

Ethnographic descriptions suggest that compared to European Americans, Chinese Americans place a greater emphasis on emotional moderation. To assess whether such cultural differences influence actual emotional responding, we compared the physiological responses and reported affect of 22 Chinese American and 20 European American college-age dating couples in an interpersonal context, that is, during conversations about areas of conflict in their relationship. Although some of our findings were consistent with ethnographic notions of greater emotional moderation in Chinese culture (Chinese Americans demonstrated less variable and less positive reported affect and less variable cardiac interbeat intervals than European Americans), other findings were not (Chinese Americans and European Americans did not differ in most measures of physiological responding and in reported negative affect).

**CULTURAL INFLUENCES
ON EMOTIONAL RESPONDING**
**Chinese American and European American Dating
Couples During Interpersonal Conflict**

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Ethnographic notions suggest that our cultural backgrounds influence how we view emotion. For example, members of Chinese culture have been described as holding stronger beliefs that emotional moderation promotes individual health and interpersonal harmony than members of Western cultures (Chiu & Kosinski, 1994; Leung & Lind, 1986; Russell & Yik, 1996). What is less clear is whether different cultural beliefs and values regarding emotion translate into tangible differences in the various aspects of emotion (physiology, subjective experience, expressive behavior) when emotions occur in everyday life. Thus, if a person of Chinese heritage holds to the

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cultural ideal of emotional moderation, we can ask whether moderation in facial expression or in other aspects of emotion is evident when that person is actually experiencing an emotion. In the present study, we examined the influence of culture on emotional responding by comparing the physiological responses and self-reported emotional experiences of Chinese American and European American dating couples in a situation that produces a great deal of emotion (discussing the strongest area of conflict in their relationships). We chose to examine Chinese Americans and European Americans because ethnographic descriptions suggest that the two cultures differ in how they view emotional expression.

EMOTION MODERATION AND CONTROL IN CHINESE CULTURE

Ethnographic studies suggest that greater emphasis is placed on emotional moderation and control in Chinese culture than in mainstream European American culture (Potter, 1988; Russell & Yik, 1996; Sue & Sue, 1991; Wu & Tseng, 1985; Zheng & Berry, 1991).¹

The importance of emotional moderation in Chinese culture can be traced back to Confucian teachings, in which "the fundamental moral idea of moderation, balance, and subtleness" (deBary, Chan, & Watson, 1960, p. 117) is emphasized. From birth, children raised in Chinese culture are socialized to control their impulses (Ho, 1994). A lack of emotional moderation is believed to have dire consequences both for the individual and for the social group. On an individual level, the inability to moderate and control one's emotions is considered debilitating to one's mental and physical health. As stated by Koo (1976),

To the Chinese being mentally healthy implied the control of the emotions, the cultivation of the mind, the moderation of behavior . . . the mentally healthy person was one who did not get into explosive fits of anger, get excessively happy, or become easily irritated. (pp. 32-33)

On an interpersonal level, harmonious group relations in Chinese culture rely on the management of members' emotions. Because social relationships are of utmost importance in Chinese culture, members of Chinese culture go to great lengths to maintain interpersonal harmony within the group. To detect disharmony in the group and circumvent potentially disruptive behavior, members avoid conflict by monitoring the expression of extreme emotions that might threaten, offend, and disrupt the stability of existing relationships (Bond & Hwang, 1986; Chiu & Kosinski, 1994; Markus & Kitayama, 1994).

Documented differences in personality and conflict management styles between Chinese and European American adults are consistent with the above ethnographic descriptions. For example, Song (1985) administered the Minnesota Multiphasic Personality Inventory to Chinese participants and found that they were "more emotionally reserved, introverted, fond of tranquility, and habituated to self-restraint compared to Westerners" (p. 53). Westwood, Tang, and Kirkbride (1992) also found that Chinese managers who endorsed values of emotional moderation avoided conflict more than British managers. Less work exists documenting how Chinese and European American beliefs about emotional moderation and control influence actual emotional responding (i.e., the changes in physiology, subjective experience, and expressive behavior that ensue when an emotion occurs).

EMPIRICAL EXAMINATIONS OF CULTURAL INFLUENCES ON EMOTIONAL RESPONDING

Few empirical studies exist that have examined the influence of culture on emotional responding under controlled conditions. Instead, the majority of studies of cultural influences on emotion have compared different cultural groups' beliefs about emotion by having participants make emotional judgments of photographs (e.g., Boucher & Brandt, 1981; Chan, 1985; Ekman et al., 1987) or words (e.g., Brandt & Boucher, 1986; Wierzbicka, 1992). Clearly, these studies do not provide a direct test of how culture influences actual emotional responding.

Among the handful of studies that have examined cultural influences on emotional responding, three similarities exist: (a) The emotional responses of European Americans are compared with those of members of Asian cultures, (b) the physiological and subjective aspects of emotional responding are measured, and (c) emotions are elicited in a nonsocial context (e.g., participants sit in a room by themselves and watch films).

Ethnographic notions suggest that members of most Asian cultures, not just Chinese culture, believe more in the importance of moderating and controlling one's emotions compared to European Americans. Although some studies have found compelling evidence for greater emotional moderation among members of Asian cultures compared to their European American counterparts, others have not. Furthermore, the pattern of cultural differences can vary as a function of the aspect of emotion being measured. Levenson, Ekman, Heider, and Friesen (1992) found that Minangkabau participants reported less intense emotions than their European American counterparts, a finding that is consistent with the notion of greater emotional moderation in

Asian cultures. However, in the physiological realm, they found no cultural differences in the autonomic nervous system activity that accompanied these emotions.

There have been other studies that have failed to find the kinds of cultural differences in either physiological responding or self-reported affect that are predicted by ethnographic accounts. No cultural differences in physiology and self-reported affect were found between Chinese Americans and European Americans in response to a sudden loud noise (Lee & Levenson, 1992) or to emotional films eliciting sadness and amusement (Tsai, Levenson, & Carstensen, 1992). Lazarus, Tomita, Opton, and Kodoma (1966) found no cultural differences in Japanese and European American male students' physiological responses or self-reports of distress in response to a "stressful" film.

EMOTIONAL RESPONDING IN INTERPERSONAL CONTEXTS

Members of Asian cultures are thought to place greater emphasis on emotional moderation than their European American counterparts because they are more collectivistic or more oriented toward the group (Markus & Kitayama, 1994). In collectivistic cultures, emotions may regulate interpersonal relations more than in individualistic cultures (Markus & Kitayama, 1994; Shweder, 1994). Therefore, we would expect members of Asian cultures to demonstrate emotional moderation more in social contexts than in nonsocial ones. This raises the possibility that findings from previous empirical studies have not supported ethnographic notions of greater emotional moderation in Asian cultures because these studies have examined emotion in relatively nonsocial contexts.

Virtually no studies have examined the influence of culture on emotional responding in an interpersonal context. One notable exception is a study of the facial expressions of Japanese and European American men who watched films of an amputation in an interpersonal context with an experimenter present and alone (Ekman, 1972; Friesen, 1972). Japanese and European Americans exhibited similar positive and negative emotional facial expressions when the experimenter was absent, but Japanese demonstrated more positive and less negative emotional behavior when the experimenter was present. These findings are consistent with Japanese "display rules" of emotional moderation and control in public social contexts and suggest that cultural differences may be more likely to emerge in social contexts.

Drawing on these findings, we decided to use an interpersonal emotion-eliciting stimulus—having couples discuss the strongest area of conflict in

their relationships—to examine whether Chinese Americans' emotional responses would be more moderated and controlled than those of their European American counterparts. Unlike Ekman (1972) and Friesen (1972), however, we were less interested in couples' responses to a public social context than we were in creating a situation in which emotional responding would have consequences for an existing relationship.

VARIATION WITHIN CULTURAL GROUPS: ACCULTURATION AND EMOTIONAL RESPONDING

Within each cultural group, tremendous heterogeneity exists in the extent to which individuals are acculturated to (or endorse and adopt) the traditions, customs, and practices of a particular culture. Some argue that differences in levels of acculturation among individuals within a cultural group can be used to confirm observed differences between cultural groups (Triandis, Kashima, Shimada, & Villareal, 1986). For example, if Chinese Americans demonstrate greater emotional moderation and control than their European American counterparts, we would also expect that those Chinese Americans who are more acculturated to mainstream European American culture would demonstrate less emotional moderation and control than Chinese Americans who are less acculturated to mainstream European American culture. To our knowledge, no studies of cultural influences on emotional responding have used such within-group differences to confirm between-group differences in emotional responding. Therefore, in the present study, we examined the relationship of levels of acculturation and emotional responding for each cultural group.

THE PRESENT STUDY

To examine whether ethnographic notions regarding greater emotional moderation in Chinese culture accurately describe actual emotional responding, we compared the physiological responses and self-reported affect of Chinese American dating couples with those of European American dating couples. To maximize the relevance of the experiment to cultural norms concerning emotion moderation and control, we used an interpersonal context known to elicit strong emotions (couples discussing the greatest area of conflict in their relationships).

HYPOTHESES

Based on ethnographic descriptions of greater emotional moderation in Chinese culture, we hypothesized that Chinese American couples' emotional

responses would be more moderated and controlled than those of European American couples. Physiologically, this greater emotional moderation would be evidenced by less change (from a preconversation baseline) in mean levels of physiological responding and less variable physiological responses during the conversation. In the domain of self-reported affect, greater emotional moderation would be evidenced by less variable self-reported affect and fewer periods of positive and negative affect during the conversation.

We also hypothesized that within each cultural group, those individuals who were more acculturated to mainstream European American culture would moderate and control their emotional responses less than those individuals who were less acculturated to mainstream European American culture.

METHOD

PARTICIPANTS

Twenty-two Chinese American and 20 European American college-age heterosexual dating couples were recruited from the University of California–Berkeley's psychology subject pool and from flyers distributed across campus. More couples were recruited from the subject pool than from flyers; however, chi-square tests revealed no cultural differences in the ratio of couples recruited from the subject pool to those recruited from flyers. More female partners than male partners were recruited from the subject pool; however, chi-square tests also revealed no cultural differences in the ratio of females to males recruited from the subject pool. Partners recruited from the subject pool received two units of experimental class credit as compensation for their participation in the project; their partners received tickets to a lottery for one of two \$250 cash prizes that were awarded following the completion of the study. Couples who were recruited from flyers distributed across campus received tickets to the lottery only.

The mean ages of male and female partners were 20.98 years ($SD = 2.47$) and 19.79 years ($SD = 1.85$), respectively. Females had on average finished 2 years of college ($M = 2.37$, $SD = 1.23$), as had their male partners ($M = 2.97$, $SD = 1.96$). Univariate analyses revealed no significant differences in the mean age or education level of female and male partners or of the two cultural groups.

Inclusion criteria for couples were as follows: (a) Both partners were Chinese American or both partners were European American, (b) at least one partner was currently enrolled as a University of California–Berkeley stu-

dent, and (c) couples described their relationships as "exclusive" and "committed."

Levels of acculturation. We chose to examine the emotional responses of bicultural Chinese American college students because we believed that they would be influenced by Chinese culture and be as familiar with aspects of the experimental setting as their European American counterparts. To increase sample homogeneity and to ensure that Chinese Americans had reasonable levels of exposure to Chinese culture, Chinese Americans who participated in the study were required to (a) be born in either China, Taiwan, Hong Kong, or the United States and (b) have both parents be Chinese. Among the Chinese Americans, 57% were foreign born and 43% were born in the United States. Chi-square tests did not reveal gender differences in the ratio of foreign-born to United-States-born Chinese Americans. On the average, foreign-born Chinese Americans had spent 9.98 years of their lives in the United States ($SD = 4.34$, range = 19 years).

Given the heterogeneity among Chinese Americans, we assessed how acculturated Chinese Americans were to mainstream European American culture by administering a modified version of the Suinn-Lew Asian Self-Identity Acculturation Scale (SL-ASIA) (Suinn, Rickard-Figueroa, Lew, & Vigil, 1987).² Participants used a 5-point Likert-type scale ranging from 1 = *very Asian* to 5 = *very American* to rate 25 multiple-choice items pertaining to their cultural identification, food and entertainment preferences, and language proficiency.

The reliability and validity measures of the SL-ASIA for our sample were comparable to those reported by its authors and others (Atkinson & Gim, 1989; Suinn, Ahuna, & Khoo, 1992; Suinn et al., 1987). Specifically, Cronbach's alpha for the SL-ASIA for our sample was .88, compared to the internal-consistency estimates of .91 reported by Suinn et al. (1992), .88 reported by Suinn et al. (1987), and .89 reported by Atkinson and Gim (1989). In addition, we examined the relationship between Chinese Americans' average acculturation scores and the length of time spent in the United States to assess the concurrent validity of the SL-ASIA. As in Suinn et al. (1992), we found that the longer Chinese Americans had lived in the United States, the more acculturated they reported being to mainstream American culture ($r = .75, p < .0001$). Thus, we were confident that the SL-ASIA was a good index of how acculturated the Chinese Americans in our sample were to mainstream European American culture.

The average acculturation of Chinese American partners was 2.78 ($SD = 0.49$), suggesting that we had recruited a sample of Chinese Americans who

adhered to aspects of both Chinese and mainstream American cultures but demonstrated a greater orientation to their Chinese heritage.

European American couples were also required to meet specific cultural criteria. They had to (a) be born in Europe or the United States and (b) have both parents be European or American. Among the European Americans, 10% were foreign born and 90% were born in the United States. Chi-square tests did not reveal gender differences in the ratio of foreign-born to United-States-born European Americans. Foreign-born European Americans had lived in the United States for an average of 17 years ($SD = 4.90$, range = 12 years).

Rather than assume that the European Americans recruited for the study were "American," European American participants also completed a 25-item modified version of the SL-ASIA, using a 5-point Likert-type scale ranging from 1 = *very European* to 5 = *very American*. The reliability and validity estimates also suggested that the SL-ASIA modified for European Americans was a reliable and valid measure for the European Americans in our sample. Cronbach's alpha for the SL-ASIA modified for European Americans was .68. Moreover, the average acculturation score for European Americans was significantly correlated with length of time spent in the United States ($r = .47$, $p < .002$). That is, the longer European Americans lived in the United States, the more acculturated to mainstream America they were.

The average acculturation score for European American partners was 4.06 ($SD = 0.30$), suggesting that we had recruited a sample of European American couples who adhered primarily to aspects of mainstream American culture.

PROCEDURE

The procedures used in this study of dating couples' interactions were adapted from those originally developed to study interactions of married couples (Levenson & Gottman, 1983). Each partner was instructed not to talk to the other for at least 8 hours before coming to the laboratory.³

Attachment of physiological sensors. After arriving, physiological sensors were attached to each partner, and partners individually completed a series of questionnaires concerning their relationship.

Events-of-the-day conversation. To acclimate couples to the experimental setting, the couple was instructed to have a conversation about what had happened during the 8 hours when they were separated. Before the conversation, couples were instructed to be silent for 5 minutes to obtain a baseline

measure of physiological responding (events-of-the-day preconversation silent interval). The conversation itself lasted for 15 minutes.

Conflict facilitation. Each partner individually completed a version of the Couples' Problem Inventory (Gottman, Markman, & Notarius, 1977), adapted for dating couples, in which he or she rated the perceived severity of 11 relationship issues (e.g., sex, communication, family, friends, jealousy) on a 0 to 100 scale (0 = *don't disagree at all*, 100 = *disagree very much*).⁴ After completing the inventory, the experimenter conferred with the couple regarding each partner's responses to assess the issue that was the strongest area of conflict in the relationship.

Conflict conversation. The couple was instructed to discuss and attempt to resolve the conflict identified by the experimenter during the conflict facilitation. As with the events-of-the-day conversation, the couple was instructed to be silent for 5 minutes prior to beginning their conversation (conflict preconversation silent interval) to standardize when couples began their conversations. The conflict conversation lasted for 15 minutes. During both conversations (events-of-the-day conversation and conflict conversation), measures of each partner's physiological responses were obtained, and the conversations were videotaped.

Affect ratings. Immediately following the conflict conversation, the couple's chairs were rotated so that each partner could view a video monitor. A screen was placed between partners so that they could not see each other. The couple then watched the video recording of the entire 20-minute conflict area interaction (5-minute preconversation silent interval and 15-minute conflict conversation). Each partner used a rating dial (see below) to provide continuous reports of his or her affect during the interaction.

Acculturation inventory. While the sensors were detached from each partner, partners individually completed the SL-ASIA.

APPARATUS

Relationship questionnaires. Prior to the events-of-the-day conversation, couples completed a series of questionnaires that measured various aspects of their relationship, primarily to ensure that the quality of the relationships was comparable across cultural groupings.⁵ To obtain a global measure of relationship satisfaction, each partner was asked to rate how happy he or she was overall with the relationship using a 7-point Likert-type scale ranging

from 1 = *very unhappy* to 7 = *perfectly happy*. In addition, partners were asked to indicate (a) how serious their relationship was, using a scale ranging from 1 = *not at all serious* to 7 = *extremely serious*; (b) the nature of their physical-sexual relationship (i.e., "no physical-sexual contact," "physical-sexual contact without intercourse," or "physical-sexual contact with intercourse"); and (c) whether they were in love (i.e., "yes," "no," or "I don't know").

Physiological measures. Continuous recordings of each partner's physiological responses were collected throughout the experimental session using a system consisting of a 12-channel Grass Model 7 polygraph and a Gateway 2000 microcomputer equipped with analog and digital input/output capabilities.

Physiological measures that are considered particularly relevant to emotional responding were drawn from the cardiac, electrodermal, and somatic systems. Seven measures were obtained from each partner. Cardiac measures included (a) *interbeat interval*: Beckman miniature electrodes with Redux paste were placed in a bipolar configuration on opposite sides of each partner's chest. Interbeat interval was computed by measuring the time in milliseconds between successive R waves of the EKG; (b) *finger pulse amplitude (FPA)*: A photoplethysmograph recorded the amplitude of blood volume in the finger using a photocell taped to the distal phalanx of the second finger of the nondominant hand. FPA was measured in units that reflected the amount of blood in the vasculature at the tip of the finger; (c) *pulse transmission time to the finger (PTF)*: PTF was calculated in milliseconds by measuring the time between the R wave of the EKG and the arrival of the pulse pressure wave at the finger, as indicated by the beginning of the upstroke in the FPA signal; (d) *pulse transmission time to the ear (PTE)*: A photoplethysmograph attached to the earlobe recorded the volume of blood in the ear. PTE was calculated by measuring the time in milliseconds between the R wave of the EKG and the arrival of the pulse pressure wave at the ear, as indicated by the beginning of the upstroke in the signal from the plethysmograph on the ear; and (e) *finger temperature*: A thermistor taped to the palmar surface of the distal phalanx of the fourth finger of the nondominant hand provided a measure of finger temperature in degrees Fahrenheit. The electrodermal measure was (f) *skin conductance level (SCL)*: A constant-voltage device (Med Associates) was used to pass a small voltage between Beckman regular electrodes (using an electrolyte of sodium chloride in Unibase) attached to the palmar surface of the middle phalanges of the first and third fingers of the nondominant hand. SCL was measured in microohms. The somatic measure was (g) *general somatic activity (ACT)*: ACT was obtained via an

electromechanical transducer that was attached to the platform under the participant's chair, which generated an electrical signal proportional to the amount of movement in any direction. ACT was measured in arbitrarily designated units.

Self-reported affect. The rating dial traversed a 180-degree path, ranging from 1 = *extremely negative* to 5 = *neutral* to 9 = *extremely positive*. Partners were instructed to "move the dial as often or as little as necessary so that it is always on track with how you were feeling moment by moment during the conversation." The validity of this approach as a means of obtaining continuous reports of affect has been previously established (Gottman & Levenson, 1985).

Video. To provide a video recording of couples' interactions, two remote-controlled, high-resolution video cameras were partially hidden with darkened glass between bookcase shelves. Each camera faced one of the partners to obtain a frontal view of the face and upper torso. These images were combined into a single split-screen image using a video special-effects generator. Lavalier microphones clipped to each partner's collar were used to monitor the audio portion of the interaction.

DATA REDUCTION

For the present study, only data collected during couples' conflict conversations were analyzed (this was the only conversation for which both physiological responses and self-reported affect were obtained).

Physiological responses. For each measure of physiological responding, each partner's physiological responses were averaged every second using a locally developed software package. These second-by-second data were further reduced into averages for the 5-minute preconversation silent interval and the 15-minute conflict conversation. For each physiological measure, the change in physiological responding was computed by subtracting the mean level of physiological responding during the preconversation silent interval from the mean level of physiological responding during the conflict conversation. For each measure of physiological responding, the variability in physiological responding during the conflict conversation was also calculated. The change in mean levels of physiological responding and variability in physiological responding were calculated for each partner.

Self-reported affect. Each partner's second-by-second rating dial responses were averaged for the 5-minute preconversation interval and for the 15-minute conflict conversation. Change in rating dial response was computed by subtracting the mean level of rating dial response during the preconversation interval from the mean level of rating dial response during the conflict conversation. Variability in rating dial response during the conflict conversation was also calculated. The change in mean levels of and variability in rating dial responding were calculated for each partner.

Using a computational procedure developed by Levenson and Gottman (1983), periods of positive and negative affect were derived. Rating dial data were averaged into 10-second periods and converted to z scores using the mean and standard deviation of the 90 periods that comprised the 15-minute conflict conversation: $(15 \text{ minutes} \times 60 \text{ seconds/minute})/10 \text{ seconds} = 90$ periods. Based on criteria established a priori, each period was then classified as positive, neutral, or negative. To be classified as positive, the dial pointer had to be on the positive portion of the dial and be positive relative to the participant's range of ratings during the conversation. Specifically, a period was classified as positive if the raw score was greater than or equal to 6.0 (based on the rating dial scale) and the z score was greater than or equal to 0.5. Similarly, a period was classified as negative if the raw score was less than or equal to 4.0 and the z score was less than or equal to -0.5 . Periods that did not meet these criteria were classified as neutral. The numbers of periods of positive and of negative affect were calculated separately for each partner.

DATA ANALYSIS AND HYPOTHESIS TESTING

The overall design of the study was 2×2 (Culture [Chinese American, European American] \times Partner [male, female]). Culture was treated as a between-subjects factor, and Partner was treated as a within-subject factor. Unless otherwise noted, the $p < .05$ rejection level was used for all analyses.

To determine whether Chinese Americans evidenced greater emotional moderation in physiological responding, we conducted a multivariate 2×2 (Culture \times Partner) repeated-measures analysis of variance on couples' physiological responses (change in mean levels of physiological responding, variability in physiological responding). We conducted univariate analyses of variance and planned comparisons to decompose any significant multivariate effects and interactions.

To determine whether Chinese Americans evidenced greater emotional moderation in self-reported affect, we conducted univariate 2×2 (Culture \times

Partner) repeated measures analyses of variance on each measure of self-reported affect (rating dial variability and the numbers of periods of positive and of negative affect). We conducted planned comparisons to decompose any significant interactions.

To examine whether levels of acculturation within each cultural group were related to emotional responding, we correlated partners' average acculturation scores with their measures of emotional responding.

Before presenting the data relevant to our hypotheses, we will briefly describe the couples who participated in the study. We will also present data establishing that the experimental task of discussing an area of conflict in their relationships was an effective elicitor of emotional responding for these couples.

DESCRIPTION OF COUPLES

Given the heterogeneity within dating couples, we wanted to ensure that Chinese American and European American couples' relationships were as comparable as possible. Based on their reports, couples had been involved in their relationships for a mean length of 9 to 11 months, ranging from 1 to 3 months to 2 to 2.5 years. On average, couples described their relationships as being "quite serious": On a Likert-type scale from 1 = *not at all serious* to 7 = *extremely serious*, the average rating was 6.17 ($SD = 0.65$). The majority of couples reported being in love (89% of Chinese American couples and 98% of European American couples) and moderately happy with their relationships: Using a 7-point Likert-type scale ranging from 1 = *extremely unhappy* to 4 = *happy* to 7 = *extremely happy*, the mean relationship satisfaction rating was 5.63 ($SD = 1.16$). Chi-square tests revealed no significant differences in mean relationship length or in reports of being in love between partners or cultural groups. Similarly, one-way analyses of variance revealed no significant main effects or interactions involving culture and partner in how serious partners reported their relationships to be or how happy they reported being with the current state of their relationship.

Chinese American couples and European American couples did differ in the physical-sexual nature of their relationships, as revealed by chi-square tests, $\chi^2(2) = 6.29, p < .05$. Sixty-two percent of Chinese American couples reported engaging in "physical-sexual contact with intercourse," whereas 95% percent of European Americans did.

In summary, Chinese American and European American couples were comparable in their relationship length and views of how serious, happy, and in love they were. The only difference that emerged between the two cultural groups was the degree of reported physical-sexual activity.

AREAS OF CONFLICT

As discussed above, couples were given an inventory to rate the amount of disagreement caused by a number of common relationship issues. The experimenter instructed the couple to discuss the issue that was the strongest area of conflict in their relationship, based on their ratings and comments during the facilitation. The most commonly discussed area of conflict was "jealousy" (discussed by 8 out of 42 couples); the second was "communication" (discussed by 7 out of 42 couples). A chi-square test revealed no significant effect of culture or partner on the frequency with which couples talked about the various topics. Finally, one-way analyses of variance revealed no cultural or partner differences in the perceived severity of the discussed topic.

PRECONVERSATION DIFFERENCES IN PHYSIOLOGY AND SELF-REPORTED AFFECT

Physiology. To examine whether there were any cultural or partner differences in physiological responding during the conflict preconversation silent interval, we conducted a 2×2 (Culture \times Partner) MANOVA on mean levels of physiological responding during the preconversation interval. These analyses revealed no significant main effects or interactions involving culture. Thus, Chinese Americans and European Americans did not differ significantly in their levels of physiological responding during this 5-minute preconversation silent interval.

The multivariate effect of partner, however, was significant, multivariate $F(1, 37) = 17.74, p < .05$. Univariate analyses revealed a significant partner difference in ACT. Female partners moved less than male partners (females: $M = 0.81, SD = 0.43$; males: $M = 1.18, SD = .57; t[41] = 4.23; p < .05$). We suspect that partner differences in ACT may have been due to possible differences in body size. Because we did not obtain measures of height and weight, however, we were unable to test this possibility directly.

Self-reported affect. We conducted a 2×2 (Culture \times Partner) analysis of variance on mean levels of rating dial response during the preconversation silent interval. No main effects or interactions involving culture or partner were found. Thus, there were no differences in how Chinese Americans and European Americans or in how female and male partners reported feeling during the preconversation silent interval.

In summary, we found no cultural differences in physiological responding or self-reported affect during the preconversation silent interval. There was

only one partner difference in physiological responding (in ACT) during the preconversation silent period but no partner differences in self-reported affect.

WAS THE CONFLICT CONVERSATION AN EFFECTIVE ELICITOR OF EMOTIONAL RESPONDING?

Physiology. To ensure that having couples discuss the strongest area of conflict in their relationships was an effective elicitor of emotional responding, we conducted $2 \times 2 \times 2$ (Culture [Chinese American, European American] \times Partner [female, male] \times Interval [preconversation, conversation]) MANOVA on couples' mean levels of physiological responding. Culture was treated as a between-subjects variable; partner and interval were treated as within-subject variables. We predicted that if the conflict conversation was an effective elicitor of emotional responding, the main effect of interval would be significant. Specifically, we would find increases in physiological responding during the conversation compared to the preconversation silent interval levels.

As predicted, analyses revealed a significant main effect of interval: multivariate $F(7, 31) = 14.77$, Hotelling's value = 3.34, $p < .001$. Univariate analyses revealed a significant main effect of interval for cardiac interbeat interval, $F(1, 40) = 59.93$, $p < .05$; ACT, $F(1, 40) = 75.70$, $p < .001$; SCL, $F(1, 40) = 14.25$, $p < .001$; FPA, $F(1, 40) = 20.62$, $p < .001$; and PTE, $F(1, 40) = 4.41$, $p < .05$. As predicted, the bulk of our findings suggests that during their conflict conversations, couples were more physiologically aroused than during the preconversation silent interval. Specifically, couples demonstrated shorter cardiac interbeat intervals, greater ACT, greater SCLs, and smaller FPA. Contrary to predictions, PTEs were longer during the conflict conversation than during the preconversation intervals, indicating less arousal in this measure (see Table 1).

In summary, across both cultural groups, couples were more physiologically aroused during the conversations than during the preconversation intervals, demonstrating that our experimental task was an effective elicitor of emotional response. Most findings were consistent across partners. There were no significant main effects or interactions involving culture.

Self-reported affect. To assess whether couples' self-reported affect differed during the conversation from preconversation silent interval levels, we conducted a $2 \times 2 \times 2$ (Culture \times Partner \times Interval) univariate analysis of variance on couples' mean levels of rating dial responding. We predicted that if the conflict conversation were an effective elicitor of emotional responding,

TABLE 1
**The Effect of Interval on Mean Levels of Physiological
 and Rating Dial Responses During Conflict**

Measure	M (SD)		F(1, 40)	p
	Preconversation	Conversation		
Physiological				
IBI	795.24 (105.48)	766.11 (94.93)	59.93	< .001
ACT	0.99 (0.53)	1.65 (0.67)	75.70	< .001
SCL	6.62 (3.18)	7.11 (3.23)	14.25	< .001
PTF	266.26 (22.48)	265.45 (19.65)	—	<i>ns</i>
FPA	9.76 (4.96)	8.40 (4.51)	20.62	< .001
PTE	196.16 (25.34)	198.45 (24.99)	4.41	.04
TEM	88.97 (6.84)	89.13 (6.84)	—	<i>ns</i>
Reported affect				
Rating dial	4.71 (0.82)	4.39 (0.92)	5.70	.02

NOTE: IBI = cardiac interbeat interval; ACT = general somatic activity; SCL = skin conductance level; PTF = pulse transmission time to the finger; FPA = finger pulse amplitude; PTE = pulse transmission time to the ear; TEM = finger temperature; *ns* = not significant at the $p < .05$ level. Decreases in IBI, PTF, FPA, PTE, and TEM and increases in ACT and SCL indicate greater arousal.

the main effect of interval would be significant. Specifically, couples would report feeling more negative during the conversation compared to the pre-conversation silent interval.

As predicted, the main effect of interval was statistically significant; couples reported feeling more negative during the conversation than during the preconversation silent interval (preconversation silent interval: $M = 4.71$, $SD = .81$; conversation: $M = 4.39$, $SD = .92$; $F[1, 40] = 5.70$, $p < .05$).

In summary, couples reported feeling more negative during their conflict conversations than during the preconversation silent interval, lending support to the efficacy of the experimental task as an elicitor of emotional responding. Again, these findings held across cultural and partner groupings.

EMOTIONAL RESPONDING DURING CONFLICT

Physiology. To test our hypotheses of cultural differences in emotional responding during conflict, we conducted 2×2 (Culture \times Partner) MANOVAs on the change in physiological levels during the conversation (conversation mean minus preconversation silent interval mean). These analyses revealed that the multivariate main effect of culture and the Culture \times Partner

TABLE 2
The Effect of Culture on Variability
in Physiological Responding During Conflict

Measure	M (SD)		F(1, 40)	p
	Chinese Americans	European Americans		
IBI	39.55 (10.99)	48.65 (15.29)	8.37	.006
ACT	0.87 (0.38)	0.97 (0.50)	—	<i>ns</i>
SCL	0.80 (0.54)	0.56 (0.37)	4.48	.04
PTF	13.02 (2.43)	12.56 (3.02)	—	<i>ns</i>
FPA	2.19 (1.17)	2.03 (1.09)	—	<i>ns</i>
PTE	7.41 (4.80)	7.59 (3.64)	—	<i>ns</i>
TEM	0.93 (0.83)	1.08 (0.67)	—	<i>ns</i>

NOTE: IBI = cardiac interbeat interval; ACT = general somatic activity; SCL = skin conductance level; PTF = pulse transmission time to the finger; FPA = finger pulse amplitude; PTE = pulse transmission time to the ear; TEM = finger temperature; *ns* = not significant at the $p < .05$ level.

interaction were not statistically significant. Thus, contrary to our hypotheses, Chinese Americans and European Americans were not significantly different in their mean levels of physiological responding.

The main effect of partner, however, was significant: multivariate $F(7, 31) = 3.16$, Hotelling's value = .71, $p < .05$. Univariate analyses revealed significant partner differences in ACT, univariate $F(1, 40) = 11.35$, $p < .01$, and finger temperature, univariate $F(1, 39) = 4.40$, $p < .05$. Specifically, female partners demonstrated smaller increases in movement (females: $M = .52$, $SD = .43$; males: $M = .79$, $SD = .66$) and greater increases in finger temperature (females: $M = .57$, $SD = 1.82$; males: $M = -.25$, $SD = 1.63$) than their male counterparts. To the extent that increases in finger temperature are associated with relaxation, this might indicate lesser physiological arousal on the part of female subjects.

We also conducted 2×2 (Culture \times Partner) MANOVAs on the variability in physiological responding during the conflict conversation. These analyses revealed a significant main effect of culture: multivariate $F(7, 31) = 3.08$, $p < .05$. Univariate analyses revealed two significant cultural differences in physiological variability. Chinese Americans demonstrated (a) less variability in cardiac interbeat interval and (b) greater variability in SCLs than European Americans (see Table 2).

In summary, for the physiological aspect of emotional responding, our findings were mixed with respect to notions of greater emotional moderation in Chinese culture. We found no cultural differences in mean levels of change in physiological responding. We found cultural differences in physiological

TABLE 3
Effect of Culture on Reported Affect During the Conflict Conversation

Measure	M (SD)		F	p
	Chinese Americans	European Americans		
Mean change from preconversation	-0.44 (0.95)	-0.19 (1.13)	—	<i>ns</i>
Variability	0.94 (0.36)	1.22 (0.44)	7.40	.009
Periods of positive affect	7.36 (8.81)	13.20 (10.02)	5.28	.03
Periods of negative affect	20.16 (13.04)	21.85 (12.28)	—	<i>ns</i>

NOTE: *ns* = not significant at the $p < .05$ level.

variability, but only one of these (lesser variability among Chinese Americans than European Americans in cardiac interbeat interval) supported ethnographic notions of greater emotional moderation in Chinese culture.

Self-reported affect. We analyzed couples' self-reported affect during the conflict conversation by conducting 2×2 (Culture \times Partner) analyses of variance on change in mean levels of rating dial response (conversation mean minus preconversation silent interval mean), rating dial variability, and the numbers of periods of positive and negative affect during the conflict conversation.

We found no significant main effects or interactions involving culture for mean levels of rating dial response. There were, however, significant effects of culture on rating dial variability and on the number of periods of positive affect. Consistent with notions of greater emotional moderation, Chinese Americans' rating dial responses were less variable, and they reported fewer periods of positive affect than their European American counterparts. However, there were no significant cultural differences in the number of periods of reported negative affect (see Table 3).

In summary, supporting ethnographic notions of greater emotional moderation in Chinese culture, Chinese American couples' rating dial responses were less variable and less positive than those of European American couples. Contrary to ethnographic notions, there were no cultural differences in periods of reported negative affect.

ACCULTURATION AND EMOTIONAL RESPONDING

To examine whether individuals who were more acculturated to mainstream European American culture demonstrated less emotional moderation and control than those who were less acculturated to mainstream American

culture, for each cultural group, we examined the relationship between partners' average acculturation scores and their emotional responding as measured by the variables for which significant cultural differences emerged (i.e., cardiac interbeat interval variability, SCL variability, rating dial variability, and periods of positive affect).

We found that the relationship between average levels of acculturation and rating dial variability was marginally significant for Chinese Americans ($r = .28, p = .07$) and significant for European Americans ($r = .35, p < .05$). The more acculturated Chinese Americans and European Americans were to mainstream European American culture, the more variable (and therefore, less moderated and controlled) their rating dial responses were. For both cultural groups, however, the relationships between average levels of acculturation and the other measures of emotional responding for which significant cultural differences emerged (i.e., cardiac interbeat interval variability, SCL variability, periods of positive affect) were not significant.

In summary, our hypothesis that the more acculturated the individuals of each cultural group were to mainstream European American culture, the less they would demonstrate emotional moderation and control was confirmed, but only in rating dial variability.

DISCUSSION

Our study of dyadic interaction in Chinese American and European American dating couples was designed to provide a test of ethnographic notions of greater emotional moderation in Chinese culture compared to European American culture. The paradigm we chose met several criteria that we consider advantageous for adequately testing this proposition: (a) emotion was studied as it occurred, rather than retrospectively or through judgments of words or visual images; (b) an interpersonal context was used, rather than studying single participants in social isolation; and (c) both subjective and physiological aspects of emotion were evaluated.

EVIDENCE OF GREATER EMOTIONAL MODERATION IN CHINESE AMERICANS THAN IN EUROPEAN AMERICANS

Physiology. One of the two cultural differences we found in physiological responding—variability in cardiac interbeat interval—supports notions of greater emotional moderation in Chinese American culture (i.e., Chinese Americans' second-to-second changes in heart rate were dampened relative to those of their European American counterparts).

The other cultural difference in physiological responding (lesser skin conductance variability among European Americans than Chinese Americans), however, ran contrary to ethnographic notions. Given this inconsistency and considering that most of our measures of physiological responding (12/14 = 86%) did not reveal significant cultural differences, it appears that consistent cultural differences in emotional moderation did not extend to the physiological realm in this study.

We considered the possibility that the lack of cultural differences in physiology resulted from large error variance among these measures. We believe this to be unlikely for two reasons: (1) our physiological measures were sufficiently sensitive to detect differences between Chinese Americans and European Americans in cardiac interbeat interval and SCL variability, and (2) they were sensitive enough to detect differences between partners in somatic activity and in finger temperature. Therefore, we interpret our finding of minimal cultural differences in physiological responding as suggesting that Chinese Americans and European Americans were highly similar in their physiological responses during their conflict conversations. These findings are consistent with other studies from our laboratory and those of Lazarus et al. (1966), that find minimal cultural differences at the level of physiological responding.

Self-reported affect. In the realm of self-reported affect, we found cultural differences that can be construed as consistent with Chinese norms regarding emotional moderation. Chinese Americans' self-reports of affect were less variable than those of European Americans (i.e., Chinese Americans' second-to-second changes in self-reported affect were dampened compared to those of European Americans).

Chinese Americans also reported fewer periods of positive affect than European Americans. Because conservative criteria were used for deriving this measure (only relatively extreme periods of positive affect were counted), this finding provides strong support of greater emotional moderation among Chinese Americans. These cultural differences in self-reported affect are consistent with those of Levenson et al. (1992), in which members of the Minangkabau culture demonstrated less intense (i.e., more moderate) reports of emotion while maintaining similar levels of physiological responding compared with European American subjects.

It is important to note that the signs of emotional moderation by Chinese Americans (less variability in rating dial response, fewer periods of positive affect, and less variability in cardiac interbeat interval) occurred against a backdrop of no cultural differences in the rating of the severity of the relationship conflict that was being discussed and no consistent cultural

differences in physiological responding. Given these cultural similarities, the moderation by Chinese Americans in the realm of self-reported affect is all the more striking.

Considering ethnographic descriptions, however, we were surprised to find no differences between Chinese Americans and European Americans in the number of periods of negative affect. One possible explanation derives from work by Colby and Emmons (1994), who found that individuals with more emotionally closed expressive personality styles report having lesser amounts of positive affect but no differences in amounts of negative affect than those with more emotionally open personality styles. A cultural extension of this finding would predict that adhering to norms of emotional moderation and control might influence reports of positive affect more than negative affect. It remains difficult, however, to resolve this prediction with the clear theme in ethnographic descriptions that negative affect is moderated in Chinese culture.

One other explanation lies in the possibility that cultural differences in self-reported affect were due to cultural biases in response style. Members of Chinese culture have been shown to use the midpoint in rating scales more than members of North American cultures, whereas members of the United States have been shown to use the extreme values more than members of Chinese culture (Chen, Lee, & Stevenson, 1995). In fact, these authors found that in both Chinese and U.S. cultures, participants who reported being more individualistic were more likely to use the extreme values of the rating scales than those who were less individualistic. In our study, one could argue that Chinese American rating dial responses were less variable and were composed of fewer periods of positive affect (a count of fairly extreme positive ratings) because of Chinese biases to avoid the extreme ends of the rating scale. However, the number of periods of negative affect (a count of fairly extreme negative ratings) reported during the conflict conversation did not differ between Chinese Americans and European Americans, which argues against this hypothesis. Beyond this, Chen et al. (1995) found that even when cultural biases in response styles are taken into account, they do not significantly change the outcome of comparisons between cultural groups. Thus, in all likelihood, our findings reflect that fact that Chinese Americans in our study moderated their emotions more than European Americans.

We had hypothesized that those Chinese Americans who reported being more acculturated to mainstream American culture would demonstrate emotional responses more similar to their European American counterparts (i.e., less emotional moderation and control). We found this to be true for rating dial variability. Both Chinese Americans and European Americans who were more acculturated to mainstream European American culture demonstrated

more variable (less moderated and controlled) rating dial responses. Unexpectedly, we did not find a significant relationship between levels of acculturation and the other measures of emotional responding for which significant cultural differences emerged (i.e., variability in cardiac interbeat interval and SCLs and periods of positive affect). It is possible that in our attempts to recruit a bicultural Chinese American sample, we restricted the range of levels of acculturation and, therefore, were not able to examine relationships between acculturation levels and these measures of emotional responding. It is also possible that for these measures of emotional responding, aspects of culture that were not represented by the SL-ASIA may have been more important (e.g., the endorsement of specific cultural values regarding emotional moderation and control). Future studies that examine the emotional responding of other Chinese samples (e.g., college and community samples in China, Taiwan, or Hong Kong) and employ multidimensional measures of acculturation that include cultural values and beliefs will further clarify this issue.

LIMITATIONS AND FUTURE DIRECTIONS

As we indicated at the outset, there has been almost no cross-cultural research studying multiple aspects of emotion as they occur in interpersonal contexts. Despite meeting these important criteria, our study has several limitations. First, although we measured the physiological and subjective aspects of emotion, we did not measure a third important aspect of emotional responding—expressive behavior. A problem that is inherent in cross-cultural studies of emotion is the difficulty of knowing whether differences between cultures in self-reported affect reflect real differences in experienced affect, differences in cultural rules regarding the disclosure of emotional states, or both. For example, a finding that members of Culture A report more sadness when thinking about the loss of a loved one than members of Culture B suggests actual differences in feeling. However, the reality may be that the underlying degree of felt sadness is the same for members of the two cultures, but in Culture A the norm is to describe exactly how you feel, whereas in Culture B the norm is not to burden others with your negative feelings. By comparing the expressive behavior of Chinese American and European American couples in our study (e.g., using microanalytic behavioral coding techniques such as the Facial Action Coding System, Ekman & Friesen, 1978), we can assess which of these possibilities is supported by findings from the third aspect of emotional responding.

Second, our study is limited in terms of the generalizability of our findings. We based our analyses on a conversation about an area of relationship

conflict. It will be important to extend this work to include other kinds of interactions, especially those that do not pull so strongly for negative affect (e.g., conversations of pleasant topics as in Levenson, Carstensen, & Gottman, 1994), as well as to relationships of longer duration (e.g., more serious dating relationships, marriages), community-based samples, and other Chinese samples (as discussed above). It should be noted that because college can be such a culturally homogenizing environment, one would expect that cultural differences would be less likely to emerge in college samples than in community samples. For this reason, our study can be considered an extremely conservative test of cultural differences.

Third, future studies should include assessments of individuals' endorsements of specific cultural values and beliefs regarding emotional expression. It is possible that these specific cultural values and beliefs are more related to emotional responding than overall levels of acculturation or cultural orientation.

Finally, we should note an important issue that was not addressed in the present study, namely the extent to which culturally appropriate behavior was influenced by the experimental context. In our study, we found that Chinese American couples evidenced emotional moderation, which ethnographies suggest is appropriate in Chinese culture. Several authors have pointed out that Chinese may be most likely to demonstrate culturally appropriate behavior in the presence of authority figures (Bond & Hui, 1982; Leung & Bond, 1984). This "gating" of culturally appropriate behavior has been demonstrated experimentally with Japanese subjects, whose emotional responses changed in culturally appropriate ways when an authority figure was present (Ekman, 1972; Friesen, 1972). In our experiment, it is unclear whether participants appraised the situation as one in which they were being observed by an authority figure (e.g., the experimenter). In our ongoing work, we are explicitly evaluating these issues by investigating the impact of the presence and absence of an authority figure on the emotional responses of Chinese American couples.

NOTES

1. When describing differences between cultural groups, two caveats are in order. First, there is considerable variation within each cultural group. Chinese Americans vary greatly in their adherence to traditional Chinese values and their adoption of mainstream European American ones (Sue & Sue, 1991). Second, statements concerning cultural norms exist in reference to particular cultural groups. For example, the emotions of many Chinese may appear moderated and controlled only when compared to those of European Americans, who have consistently served as the comparison group in cross-cultural studies of emotion.

2. Despite common criticisms regarding the unidimensionality and bipolar nature of this particular acculturation inventory, it remains the most widely used acculturation assessment tool for Asian American populations. Using it in this study enabled us to maintain comparability with other studies of acculturation of various Asian American subgroups.

3. We did not assess whether couples complied with this instruction.

4. Because the Couples' Problem Inventory (Gottman, Markman, & Notarius, 1977) has been typically used to assess areas of disagreement among married couples, psychometric data using this measure with dating couples and couples of different cultural groups were not available. Therefore, we were unable to compare the reliability and validity estimates of the instrument for our sample with those of other samples. However, for our sample, we found this measure to have comparable levels of internal consistency for Chinese Americans and European Americans (Cronbach's alpha for Chinese Americans = .75; Cronbach's alpha for European Americans = .68). To examine the validity of the Couples' Problem Inventory in this sample, we correlated average ratings of perceived severity across the 11 relationship issues with ratings of relationship satisfaction. We found that the two were significantly correlated for each cultural group; that is, the greater the average severity of relationship issues, the less happy partners reported being with their relationships (Chinese Americans: $r = -.43, p < .01$; European Americans: $r = -.37, p < .05$).

5. For the purposes of this report, comparisons in the relationship quality of Chinese American and European American couples were made to ensure that there were no cultural differences in how serious and committed couples were.

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