

# Further Evidence for the Cultural Norm Hypothesis: Positive Emotion in Depressed and Control European American and Asian American Women

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How does culture shape the effects of depression on emotion? A previous study showed that depression dampened negative emotional responses in European Americans, but increased these responses in Asian Americans (Chentsova-Dutton et al., 2007). These findings support the cultural norm hypothesis, which predicts that depression reduces individuals' abilities to react in culturally ideal ways (i.e., disrupting European Americans' abilities to express emotions openly and Asian Americans' abilities to moderate emotions). In the present study, we examined the generalizability of this hypothesis to positive emotion. We measured the emotional reactivity of 35 European Americans (17 depressed) and 31 Asian Americans (15 depressed) to an amusing film. Consistent with the cultural norm hypothesis, European Americans who were depressed showed dampened emotional reactivity (i.e., fewer smiles, less intense reports of positive emotion, lower cardiac activation) compared to control European Americans, whereas Asian Americans who were depressed showed similar (for smiles and reports of positive emotion), and even greater (for higher cardiac activation) emotional reactivity compared to control Asian Americans. These findings suggest that the cultural norm hypothesis generalizes to positive emotion.

*Keywords:* depression, culture, Asian Americans, facial expression, positive emotions

In working with . . . those from Asian background, a Euro American therapist can feel not only uncertain but at sea. This is because there is a different normality/psychopathology continuum from the one we are used to, influenced by radically different cultural patterns than our own. (Roland, 2005, p. 146)

The above quotation illustrates the frustration experienced by many Western clinicians when diagnosing and treating mental illness in individuals from East Asian cultural contexts. One prevailing theory is that cultural differences in norms regarding emotional expression present a significant threat to diagnostic validity and make it difficult to interpret expressions of mental illness (see Leong & Lau, 2001). For example, clinicians and researchers have long speculated that because of East Asian norms to moderate and control one's emotions, East Asian individuals who are depressed tend to moderate their emotions in favor of physical complaints (Kleinman, 1982; Parker, Cheah, & Roy, 2001; Ryder et al., 2008; Simon, VonKorff, Picvinelli, Fullerton, & Ormel, 1999; Waza,

Graham, Zyzanski, & Inoue, 1999), making their reports and displays of emotion unreliable indicators of their mental health status. Rather than rendering reports and displays of emotion unreliable; however, East Asian norms of emotional expression may produce different emotional responses in individuals who are depressed than American norms of emotional expression. Surprisingly few studies have compared the emotional reactivity (i.e., moment-to-moment loosely coordinated changes in several systems including perception, feelings, behavior, and peripheral and central physiology that occur in response to identifying personally relevant events, reacting to them, and categorizing reaction to them as instances of emotional concepts) associated with depression in American and East Asian cultures. In a previous study (Chentsova-Dutton et al., 2007), it was demonstrated that the effects of depression on reactivity to negative emotional stimuli varied for European American and Asian American individuals. The present study examines whether these differences generalize to responses to positive emotional stimuli. Prior to describing the study, we outline the theory motivating this research in greater detail.

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## Cultural Norm Hypothesis

The cultural norm hypothesis predicts that individuals who are depressed display patterns of positive and negative emotional reactivity that differ from their culturally ideal ways of experiencing and expressing emotions (Chentsova-Dutton et al., 2007). More specifically, we hypothesize that the symptoms of depression (i.e., impaired concentration, low energy, and inability to receive pleasure from social reinforcements) impair individuals' abilities to attend to and enact cultural norms and ideals regarding emotion. In addition, reduced ability to enact culturally normative emotions may result in additional stress and isolation, further exacerbating depressive symptoms. Therefore, in cultures that emphasize the

open expression of emotion, depression should be associated with a failure to up-regulate experience and expression of emotions, dampening positive and negative emotional reactivity as a result. By contrast, in cultures that emphasize moderation and control of emotion, depression should be associated with a failure to moderate experience and expression of emotions. In this case, we would not expect to see dampening of positive and negative emotional reactivity. Because impaired concentration and low energy may affect individuals' abilities to engage with elicitors of emotions as well as their abilities to attend to and enact cultural norms regarding emotion, we may observe that depression does not significantly alter emotional reactivity in these cultures. Alternatively, impaired concentration and low energy may impair individuals' abilities to engage with elicitors of emotions less than their abilities to attend to and enact norms about emotions because the former task may be less cognitively and motivationally complex than the latter. If so, we may observe enhanced positive and negative reactivity in these cultures.

For instance, mainstream European American culture emphasizes the open expression of one's emotions as a way of asserting one's individuality (Bellah, Madsen, Sullivan, Swindler, & Tipton, 1985; Wierzbicka, 1992, 1999). Although these norms apply to both positive and negative emotions, the experience and expression of high arousal positive emotions such as happiness, excitement, and cheerfulness are particularly valued (Bellah et al., 1985; Kotchemidova, 2005; Tsai, Knutson, & Fung, 2006). In this cultural context, anhedonia (i.e., loss or interest in pleasure)—one of the core features of depression—represents a failure to enact cultural norms of maintaining a cheerful emotional state and pursuing and enjoying pleasurable experiences (Lutz, 1985; Mesquita & Walker, 2003). Thus, European American individuals who are depressed should show dampened emotional responses, particularly positive emotional responses.

A number of studies have examined whether the dysphoria, loss of interest, and pleasure described by individuals who are depressed from European American or Western European cultural backgrounds are reflected in online reactivity to specific elicitors of negative and positive emotions in laboratory settings (e.g., emotional films, images; Bylsma, Morris, & Rottenberg, 2008). These studies demonstrated that, in comparison to healthy controls, European American individuals who are depressed react less intensely to negative and positive stimuli, such as imagery (Gehricke & Fridlund, 2002; Sloan, Strauss, Quirk, & Sajatovic, 1997), pictures (Allen, Trinder, & Brennan, 1999), and emotional films (Renneberg, Heyn, Gebhard, & Bachmann, 2005; Rottenberg, Kasch, Gross, & Gotlib, 2002). Therefore, depression among European Americans is associated with diminished negative and positive emotional reactivity to emotional stimuli.

Compared to European American contexts, East Asian cultures promote the moderation of emotion—including high arousal positive emotions such as excitement—as a way of avoiding interpersonal tension (Bond, 1991; Heine, Lehman, Markus, & Kitayama, 1999; Iwata, Roberts, & Kawakami, 1995; Markus & Kitayama, 1991; Russell & Yik, 1996). For example, Japanese are more likely than European Americans to recognize that open expression of happiness may endanger interpersonal harmony (Uchida, Norasakkunkit & Kitayama, 2004). As a result, individuals from East Asian cultures are more likely than European Americans to report making an effort to mask or suppress their expressions of high

arousal positive emotions (Gross & John, 1998; Gross, Richards, & John, 2006; Matsumoto et al., 2008) or express them indirectly (Hsu et al., 1985). Not surprising, different individuals within European American and East Asian cultural settings respond differently to these norms; however, despite significant within-culture and across-situation variability (Matsumoto, 1990; Matsumoto et al., 2008), studies have shown that college students and adults from East Asian cultural contexts experience and express lower levels of high arousal positive emotions (Eid & Diener, 2001; Mesquita & Karasawa, 2002; Scherer, Matsumoto, Wallbott, & Kudoh, 1988; Tsai, Chentsova-Dutton, Freire-Bebeau, & Przymus, 2002). This pattern of reactivity is consistent with East Asian cultural norms. Similarly, Asian and Asian American individuals report lower levels of pleasure and interest than do European American individuals on measures of depression administered to college student and adult samples not selected for their clinical status (Iwata & Buka, 2002; Iwata et al., 1995; Kanazawa, White, & Hampson, 2007; Yen, Robins, & Lin, 2000).

Thus, the cultural norm hypothesis predicts that due to the symptoms associated with depression, East Asians who are depressed should show similar or increased levels of positive emotional reactivity compared to control East Asians. The findings from the few studies that have examined emotional functioning among individuals who are depressed from East Asian cultural settings are consistent with the cultural norm hypothesis. For example, two studies showed no differences in retrospective reports of positive affect for individuals who are and are not depressed from East Asian cultures (Iwata et al., 1998; Yen et al., 2000), and a third study found that the more depressed Asian American college students were, the more they endorsed the open expression of positive and negative emotion (Aldwin & Greenberger, 1987). These studies, however, did not examine in-the-moment positive emotional reactivity.

Therefore, in a previous study, Chentsova-Dutton et al. (2007) compared the emotional reactivity of depressed and control European Americans and Asian Americans groups to sad and amusing film clips. Consistent with the cultural norm hypothesis, European Americans who are depressed showed dampened negative emotional reactivity to the sad film compared to control European Americans, whereas Asian Americans who are depressed showed heightened negative emotional reactivity to the sad film compared to control Asian Americans. That is, participants who are depressed from both cultural groups demonstrated emotional responses that were inconsistent with their culture's ideal way of experiencing and expressing negative emotion.

Participants' emotional responses to the amusing film clip, however, were inconsistent with the cultural norm hypothesis. On the one hand, these findings suggest that the cultural norm hypothesis may not apply to positive emotions. On the other hand, because the amusing film clip was always presented after the sad film clip, it is possible that the participants' emotional responses to the sad film clip influenced their responses to the amusing film clip, or that their pattern of responses was due to fatigue. Consequently, it remains unclear whether the cultural norm hypothesis applies to positive emotional reactivity. Therefore, in the present study, we presented an amusing film clip to the depressed and control European Americans and Asian Americans groups. We predicted that European Americans who are depressed would show lesser positive emotional reactivity than would control European

Americans, whereas Asian Americans who are depressed would show similar or even greater positive emotional reactivity than would control Asian Americans.

## Method

### Participants

Thirty-five European American (17 depressed, 18 controls) and 31 Asian American (15 depressed, 16 controls) English-speaking adult women participated in the study. This sample size was expected to offer moderate statistical power in detection of the expected effects. The sample size is consistent with those reported in the literature on the effects of depression on emotional reactivity of European Americans (see Bylsma et al., 2008), and members of ethnic minorities (Tsai, Pole, Levenson, Munoz, 2003). The sample was limited to women to reduce within-sample variability in positive emotional reactivity (see Chentsova-Dutton & Tsai, 2007). Participants were recruited through advertisements and clinical referrals.

The sample's demographics are presented in Table 1. Asian Americans represented several East Asian cultures (Chinese 64.5%, Korean 16.1%, Southeast Asian 12.9%, and Japanese 6.5%). Nearly half of the Asian Americans ( $n = 13$ , 41.8%) were born overseas, and spent an average of 14.35 years ( $SD = 10.68$ ) in the United States. The remaining Asian Americans were second ( $n = 15$ , 48.3%), and third ( $n = 3$ , 9.7%) generation immigrants.<sup>1</sup> The depressed and control Asian Americans groups did not differ in their generational status,  $\chi^2(3, N = 31) = .31$ , *ns*. European Americans were born and raised in the United States, had U.S.-born parents, and identified themselves as Caucasian. About one third of the group had at least one foreign-born grandparent ( $n = 12$ , 34.3%).

### Clinical Assessment

Participants were interviewed with the Structured Clinical Interview for *DSM-IV* (SCID; First, Gibbon, Spitzer, & Williams, 1997) by trained psychology graduate students and research assistants. Interviewers were European American, Hispanic American, Asian American, and Russian. They were not matched to participants by ethnicity. To be classified as "depressed," participants were required to meet the *Diagnostic and Statistical Manual for Mental Disorders* (4th ed., *DSM-IV*; American Psychiatric Association, 1994) criteria for a current Major Depressive Disorder. All individuals with MDD reported experiencing significant anhedonia. Control participants were excluded if they reported a lifetime history of any Axis I disorder. Depressed and control individuals with comorbid Axis I disorders, a lifetime history of panic disorder, social phobia, mania, hypomania, or psychotic symptoms, or a history of generalized anxiety disorder, substance abuse or dependence in the past 6 months were excluded from the study.

To assess severity of depression, interviewers completed the clinician-rated Hamilton Depression Rating Scale (HDRS; Hamilton, 1960), and participants completed the self-rated Beck Depression Inventory (BDI; Beck, Rush, Shaw, & Emery, 1979). These measures have adequate reliability and validity (Beck, Steer, & Carbin, 1988; Morriss, Leese, Chatwin, & Baldwin, 2008; Yin & Fan, 2000; but also see Bagby, Ryder, Schuller, & Marshall,

2004, for concerns regarding psychometric qualities of the HDRS). As expected, across cultural groups, participants who are depressed had higher levels of depressive symptoms as measured by the HDRS,  $F(1, 62) = 173.74$ ,  $p < .01$ ,  $\eta_p^2 = .73$ ,<sup>2</sup> and the BDI,  $F(1, 62) = 124.62$ ,  $p < .01$ ,  $\eta_p^2 = .68$ , compared to control participants (see Table 1). There were no significant differences between cultural groups in severity of depression, BDI:  $F(1, 62) = .07$ , *ns*,  $\eta_p^2 = .001$ ; HDRS:  $F(1, 62) = .57$ , *ns*,  $\eta_p^2 = .01$ , and the cultural by diagnostic group interaction was not significant, BDI:  $F(1, 62) = .93$ , *ns*,  $\eta_p^2 = .015$ ; HDRS:  $F(1, 62) = .60$ , *ns*,  $\eta_p^2 = .01$ .

Most participants who are depressed were not taking psychotropic medications at the time of the study (see Table 1). The proportion of individuals who are depressed taking a variety of psychotropic medications did not differ for European Americans and Asian Americans,  $\chi^2(1, N = 32) = .34$ , *ns*. Consistent with previous reports (Rottenberg, Gross, & Gotlib, 2005), controlling for medication status did not alter our results, and therefore, we do not discuss medication status further.

### Cultural Orientation

To ensure that participants were oriented to the cultures of interest, European Americans and Asian Americans completed the General Ethnicity Questionnaire (GEQ)–American version (Tsai, Ying, & Lee, 2000), and Asian Americans completed the General Ethnicity Questionnaire–Asian version. These questionnaires have adequate reliability and validity (see Tsai et al., 2000) and allow for independent assessments of orientation to American and East Asian cultures, respectively.

Although Asian Americans reported being moderately oriented to Asian cultures, they were more oriented to American culture than to Asian cultures,  $F(1, 29) = 6.29$ ,  $p < .05$ ,  $\eta_p^2 = .18$ . Asian Americans reported marginally lower orientation to American culture than European Americans,  $F(1, 62) = 3.70$ ,  $p = .06$ ,  $\eta_p^2 = .06$ . There were no significant main effects, GEQ–American:  $F(1, 62) = .58$ , *ns*,  $\eta_p^2 = .01$ ; GEQ–Asian:  $F(1, 29) = .60$ , *ns*,  $\eta_p^2 = .02$ , or interactions, GEQ–American:  $F(1, 62) = .34$ , *ns*,  $\eta_p^2 = .01$ , involving depression. Thus, the depressed and control Asian Americans groups reported moderate levels of familiarity with East Asian cultures, and high levels of familiarity with American culture. Because the GEQ questionnaires tap behavioral indexes of cultural orientation, such as social interactions and exposure to media and language use, this pattern of cultural orientation is typical of Asian Americans residing in the United States. Despite high levels of behavioral orientation to American culture, Asian Americans showed similar levels of identification (e.g., "Overall, I am Chinese/Korean . . .") with East Asian ( $M = 3.62$ ,  $SD = 0.98$ ) and American ( $M = 3.50$ ,  $SD = 1.14$ ) cultures,  $F(1, 29) = .09$ , *ns*. Thus, we were confident that we were successful in recruiting a bicultural sample of Asian Americans.

<sup>1</sup> Studies indicate that individuals of different East Asian backgrounds and generational statuses hold similar values regarding emotional moderation (Kim, Atkinson, & Yang, 1999; Kim, Yang, Atkinson, Wolfe, & Hong, 2001).

<sup>2</sup> We report partial eta squared,  $\eta_p^2$ , as a measure of effect size (Tabachnick & Fidell, 1989).

Table 1  
Sample Characteristics

	<i>M (SD) %</i>			
	Depressed		Control	
	EA	AA	EA	AA
Demographics				
Age	37.88 (12.48) <sub>b</sub>	32.03 (9.58) <sub>b</sub>	32.05 (10.30) <sub>b</sub>	28.44 (8.43) <sub>b</sub>
Household income <sup>a</sup>	3.00 (1.12) <sub>b</sub>	2.74 (0.96) <sub>b</sub>	2.94 (0.94) <sub>b</sub>	2.75 (0.86) <sub>b</sub>
Cultural orientation				
GEQ–American	3.85 (0.37) <sub>b</sub>	3.62 (0.59) <sub>b</sub>	3.98 (0.39) <sub>b</sub>	3.64 (0.65) <sub>b</sub>
GEQ–Asian	—	3.09 (0.68) <sub>b</sub>	—	3.13 (0.75) <sub>b</sub>
Years spent in the United States <sup>b</sup>	—	14.86 (7.69) <sub>b</sub>	—	13.83 (13.69) <sub>b</sub>
Depression severity				
BDI <sup>***</sup>	28.24 (13.52) <sub>b</sub>	25.67 (8.66) <sub>b</sub>	1.85 (2.70) <sub>c</sub>	3.29 (4.91) <sub>c</sub>
HDRS <sup>***</sup>	13.53 (5.62) <sub>b</sub>	15.00 (4.57) <sub>b</sub>	1.76 (1.79) <sub>c</sub>	1.80 (2.54) <sub>c</sub>
Treatment status				
Psychotropic medication (%)	29.40 <sub>b</sub>	20.00 <sub>b</sub>	—	—

Note. Means and proportions having the same subscript within rows are not significantly different at  $p < .05$ . EA = European Americans; AA = Asian Americans; GEQ = Generalized Ethnicity Questionnaire, American and Asian versions; BDI = Beck Depression Inventory; HDRS = Hamilton Depression Rating Scale.

<sup>a</sup> Measured based on a 1 to 5 scale, with higher scores indicating higher levels of household income (a score of 3 is equivalent to middle-class income). <sup>b</sup>  $n = 14$ .

<sup>\*\*\*</sup>  $p < .01$ .

## Procedure

Participants who met criteria for the study were invited to participate in the laboratory part of the study. On arrival, participants were informed that they were going to watch a film clip and that they would be videotaped during the task. After participants completed a packet of questionnaires including demographic data, self-rated depression severity, and cultural orientation, physiological sensors were attached to their hands and torso. Participants were asked to relax and clear their minds while focusing on a screen with a fixation cross for 3 min. This resting period provided a baseline against which to compare the effects of the film. Immediately after the resting baseline, participants completed an emotion inventory to report how they felt while relaxing. They then viewed the amusing film clip. During the task, participants were in the room alone, and written instructions were delivered by video. Immediately after the film clip, participants reported how they felt during the film.

The amusing film clip was approximately 3 min in length. The film was a slapstick comedy routine of an African American comedian describing his visit to the dentist. The clip was pretested for this study with two pilot samples that included European Americans and Asian Americans, using the criteria outlined by Gross and Levenson (1995). Across cultural groups, it elicited moderate levels of amusement, excitement, and happiness; based on a pilot sample  $N = 67$ , aggregate  $M = 3.78$  using a 0 to 8 Likert scale ranging from 0 (*not at all*) to 8 (*the most in my life*),  $SD = 1.49$ ,  $\alpha = .78$ , and did not elicit significant levels of other emotions.

## Dependent Variables

Emotional reactivity is a multicomponent construct that is best captured by multimethod assessment of changes in behavior, experience, and physiological reactivity (Levenson, 2003). We assessed

facial emotional behavior, reported intensity of emotional experience, and physiological reactivity in response to the amusing film clip. These measures of emotional reactivity have been shown to be reliable and valid in prior studies that examined the effects of culture and/or depression on emotional reactivity (Fraguas et al., 2007; Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005; Roberts, Levenson, & Gross, 2008; Rottenberg, Kasch, et al., 2002; Rottenberg, Wilhelm, Gross, & Gotlib, 2002; Soto, Levenson, & Ebling, 2005).

**Facial behavior.** Remote-controlled videocameras recorded participants' facial behavior. In three cases, the record of facial behavior during the film was lost due to equipment failure.

Facial behavior was coded using Gross and Levenson's (1993) Emotional Expressive Behavior Coding System (EEB; see Gross & John, 1997, for reliability and validity information). *Enjoyment smiles* were defined by the presence of bagging or wrinkling around the eyes (i.e., "smiling eyes") and by the absence of any behaviors associated with negative affect. *Nonenjoyment smiles* were defined by the absence of "smiling eyes" and, unlike enjoyment smiles, could co-occur with displays of negative emotion. Three trained undergraduate coders blind to the study hypotheses, to the films shown, and to the diagnostic status of participants, scored occurrences of each type of smile during the study. The interrater reliability was acceptable for enjoyment (intraclass  $r = .96$ ), and nonenjoyment (intraclass  $r = .78$ ) smiles. For cases in which coders disagreed about their ratings, coders discussed their ratings to resolve the disagreements. When disagreements could not be resolved, the ratings of the coders were averaged.

**Reported intensity of emotional experience.** An inventory consisting of 23 emotion terms was administered after the baseline and after the film. For each of the emotion terms, participants used a 9-point rating scale ranging from 0 (*not at all*) to 8 (*the most in my life*) to indicate how strongly they felt each emotion. As expected based on the film pilot data, the film clip elicited reports

of high arousal positive emotion (amusement, excitement, and happiness) compared to resting baseline (see Results section). A three-item composite of these emotion terms was used to measure reports of high arousal positive emotions during the film ( $\alpha = .84$ ).

**Physiological measures.** A system consisting of a computer, HPVEE software, and Coulbourn Lab Link V bioamplifiers (Coulbourn Instruments, Whitehall, PA) was used to obtain continuous recording of participants' physiological reactivity during the study.

We examined measures of cardiac (interbeat interval, IBI), electrodermal (skin conductance level, SCL), vascular (finger temperature, TEM), and respiratory (intercycle interval, ICI) reactivity because they sample systems known to be important in positive and negative emotional reactivity (Boiten, Frijda, & Wientjes, 1994; Levenson, 2003).<sup>3</sup> These measures show modest to moderate levels of stability and association with other measures of positive and negative emotional reactivity (Fahrenberg, Schneider, & Safian, 1987; Manuck, Kamarck, Kasprovicz, & Waldstein, 1993; Manuck, Kasprovicz, Monroe, Larkin, & Kaplan, 1989; Mauss et al., 2005; Simons, Losito, Rose, & MacMillan, 1983) and have been used to examine positive emotional reactivity of European Americans and Asian Americans in prior research (Frazier, Strauss, Steinhauer, 2004; Tsai & Levenson, 1997).

To measure IBI, Beckman electrodes (Beckman Coulter, Inc, Fullerton, CA) with Redux paste were placed in a bipolar configuration on opposite sides of each participant's chest. IBI was measured in milliseconds between successive R waves of the electrocardiogram. Higher levels of IBI indicate lower levels of physiological reactivity. To measure SCL, 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. SCL was measured in micro ohms. Higher levels of SCL indicate higher levels of physiological reactivity. To measure TEM, a thermistor was attached to the palmar surface of the distal phalanx of the fourth finger of the nondominant hand. TEM was calibrated to 0 prior to baseline, and was measured in changes from that value in degrees Fahrenheit. Higher levels of TEM indicate lower levels of physiological reactivity. To measure ICI, a pneumatic bellow was placed around the participant's upper abdomen. ICI was measured in milliseconds between successive inspirations. Higher levels of ICI indicate lower levels of physiological reactivity.

Custom-designed data reduction software extracted raw data and produced waveform transformations, peak detection, and graphic display for each channel. Trained research assistants removed periods affected by noise (e.g., due to factors such as participant movement), and calculated period averages for the baseline and the film. Change scores were calculated for each measure of emotional reactivity (facial behavior, reported intensity of emotional experience, physiological reactivity) by subtracting levels of these variables during resting baseline from levels of these variables during the amusing film (see Manuck et al., 1989; Rogosa, 1995, for a discussion of the advantages of change scores over other techniques of adjusting for baseline differences in emotional reactivity).<sup>4</sup>

## Results

A correlation matrix of baseline and film task levels of all dependent variables is presented in Table 2.

## Resting Baseline

To understand how participants reacted in the absence of emotional stimuli, we first examined positive emotional reactivity during the resting baseline. We conducted two-way univariate analyses of variance (ANOVAs) for continuous dependent variables and logistic regression for categorical variables, with diagnostic group (depressed, control) and cultural group (European American, Asian American) as between-subjects factors. We controlled for the number of comparisons conducted for each set of dependent variables (i.e., setting significance level at  $0.5/2 = .025$  for facial expressive behavior,  $0.5/1 = 0.5$  for reports of emotional experience, and  $0.5/4 = .013$  for physiological reactivity).

**Facial expressive behavior.** As expected, the baseline elicited very low levels of facial emotional behavior. Smiles were infrequent; therefore, we examined their occurrence rather than frequency. The strength of association between cultural and diagnostic group and the occurrence of enjoyment and nonenjoyment smiles was tested using logistic regression. There were no significant main effects of diagnostic group or cultural group and no interaction for enjoyment and nonenjoyment smiles, all main effects and interactions yielded the same Wald  $\chi^2(1, N = 66) = .00, ns$ .

**Reports of emotional experience.** During the baseline, depressed participants reported experiencing lower levels of positive emotions ( $M = 1.70$ ;  $SD = 1.21$ ),  $F(1, 62) = 46.09, p < .01, \eta_p^2 = .09$ , than did control participants ( $M = 2.43$ ;  $SD = 1.23$ ). In addition, Asian American participants ( $M = 1.74$ ;  $SD = 1.41$ ) reported experiencing lower levels of positive emotions than did European American participants ( $M = 2.37$ ;  $SD = 1.06$ ),  $F(1, 62) = 6.49, p < .01; \eta_p^2 = .07$ . There were no significant diagnostic by cultural group interactions for reports of positive emotions,  $F(1, 62) = .01, ns, \eta_p^2 = .00$ .

**Physiological reactivity.** There were no significant main effects or interactions involving cultural group or diagnostic group for IBI, diagnostic group:  $F(1, 62) = 0.15, ns, \eta_p^2 = .002$ ; cultural group:  $F(1, 62) = 2.90, p = .09, \eta_p^2 = .05$ , interaction:  $F(1, 62) = 3.01, p = .09, \eta_p^2 = .05$ ; SCL, diagnostic group:  $F(1, 62) = 0.85, ns, \eta_p^2 = .01$ , cultural group:  $F(1, 62) = 3.24, p = .08, \eta_p^2 = .05$ , interaction:  $F(1, 62) = 1.95, ns, \eta_p^2 = .03$ ; TEM, diagnostic group:  $F(1, 62) = 4.69, p = .03, \eta_p^2 = .07$ , cultural group:  $F(1, 62) = 4.30, p = .04, \eta_p^2 = .07$ , interaction:  $F(1, 62) = .16, ns, \eta_p^2 = .00$ ; and ICI, diagnostic group:  $F(1, 62) = 3.53, p = .07, \eta_p^2 = .06$ ,

<sup>3</sup> These physiological indexes differ in their association with sympathetic and parasympathetic activation of the ANS. IBI, TEM, and ICI are jointly influenced by sympathetic and parasympathetic activation, whereas SCL is primarily influenced by sympathetic activation (see Cacioppo, Tassinary, & Berntson, 2007). In addition, individuals have more voluntary control over ICI compared to other aspects of physiological reactivity. Thus, low levels of association are typically observed between different physiological measures (Lacey, 1967), particularly when interindividual associations are examined (Lazarus, Speisman, & Mordkoff, 1963). In line with previous research, different measures of physiological reactivity were not significantly associated in this study. Therefore, we examined each index separately instead of forming a composite of physiological reactivity to the amusing film.

<sup>4</sup> Using covariance analysis to control for the baseline levels of emotional reactivity did not affect the findings for any of the reported main effects or interactions.

Table 2  
Correlations Among Baseline and Film Task Levels of Dependent Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<i>Baseline</i>														
1. Enjoyment smiles	1.00													
2. Non-enjoyment smiles	-.02	1.00												
3. Positive emotions	-.15	.30*	1.00											
4. IBI	-.04	.01	-.32**	1.00										
5. SCL	-.01	-.02	-.15	.14	1.00									
6. TEM	-.01	-.05	-.12	.15	.03	1.00								
7. ICI	.04	-.04	-.23	.04	.04	-.14	1.00							
<i>Film</i>														
8. Enjoyment smiles	.09	-.13	.11	-.04	-.11	-.01	-.01	1.00						
9. Non-enjoyment smiles	.00	.18	-.01	-.08	-.23	-.11	.24	.30*	1.00					
10. Positive emotions	-.11	-.04	.36**	-.17	-.15	-.05	-.09	.47**	.06	1.00				
11. IBI	-.01	.05	-.29*	.78**	.15	-.03	.09	-.24	-.25	-.36**	1.00			
12. SCL	-.02	-.03	-.07	.08	.77**	.03	.03	.12	-.14	.04	.04	1.00		
13. TEM	.06	.03	.04	-.07	-.15	.58**	-.03	-.06	-.06	.09	-.13	-.14	1.00	
14. ICI	-.08	.03	-.10	.11	-.01	.03	.11	.14	.04	-.01	-.02	.04	-.15	1.00

\*  $p < .05$ . \*\*  $p < .01$ .

cultural group:  $F(1, 62) = 1.31$ ,  $ns$ ,  $\eta_p^2 = .02$ , interaction:  $F(1, 62) = .47$ ,  $ns$ ,  $\eta_p^2 = .01$ , during the resting baseline.

In summary, there were differences between cultural groups and between diagnostic groups in reports of emotional experience during the resting baseline. Participants who are depressed reported feeling less positive than did control participants. Similarly, Asian American participants felt less positive than did European American participants. There were no significant baseline cultural group or diagnostic group differences in levels of facial expressive behavior or physiological reactivity.

### Did the Amusing Film Clip Effectively Elicit Positive Emotion?

We first examined whether responses to the amusing film clip significantly differed from responses during resting baseline, using repeated-measure ANOVA. Participants showed more intense enjoyment,  $F(1, 60) = 71.04$ ,  $p < .001$ ,  $\eta_p^2 = .54$ , and nonenjoyment smiles,  $F(1, 60) = 77.90$ ,  $p < .001$ ,  $\eta_p^2 = .56$ , reported experiencing more intense positive emotion,  $F(1, 62) = 78.63$ ,  $p < .001$ ,  $\eta_p^2 = .56$ , and showed greater physiological activation, decreases in IBI,  $F(1, 62) = 12.02$ ,  $p < .001$ ,  $\eta_p^2 = .16$ , increases in SCL,  $F(1, 62) = 40.03$ ,  $p < .001$ ,  $\eta_p^2 = .40$ , and decreases in TEM,  $F(1, 62) = 28.19$ ,  $p < .001$ ,  $\eta_p^2 = .32$ , during the amusing film compared to baseline. Because there were no significant changes from baseline to the amusing film in ICI,  $F(1, 62) = .99$ ,  $ns$ ,  $\eta_p^2 = .02$ , we will not discuss this measure further. These findings suggest that overall the amusing film clip effectively elicited positive emotion compared to baseline.

### Evidence for the Cultural Norm Hypothesis?

To test the cultural norm hypothesis, we conducted two-way univariate ANOVAs for each change score measure of emotional reactivity, with diagnostic group (depressed, control) and cultural group (European American, Asian American) as between-subjects factors. We controlled for the number of comparisons conducted for each set of dependent variables (i.e., setting significance level at  $0.5/2 = .025$

for facial expressive behavior,  $0.5/1 = 0.5$  for reports of emotional experience, and  $0.5/3 = .017$  for physiological reactivity). We then conducted planned one-tailed comparisons (European American: depressed vs. controls; Asian American: depressed vs. controls).

### Facial Expressive Behavior<sup>5</sup>

A two-way (Diagnostic Group  $\times$  Cultural Group) ANOVA conducted on change scores in enjoyment smiles yielded a main effect of diagnostic group, with depressed participants ( $M = 5.57$ ;  $SD = 6.19$ ) showing smaller increases in the number of enjoyment smiles than did control participants ( $M = 10.88$ ;  $SD = 8.61$ ),  $F(1, 59) = 7.33$ ,  $p < .01$ ,  $\eta_p^2 = .11$ . Neither the main effect of cultural group nor the interaction of cultural and diagnostic groups was significant.

Neither the main effect of cultural group nor the main effect of diagnostic group was significant for change scores in nonenjoyment smiles. The interaction of cultural by diagnostic group, however, was significant,  $F(1, 59) = 5.37$ ,  $p < .025$ ,  $\eta_p^2 = .08$ . Planned comparisons revealed that whereas European Americans who are depressed ( $M = 2.13$ ;  $SD = 3.20$ ) showed significantly smaller increases in their nonenjoyment smiles than did control European Americans ( $M = 4.88$ ;  $SD = 4.57$ ),  $t(59) = 2.68$ ,  $p = .01$ ; Asian Americans who are depressed ( $M = 5.50$ ;  $SD = 3.65$ ) tended to show greater levels of increases in their nonenjoyment smiles than control Asian Americans ( $M = 3.88$ ;  $SD = 3.32$ ), although these differences were not significant,  $t(59) = 1.18$ ,  $ns$ , see Figure 1.

Thus, as predicted by the cultural norm hypothesis, depression was consistently associated with dampening of positive facial behavior for European Americans. For Asian Americans, depression was associated with the dampening of enjoyment smiles, but not nonenjoyment smiles.

<sup>5</sup> Change scores in enjoyment and nonenjoyment smiles, IBI, and TEM showed minor violation of normal distribution. Although ANOVA tends to be robust to violations of normal distribution assumption (Weiss, 2005), we examined all contrasts using nonparametric Mann-Whitney  $U$  tests to ensure that our results were not affected by these violations. In each case, the results obtained with nonparametric tests were identical to those obtained with ANOVA.

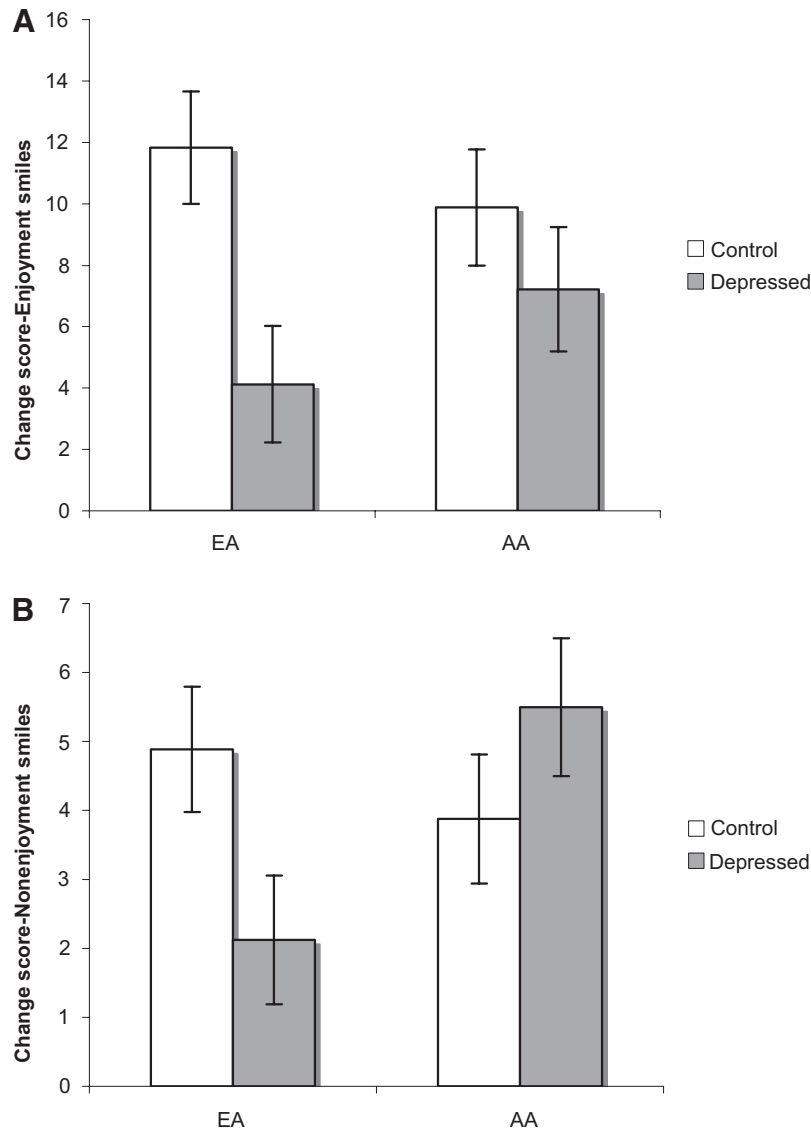


Figure 1. Change scores for enjoyment and nonenjoyment smiles during the amusing film clip. The bars in the figures indicate standard errors. EA = European Americans; AA = Asian Americans.

### Reports of Emotional Experience

A two-way ANOVA conducted on change scores in reported positive emotion yielded a significant interaction of diagnostic and cultural groups,  $F(1, 62) = 4.50, p < .05, \eta_p^2 = .07$ . Planned comparisons showed that whereas European Americans who are depressed ( $M = 1.22; SD = 1.67$ ) reported smaller increases in reported positive emotions than did control European Americans ( $M = 2.09; SD = 1.42$ ),  $t(62) = 1.75, p < .05$ , Asian Americans who are depressed ( $M = 2.18; SD = 1.50$ ) tended to show greater increases in reported positive emotions than control Asian Americans ( $M = 1.50; SD = 1.32$ ), although these differences were not significant,  $t(62) = 1.27, ns$ , see Figure 2.

Again, as predicted by the cultural norm hypothesis, depression was associated with dampening of reported positive emotions for European Americans. In contrast, depressed and nondepressed

Asian Americans reported similar levels of positive emotional experience.

**Physiological reactivity.** There were no significant main effects or interactions for change scores in SCL, cultural group:  $F(1, 62) = 0.46, ns, \eta_p^2 = .01$ , diagnostic group:  $F(1, 62) = 0.90, ns, \eta_p^2 = .02$ , interaction:  $F(1, 62) = 0.18, ns, \eta_p^2 = .003$ , or TEM, cultural group:  $F(1, 62) = 0.004, ns, \eta_p^2 = 0$ , diagnostic group:  $F(1, 62) = 0.95, ns, \eta_p^2 = .02$ , interaction:  $F(1, 62) = 0.20, ns, \eta_p^2 = .003$ .<sup>6</sup> There were also no significant main effects of diagnostic,  $F(1, 62) = 0.1, ns, \eta_p^2 = .002$ , or cultural group,  $F(1, 62) = 0.56, ns, \eta_p^2 = .01$ , for IBI change scores. However, a two-way ANOVA conducted on

<sup>6</sup> See footnote 5.

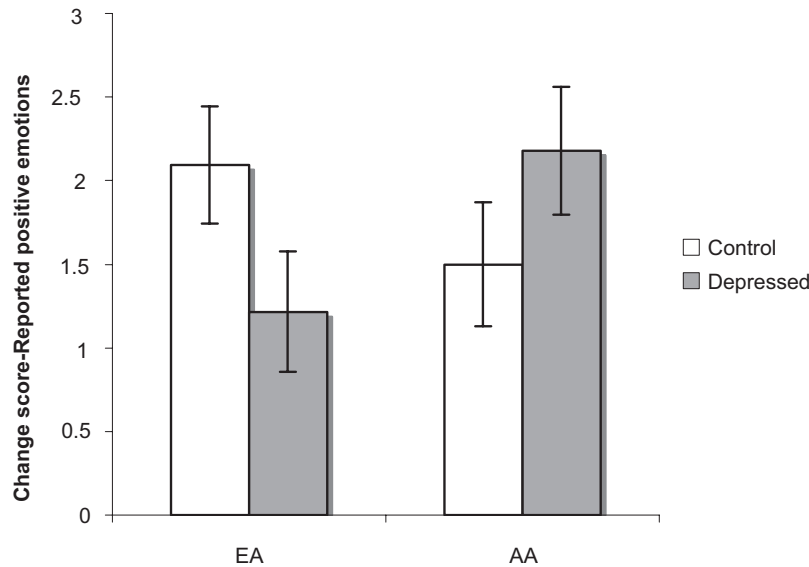


Figure 2. Change scores for reported positive emotions during the amusing film clip. The bars in the figures indicate standard errors. EA = European Americans; AA = Asian Americans.

IBI change scores<sup>7</sup> yielded a significant interaction of diagnostic and cultural groups,  $F(1, 62) = 7.84, p < .01, \eta_p^2 = .11$ . Larger decreases in IBI indicate increased cardiac activation in response to the amusing film. Planned comparisons revealed that whereas European Americans who are depressed ( $M = -19.96; SD = 94.09$ ) showed significantly smaller increases in cardiac activation than did control European Americans ( $M = -105.58; SD = 117.82, t(62) = 2.27, p < .05$ , Asian Americans who are depressed ( $M = -76.29; SD = 141.09$ ) showed significantly larger increases in cardiac activation than did control Asian Americans ( $M = -8.02; SD = 83.74$ ; see Figure 3),  $t(62) = 1.71, p < .05$ . Thus, as predicted by the cultural norm hypothesis, the effects of depression on cardiac reactivity to the amusing film differed by cultural group.

Across cultural groups, the depressed and control individuals groups did not differ in electrodermal reactivity or finger temperature, suggesting that these aspects of emotional reactivity may not be affected by depression for these cultural groups. Although one previous study (Tsai et al., 2003) demonstrated that depression is associated with dampened physiological reactivity to elicitors of positive emotion, other studies have not shown this pattern (Rotenberg, Kasch, et al., 2002, 2005). Indeed, previous studies have shown that the effects of depression on physiological reactivity tend to be small in magnitude (see Bylsma et al., 2008). It is possible that the effects of depression on cardiac, electrodermal, and vascular activity differ by factors such as cultural group, severity of depression, and the nature of the emotion elicitation task.

In summary, we observed some support for the cultural norm hypothesis: Among European Americans, depression was associated with less intense smiles (enjoyment and nonenjoyment), less intense reports of positive emotions, and lower cardiac activation. In contrast, among Asian Americans, depression was associated with greater cardiac activation. In addition, Asian Americans who are depressed tended to show greater increases in reports of positive emotions and nonenjoyment smiles than did control Asian

Americans, although these differences were not significant, perhaps due to the small sample size. No differences in skin conductance or finger temperature emerged for depressed and control participants across cultural groups.

## Discussion

In previous work, Chentsova-Dutton et al. (2007) demonstrated that the effects of depression on negative emotional reactivity varied for European Americans and Asian Americans. Whereas European Americans who are depressed showed dampened negative emotional responses compared to healthy controls, Asian Americans who are depressed showed increased negative emotional responses compared to healthy controls. Similarly, the present study found that European Americans who are depressed showed dampened positive emotional responses compared to healthy controls, and Asian Americans who are depressed showed similar or even increased positive emotional responses compared to healthy controls. Together, these separate studies suggest that the effects of depression on positive and negative emotional reactivity vary across cultures. Although the magnitude of the observed differences was modest across both studies, this pattern of results suggests that depression is associated with dampened emotions in the cultures that encourage open or even exaggerated emotional expression, but not in cultures that encourage emotional moderation.

More important, the effects of depression on positive emotional reactivity varied by component of emotional response. For instance, European Americans who are depressed showed fewer enjoyment and nonenjoyment smiles, reported experiencing less intense positive emotion, and showed less intense cardiac activation than did control European Americans. This pattern, however,

<sup>7</sup> See footnote 5.



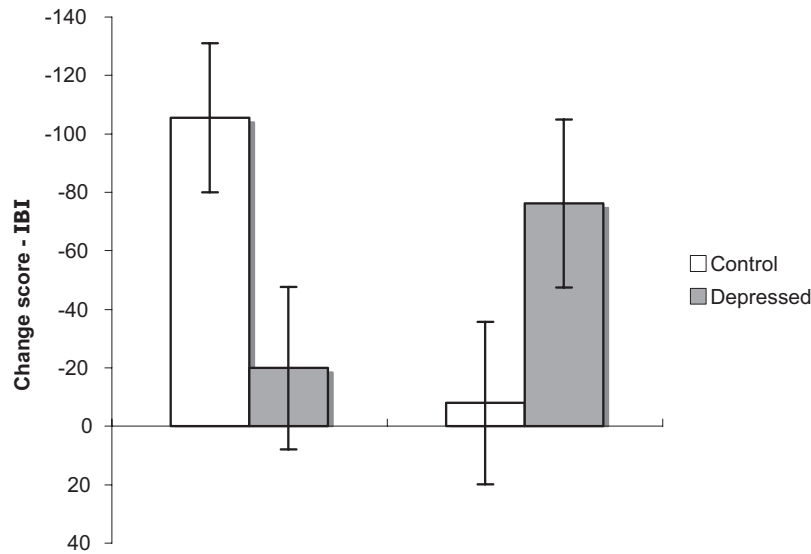


Figure 3. Change scores for interbeat interval (IBI) during the amusing film clip. The bars in the figures indicate standard errors. EA = European Americans; AA = Asian Americans.

was not observed for electrodermal or vascular activation. Similarly, Asian Americans who are depressed showed greater cardiac reactivity than did healthy controls, but did not show differences in smiles, reports of positive emotion, or the other measures of physiological response. The results obtained for Asian Americans are novel and await further replication. If replicated, they may indicate that although depression is associated with increased physiological reactivity to positive emotional stimuli for Asian Americans, this pattern is not translated into significant increases in facial behavior and reports of positive emotions. Alternatively, it is possible that using stronger elicitors of positive emotions, such as more intense film clips, social interactions, or valued rewards may produce more consistent pattern of results across components of positive emotional reactivity.

Intriguingly, data observed for Asian Americans who are depressed contradicted their clinical reports of reduced ability to experience interest and pleasure. This group was at least as able—and possibly more able—to experience positive emotions in response to a pleasant task as control Asian Americans. Recall of emotional experiences prompted by clinical interview questions may reflect what one thinks one generally feels or ought to feel, and can differ substantially from in-the-moment reports of emotions (Robinson & Clore, 2002). Our results raise the possibility that clinical reports of loss of pleasure among Asian Americans who are depressed may not accurately reflect their in-the-moment positive emotional reactivity. Future studies need to investigate the relationship between retrospective reports of anhedonia and online positive emotional reactivity among Asian Americans. It is also possible that Asian Americans' clinical reports of anhedonia refer to inability to experience low arousal positive states—such as calmness and tranquility—that are particularly valued in East Asian cultures (Tsai et al., 2006). It would be important to examine emotional reactivity to elicitors of low arousal positive emotions in future work.

The interaction between cultural and diagnostic groups emerged against a backdrop of similarities across cultural groups in the

effects of depression on positive and negative emotional reactivity during the resting baseline. Consistent with previous findings (Chentsova-Dutton et al., 2007), in the absence of an emotional stimulus, European American and Asian American individuals who are depressed reported less intense positive emotions than did control individuals. In addition, European Americans reported more intense positive emotion than did Asian Americans during baseline, suggesting that responses during baseline may reflect overall differences in mood.

### Limitations and Future Directions

This study has a number of limitations. First, our sample size was small. Partial eta squared values obtained for the cultural by diagnostic group interactions were in the small to moderate effect size range. As a consequence, the power observed in this study was modest in magnitude, ranging from .61 to .77. Thus, it is possible that the study was a conservative test of the hypothesis and failed to detect differences in positive emotional reactivity that were more subtle in nature (e.g., cultural by diagnostic group interaction in enjoyment smiles). Future research will need to utilize larger samples and examine clinical and diagnostic significance of the detected differences in positive emotional reactivity.

Second, we did not address the causal nature of the relationship between major depression and positive emotional reactivity. We do not know whether symptoms of depression contribute to changes in positive emotional reactivity, or vice versa. Future longitudinal research needs to examine how the associations between these constructs unfold over time across cultures, focusing on individuals at risk for depression, such as children of parents who are depressed or remitted individuals with a history of major depression.

Third, scholars of culture and emotion have expressed caution about diagnostic overreliance on emotional symptoms of depression, particularly anhedonia (Kotchemidova, 2005; Lutz, 1985; Mesquita & Walker, 2003). Although all of our participants met

criteria for current MDD and endorsed anhedonia, it is possible that some Asian Americans who are depressed may not meet the *DSM-IV* criteria for depression because they may present with a pattern of emotional dysregulation that is different from that observed for European Americans who are depressed. Thus, our sample of Asian Americans who are depressed may not have been representative of Asian Americans who experience symptoms of depression. That said, given that Asian Americans did meet Western criteria for depression, the differences are all the more striking. Future studies need to examine positive emotional reactivity among individuals who report significant impairment due to depressive symptoms in the absence of anhedonia.

Fourth, the depressed participants in this study were relatively homogenous in their endorsement of the emotional symptoms of major depression. All reported experiencing clinically significant levels of anhedonia and depressed mood. In the future, it will be important to examine the emotional reactivity of individuals who are depressed who present primarily with depressed mood or primarily with anhedonia and blunted affect. This research would have implications for diagnosing and treating emotional symptoms of depression in individuals with different subtypes of this disorder.

Finally, the cultural heterogeneity of Asian American sample presented another significant limitation. Future studies need to recruit larger samples of Asian Americans who are depressed from specific cultural backgrounds (e.g., Chinese, Japanese, Korean) to examine whether individuals from different East Asian cultures differ in their positive emotional reactivity.

Notably, because Asian Americans in this study were oriented to East Asian as well as American cultures, the study was a conservative test of the cultural norm hypothesis. Also, the dynamic constructivist perspective (e.g., Hong, Benet-Martinez, Chiu, & Morris, 2003; Hong, Morris, Chiu, & Benet-Martinez, 2000) suggests that individuals oriented to more than one culture are better able to shift between enacting different cultural norms depending on which is cued by the situation. Thus, the responses of Asian American individuals in this study may have been shaped by situational cues to a greater extent than those of European American individuals. Future work should include individuals in East Asian cultures, as well as larger samples of recent immigrants versus U.S.-born Asian Americans to examine whether the observed differences are more pronounced in less acculturated samples, and help us better understand the role of acculturation and bicultural orientation in positive emotional reactivity of individuals who are depressed.

Despite these limitations, this study provides further evidence for the cultural norm hypothesis by extending previous findings observed for negative emotions (Chentsova-Dutton et al., 2007) to positive emotions. Taken together, the results of the two studies suggest that, instead of blunting affect, depression appears to minimally alter or even heighten negative and positive emotional responses among Asian Americans. Thus, rather than rendering reports and displays of emotion unreliable, different cultural norms regarding emotional experience, and expression may result in predictable differences in emotional responses among individuals who are depressed. Consequently, Western clinicians may find assessment and treatment of depression difficult in Asian Americans not because Asian Americans moderate and control their emotional responses, but because Asian Americans who are de-

pressed show a different pattern of positive and negative emotional reactivity than do European Americans who are depressed. Together, these findings take us one step closer to understanding how cultural factors shape the experience and expression of depression.

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