of familial associations with the word *happiness* were similar for Studies 2 and 3, European American participants in Study 3 were more likely to produce this type of association than were European Americans in Study 2. Consequently, there were no cultural differences in familial associations with the emotion happiness in Study 3. The sample in Study 3, unlike those in Studies 1 and 2, comprised students from a private Catholic university that prides itself on promoting relational interdependence. It is possible that this sample endorsed values that reduced

cultural differences in the tendency to associate emotions with relational aspects of the self.

Contrary to our expectations, the measure of individual emotion associations did not yield consistent cultural group differences in this study. Moreover, cultural differences in individual associations were not associated with corresponding cultural group differences in emotional reactivity in the individual cue condition. It is possible that the emotion association measure used in these studies does not adequately capture cultural differences in the extent to which emotions are associated with the individual aspects of the self. Despite our instructions in Study 3, participants' descriptions of individual emotional associations tended to be vague, and therefore, some individual associations may not have been scored as such. Therefore, although patterns of emotional reactivity were consistent with the emotion association hypothesis, further evidence is needed to demonstrate that individually oriented associations with emotion account for these findings.

### Limitations, Future Directions, and Implications

One limitation of our studies is our reliance on an explicit measure of emotional associations. Using explicit verbal descriptions to capture cultural differences raises a number of concerns (e.g., Matsumoto, 2006; Miller, 2002). For example, it is possible that this measure was not sufficiently contextually grounded. In addition, individual emotion associations that are activated by self-focused attention may be implicit rather than explicit in nature. Future studies should examine implicit measures of emotion associations to address this concern. Finally, our measure of positive emotion association was limited to happiness, which was one of several positive emotions elicited by the positive film and music clips. Future studies should examine associations with other positive emotions such as excitement and satisfaction.

Another limitation of these studies is the fact that Asian American participants were bicultural individuals residing in the United States who were oriented to American culture as well as East Asian cultures. As a result, our studies provided a conservative test of our hypothesis. Future research should focus on sources of within-culture variation in emotional reactivity under self-focusing conditions, as well as examine whether the observed effects hold for individuals living in collectivistic countries, such as Korea or China.

Despite these limitations, these findings shed light on previous studies of European Americans and Asian Americans in the laboratory and in clinical settings. In many laboratory studies of emotion (e.g., Tsai et al., 2002), including our own, researchers use video cameras and reflective surfaces (i.e., mirrors that conceal video cameras; reflective television screens) or observers and administer questionnaires asking about internal attributes or preferences. All of these methods are known to direct attention to the individual aspects of the self (Duval & Silvia, 2002; Fenigstein, 1979; Millar, Millar, & Tesser, 1988; Scheier & Carver, 1983). Placing participants in laboratory settings with powerful elicitors of attention to individual cues can stack the odds in favor of more-intense emotional reactivity for some cultural groups (i.e., European Americans) compared with others (i.e., Asian Americans). Given this, it may not be surprising that in previous studies, East Asian and Asian American participants produced less frequent, intense, and variable self-reports of emotion and facial

emotional behavior than did European American participants (Eid & Diener, 2001; Kitayama et al., 2000; Mesquita & Karasawa, 2002; Tsai et al., 2002; Tsai & Levenson, 1997). Our study demonstrates that for positive emotions and sadness, cultural differences in emotional reactivity are qualified by self-focusing conditions.

Conversely, the use of relational cues—such as dyadic tasks or questionnaires asking about family relationships—can direct attention to the relational aspects of the self and produce the opposite effect. This study is one of the first to demonstrate that when attending to thoughts of family, Asian Americans show similar or even heightened levels of emotional reactivity compared with that of European Americans. Future studies examining emotional reactivity across cultural groups should be particularly sensitive to the potential effects of situational cues in the laboratory. If further replicated, our findings may also offer insights to clinicians working with Asian American clients. It may be possible to strategically use situational cues to facilitate open communication of emotional distress for members of different cultural groups. Asian American clients are more likely to underutilize psychotherapy and terminate treatment prematurely than are European American clients (Sue, 1994). This pattern may be due to a mismatch between individually focused assessment and psychotherapy (e.g., placing emphasis on personal history and experiences) and the relational contexts in which Asian Americans are more likely to experience and express emotional distress (i.e., when thinking about close others). Indeed, culturally sensitive forms of family therapy appear to be well suited to Asian American clients (see Lee & Mock, 2005). Prompting Asian American clients with relational cues such as questions about their families may allow clinicians to assess their emotional functioning more comprehensively. Future research should examine these possibilities.

Finally, our studies have not fully examined the extent to which our findings could also be due to cultural norms regarding the experience and expression of emotions. In Western cultural contexts, expression of one's emotions is valued because emotions are thought to signal individualistic values and preferences (Bellah, Madsen, Sullivan, Swindler, & Tipton, 1985; Markus & Kitayama, 1991; see also Oyserman, Coon, & Kimmelmeier, 2002). In contrast, individuals in East Asian cultures are keenly aware of the potential interpersonal costs of emotional expression, and therefore, East Asian cultures emphasize moderation of emotional expression on the basis of situational cues (Bond, 1991; Russell & Yik, 1996). Thus, self-focused attention may lead to spreading activation to behavior-relevant content (see Markus & Wurf, 1987) and, specifically, cultural norms of experiencing and expressing emotions. Our measure of emotion associations did not assess the endorsement of these norms; however, it is possible that differences in adherence to these norms could have accounted for the observed cultural differences in the individual cue condition. Future studies should explore this possibility (see Duval et al., 2001).

In conclusion, our data suggest that what happens to people's emotions when they notice their reflection in a shop window or a picture of their family on their desk depends on their cultural context. In European American contexts, noticing one's own reflection increases emotional reactivity more than in Asian American contexts, whereas in Asian American contexts, noticing a family picture may increase emotional reactivity more than in European American contexts. Thus, in order to understand how

attention to the self affects emotion, one must understand the critical role that culture plays in shaping models of the self and emotion.

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