

Emotion control values and responding to an anger provocation in Asian-American and European-American individuals

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The present research examined whether Asian-American (AA) versus European-American (EA) women differed in experiential, expressive, or autonomic physiological responding to a laboratory anger provocation and assessed the mediating role of values about emotional control. Results indicate that AA participants reported and behaviourally displayed less anger than EA participants, while there were no group differences in physiological responses. Observed differences in emotional responses were partially mediated by emotion control values, suggesting a potential mechanism for effects of cultural background on anger responding.

Keywords: Emotional responding; Asian-American and European-American cultural background; Mediation; Cultural values; Anger experience; Anger expression; Autonomic physiology.

Understanding cultural differences is a pressing and practical concern, with implications for nearly every aspect of human exchange. For example, cultural differences in prescriptions of how emotions (e.g., anger) should be experienced and expressed may translate into differences in actual emotional responses and in turn have implications

for individual well-being and interpersonal interactions (Ekman & Friesen, 1969; Hochschild, 1979; Hofstede, 1980; Markus & Kitayama, 1991; Triandis, 1990). Asian/Asian-American (AA) and European/European-American (EA) cultures provide an interesting contrast in this regard because cumulative research suggests that AA culture

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values emotion control (i.e., modulating one's own emotional experiences and expressions) more than EA culture (cf. Bond, 1993; Ekman, 1972; Klineberg, 1938; Markus & Kitayama, 1991; Matsumoto, 1993; Potter, 1988; Russell & Yik, 1996; Tsai, Knutson, & Fung, 2006a; Wu & Tseng, 1985). Similarly, in laboratory studies of emotion, AAs and EAs have been found to differ in some aspects of emotional responding (e.g., AAs report less positive affect than EAs; Tsai & Levenson, 1997). Researchers have proposed that these differences in emotional responding are due in part to culturally specific values about emotion and emotion control (Eid & Diener, 2001; Kitayama & Park, 2007; Matsumoto, 1990). However, few studies have tested this notion.

We conducted two studies in which we (1) assessed differences in emotion control values (ECV; defined as the extent to which individuals believe that people should generally control [modulate] their emotions) between Asian-American (AA) and European-American (EA) individuals, (2) examined AA versus EA women's experiential, expressive, and physiological responding to a laboratory anger induction, and (3) assessed whether individuals' ECV mediated any observed group differences in anger responding.

Differences between AA and EA cultural backgrounds in emotion control values

We defined culture as "patterns of historically derived and selected ideas and their embodiment in institutions, practices, and artifacts" (Kroeber & Kluckholm, 1952, p. 357). This definition does not imply that all people from one cultural background are alike. Rather, they are expected to show some similarities in psychological functioning to the extent that they engage in particular cultural contexts and endorse values characteristic of that context (Kitayama & Park, 2007). Culturally specific values, then, are values that covary with other core cultural ideas and practices (Kitayama, 2002).

One important framework for understanding potential differences between AA and EA values about emotion control is the distinction between

interdependent versus independent construals of the self (Hofstede, 1980; Markus & Kitayama, 1991; Triandis, 1994). According to this distinction, members of Asian cultures tend to define and think about themselves relative to members of an in-group ("interdependent"). Because group concerns are weighed relatively more strongly than individual concerns, individual self-control—including emotion control—is highly valued (Bond, 1993; Ekman, 1972; Kim & Markus, 2002; Kitayama, Mesquita, & Karasawa, 2006; Markus & Kitayama, 1991; Potter, 1988; Tsai et al., 2006a; Wu & Tseng, 1985). For example, Klineberg (1938) reported that Chinese individuals generally describe emotions as dangerous, value emotional moderation, and emphasise social harmony over individuals' expression of emotions.

In contrast, members of European-American cultural backgrounds tend to conceive of themselves as an entity independent of social context, even with respect to an in-group (Markus & Kitayama, 1991). Compared to members of interdependent cultures, members of independent cultures are expected to value emotion control to a lesser extent because emotional experience and expressions allow the individual to assert and experience the self as an independent entity (Kim & Sherman, 2007; Matsumoto, 1990). Indeed, EA individuals tend to view emotions and their expression as signs of psychological health and an individual's authenticity (Bellah, Madson, Sullivan, Swidler, & Tipton, 1985; Marshall, 1972; Tavis, 1984).

Psychological studies comparing AA and EA participants support this distinction. North-American participants report more strongly wishing to feel positive or negative emotions as compared to East-Asian participants (Diener, Suh, Smith, & Shao, 1995; Eid & Diener, 2001; Izard, 1971; Sommers, 1984). In addition, AAs compared to EAs tend to rate emotion expression as less appropriate (Matsumoto, 1993), are more likely to report suppressing emotional behaviours (Gross & John, 2003; Triandis, 1994), and exhibit more positive correlates when they are instructed to suppress their emotions (Butler, Lee, & Gross, 2007).

While these effects vary across specific emotions and situations (e.g., Eid & Diener, 2001; Matsumoto, 1993; Matsumoto, Takeuchi, Andayani, Kouznetsova, & Krupp, 1998), some values appear common to emotions in general as well (Klineberg, 1938; Markus & Kitayama, 1991; Matsumoto, 1993; Potter, 1988; Russell & Yik, 1996; Wu & Tseng, 1985).

Differences between AA and EA groups in emotional responding

In addition to differences in values about emotion control, several laboratory and online-sampling studies have provided evidence supportive of the hypothesis that AAs are more moderate in their *actual* emotional responses than EAs (e.g., Diener et al., 1995; Kitayama, Markus, & Kurokawa, 2000; Le, Berenbaum, & Raghavan, 2002; Mesquita & Karasawa, 2002; Tsai & Levenson, 1997; Tsai et al., 2006a). However, this general statement has to be qualified in three ways. First, cultural background affects different components of emotions to different extents (Frijda, 1986; Scherer, 2004) such that cultural differences in emotional experience and behaviour but not in physiological responding have been documented (Lazarus, Opton, Tomita, & Kodama, 1966; Roberts & Levenson, 2006; Tsai, Chentsova-Dutton, Freire-Bebeau, & Przymus, 2002; Tsai & Levenson, 1997; Tsai, Levenson, & Carstensen, 2000a; Tsai, Levenson, & McCoy, 2006b; see also Levenson, Soto, & Pole, 2007, for a review). Second, some studies have not found cultural differences even in experience or behaviour (e.g., Oishi, 2002; Tsai et al., 2000a). To explain why sometimes no cultural differences are found, it has been noted that personally relevant, intense, and interpersonal situations appear best suited to reveal cultural differences in emotional responding (e.g., Roberts & Levenson, 2006; Tsai et al., 2002). Third, emotion type matters. Kitayama and colleagues (2000, 2006) have argued that interdependent cultural contexts should particularly discourage “socially disengaging” emotions (e.g., pride, anger), which promote distinction of individuals from their social context. For “socially

engaging” emotions (e.g., friendly feelings, guilt), which promote social harmony, the general norm of controlling emotions might conflict with other goals for achieving interpersonal harmony and thus not hold as strongly. In line with this hypothesis, Kitayama and colleagues (2006) found that EA participants reported experiencing socially *disengaging* emotions more intensely than Japanese participants, while the groups did not differ in socially engaging emotions (see also Scollon, Diener, Oishi, & Biswas-Diener, 2004).

Anger is a focal example of a socially disengaging emotion, and, in line with predictions, people from Asian and European cultural backgrounds have been shown to differ in some studies examining self-reported anger (e.g., Ramirez, Andreu, & Fujihara, 2001). While some studies have not shown differences between AA and EA participants’ self-reported display rules regarding anger and self-reported frequency of anger expressivity (Matsumoto, 1993), one can argue that self-reports of anger expression are limited because anger is generally an undesirable emotion. To our knowledge, two studies have provided measures of expressive or physiological responding to laboratory anger inductions among Asian versus European participants. Drummond and Quah (2001) compared experiential and physiological responses of European- versus Chinese-descent Australian males to an anger recall task. Suchday and Larkin (2004) compared Indian-American and European-American men’s experiential, expressive, and physiological responses to two anger provocations. In these studies, participants differed only on select physiological measures or not at all in anger responding. However, in both studies participants were instructed to modulate their behaviour during the anger inductions, which may have obstructed differences between ethnic groups (cf. Roberts, Levenson, & Gross, 2008). In sum, then, studies of socially disengaging emotions predict that AA should exhibit less anger than EA participants, while results from the few laboratory studies of anger are ambiguous.

Together, the studies we reviewed suggest that EA and AA individuals differ in terms of emotion

experience and expressive behaviour but not physiological responding. These differences are most likely to be apparent in personally relevant, intense interpersonal situations and with respect to socially disengaging emotions such as anger. One important question is through what mechanism these cultural group differences emerge. As noted earlier, researchers have proposed that cultural differences in emotional responses are at least partly due to individuals' values about emotion (Eid & Diener, 2001; Kitayama & Park, 2007; Markus & Kitayama, 1991; Matsumoto et al., 2008; Tsai et al., 2006b; van Hemert, Poortinga, & van de Vijver, 2007), in addition to factors such as situational demands, genetic factors, or temperament. However, few studies have directly tested whether observed cultural differences can be accounted for by cultural values.

The present research

The present research was designed to address two hypotheses: First, differences between ethnic groups in response to an anger provocation should emerge more strongly in experience and expressive behaviour than in physiology. Second, these differences would be partially mediated by emotion control values (ECV). The present studies assessed: (1) differences between AA and EA participants in ECV (Studies 1 and 2); (2) differences between AA and EA participants in experiential, expressive, and physiological responding to an anger provocation (Study 2); and (3) whether ECV mediate any differences in anger responding (Study 2). We focused our investigation on one factor—values—that has been hypothesised to play a particularly important role in cultural differences (Eid & Diener, 2001; Hochschild, 1979; Markus & Kitayama, 1991; Tsai et al., 2006b).

We focused on AA and EA cultural backgrounds because cumulative research leads one to expect that individuals from these two backgrounds would clearly differ from each other in values regarding emotions (Klineberg, 1938; Markus & Kitayama, 1991). We operationalised cultural background as ethnic background, because

ethnicity often covaries with cultural ideas and practices (Matsumoto, 1993; Oyserman, Coon, & Kimmelmeier, 2002). Ideally, one would directly measure the cultural ideas and practices that presumably are the “active ingredient” in the effects of culture (cf. Kitayama, 2002). However, because this is often difficult, we and others use ethnicity to operationalise cultural background (Butler et al., 2007; Kim, Sherman, Ko, & Taylor, 2006; Matsumoto, 1993; Tsai et al., 2006a,b). Consistent with this decision, we use the terms “cultural background” when we refer to culture as our construct of interest and “ethnic background” when we refer to our operationalisation of cultural background.

We focused on anger for two reasons. First, an anger provocation allows for the creation of an intense, personally relevant emotional context of the kind that has most consistently produced cultural differences in emotional responses. Second, anger is a focal example of a socially disengaging emotion, on which people from Asian and European cultural backgrounds have been shown to differ in studies of self-reported emotion (e.g., Kitayama et al., 2006).

STUDY 1: CULTURAL BACKGROUND AND EMOTION CONTROL VALUES

Various measures exist to assess values that may differ across cultures (e.g., individualism–collectivism; Triandis, 1990), habitual emotion regulation (i.e., how individuals report that they typically regulate their emotions; e.g., Gross & John, 2003), values regarding controlling specific emotions in specific situations (Timmers, Fischer, & Manstead, 2003; Tsai et al., 2006a), or display rules (i.e., rules concerning the behavioural expression of particular emotions; Matsumoto et al., 1998). However, we hypothesised that AA and EA individuals would also differ with respect to general ideas about emotion (e.g., emotions are dangerous versus functional; cf. Hochschild, 1979; Klineberg, 1938; Markus & Kitayama, 1991; Matsumoto, 1993; Russell & Yik, 1996). We

thus aimed to develop a measure that would capture such values (Emotion Control Values; ECV).

Our first goal for Study 1 was to provide validation for this measure. To do so, we correlated this measure of ECV with established measures of emotion regulation. Because we expected that individuals who tend to believe that emotions should be controlled would engage in emotion regulation relatively frequently, we hypothesised moderate positive correlations between ECV and measures of habitual emotion regulation. At the same time, however, ECV should not be redundant with habitual emotion regulation, because habitual emotion regulation is influenced by other factors (e.g., ability) as well. Our second goal was to examine whether Asian-American (AA) and European-American (EA) participants differed systematically in ECV. Based on the literature reviewed above, we hypothesised that AA participants would report greater ECV than EA participants.

Methods

Participants

Questionnaires were administered to a total of 506 undergraduate students (age $M = 19.9$ years, $SD = 2.5$ years); 435 (86%) female; 367 (75%) EA and 139 (25%) AA; along with a number of other questionnaires not relevant to the present study. AA participants were those who selected "Asian/Asian American", and EA participants were those who selected "European/European American" on an item that asked "What is your ethnic background?" and provided eight ethnic-identification options.

Measures

Emotion control values (ECV). As noted above, this scale was created to capture relatively general values about emotion control. We generated items by examining existing scales of emotion regulation (e.g., the Emotion Regulation Questionnaire; Gross & John, 2003) and by asking members of an ethnically diverse research team how they would describe their values regarding emotion

control. We excluded redundant items and items that did not seem face valid to all members of the team. This procedure yielded the following six items: (1) "People should not express their emotions openly"; (2) "It is wrong for people to always display how they feel"; (3) "It is better for people to let out pent up emotions" (reversed); (4) "People should show their emotions when overcome with strong feelings" (reversed); (5) "People in general should control their emotions more"; and (6) "I think it is appropriate to express emotions, no matter whether negative or positive" (reversed). Cronbach's alphas were adequate with .64 for the AA and .71 for the EA sample.

Emotion regulation. Trait emotion regulation was assessed with two scales. First, we used the Suppression scale from the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003), a widely used measure of expressive control. The Suppression scale includes four items that tap the tendency to control emotions by not expressing them (e.g., "I control my emotions by not expressing them"), alphas were .69 for AA ($N = 138$) and .71 for EA participants ($N = 320$). Second, we used the Venting Scale from the COPE Inventory (Carver, Scheier, & Weintraub, 1989), which measures the *lack* of emotional control with four items (e.g., "I get upset and let my feelings out"), alphas were .75 for AA ($N = 66$) and .86 for EA participants ($N = 82$). Some of the questionnaires were not administered to the full sample, leading to variation in cell sizes across different analyses.

Results

Emotion control values and emotion regulation. ECV scores correlated in the expected direction with the measures of habitual emotion regulation such that ECV scores were positively correlated with the tendency to suppress emotions, $r(137) = .43$ for AA and $r(319) = .43$ for EA participants, $ps < .001$, and negatively correlated with emotional venting, $r(65) = -.28$ for AA and $r(81) = -.38$ for EA participants, $ps < .05$.

Ethnic background and emotion control values. As predicted, there were significant differences in ECV such that AA participants ($M = 4.0$, $SD = 1.2$) reported greater ECV than EA participants ($M = 3.6$, $SD = 1.3$), $F(1, 504) = 11.3$, $p < .001$, $\eta^2 = .02$. Because half of the items on the ECV scale were reverse scored, this difference was unlikely to be caused by variations in response style between the two cultural groups.

Gender was also significantly associated with ECV, such that male participants ($M = 4.2$, $SD = 1.3$) reported greater ECV than female participants ($M = 3.6$, $SD = 1.3$), $F(1, 504) = 11.7$, $p < .001$, $\eta^2 = .02$. However, gender did not interact with ethnic background ($p = .98$), suggesting that the effects of ethnic group hold across both genders.

There were also significant group differences in habitual emotion regulation such that AA participants ($M = 3.7$, $SD = 1.2$) reported greater habitual emotion suppression than EA participants ($M = 3.4$, $SD = 1.1$), $F(1, 456) = 7.1$, $p < .01$, $\eta^2 = .02$. However, the two groups did not differ in the measure of venting ($p = .57$).

Summary and discussion

Results from Study 1 suggest that the ECV items tap into a coherent construct. Our measure of ECV converges with measures of emotion regulation such that among EAs and AAs, greater ECV were associated with higher levels of habitual emotion suppression and a reduced tendency to vent emotions. In line with our hypotheses, AA participants endorsed ECV to a greater extent than EA participants.

This finding raises the important question of whether these differences in ECV translate into differences in actual emotional responding. That is, if associations between cultural background and emotional responding exist, are they mediated by ECV? While many studies have suggested that cultures vary with respect to values regarding emotion, fewer studies have assessed whether those values *translate* into differences in actual emotional responding (e.g., Eid & Diener, 2001), and, if so, which components of emotional

responding they influence. Study 2 was designed to address these questions.

STUDY 2: CULTURAL BACKGROUND, EMOTION CONTROL VALUES, AND ANGER RESPONDING

Our goals in Study 2 were to: (1) replicate the result from Study 1 that AA and EA individuals differ in ECV; (2) assess whether AA and EA individuals differ in experiential, expressive, or physiological responses to a laboratory anger provocation; and (3) test whether observed differences would be mediated by ECV.

We focused on anger for two reasons. First, an anger provocation allows for the creation of an intense, personally relevant emotional context of the kind that has most consistently produced cultural differences in emotional responses (cf. Tsai et al., 2006b). Second, anger is a focal example of a socially disengaging emotion, on which people from Asian and European cultural backgrounds are expected to differ (e.g., Kitayama et al., 2006).

We induced anger with a standardised laboratory provocation because observing emotional responses as they happen in standardised situations rather than assessing them retrospectively with questionnaires or recall tasks allows one to: (a) unconfound the cultural background from the emotional situation (Kitayama, Markus, Matsumoto, & Norasakkunkit, 1997); (b) minimise biases of retrospective reports (Feldman Barrett, 1997); and (c) assess multiple components of emotional responding that cannot be assessed with questionnaires (i.e., expressive behaviour and physiological responding; cf. Mauss & Robinson, 2009). In addition, we used a standardised interpersonal anger provocation rather than a film clip (a common method of emotion elicitation) because it is difficult to induce anger with film clips (Gross & Levenson, 1995).

We induced anger by asking participants to perform tedious mental arithmetic tasks and by creating a situation where participants were likely to become angry with the experimenter. To reduce potential experimenter bias, we used a

highly standardised laboratory anger provocation with minimal face-to-face and improvised interactions between the experimenter and participants. We minimised potential self-report biases by controlling for social desirability and by obtaining observer-codes of facially expressed anger and physiological measures in addition to self-reports. We included only female participants because norms regarding anger appear to apply particularly strongly to women (Timmers, Fischer, & Manstead, 1998) and to minimise variance due to gender differences. Because we hypothesised that there would be no or weak cultural differences in autonomic physiological responding, we obtained a broad range of physiological measures to reduce type II error.

Based on the literature and results from Study 1, we hypothesised that: (1) AA women would report greater ECV than EA women; (2) AA women would exhibit less anger experience and anger expressions than EA women in response to an anger provocation, but that group differences in autonomic physiological responding would be weak or non-existent; and (3) ECV would partially mediate any group differences found. We expected partial rather than full mediation because other factors (e.g., genes) might also affect anger responding.

Methods

Participants

Participants came from a larger sample of 195 undergraduate women who underwent an anger provocation protocol. To increase the specificity of the ethnic groups, we used more stringent criteria than in Study 1. AA background was operationalised as selecting "Asian/Asian American" to describe their ethnic background (as in Study 1). In addition, AA participants had to describe both parents' and grandparents' ethnicity as Asian or Asian American in six items that asked "What ethnicity would you describe your [family member] as?" and state that both parents

and grandparents were born in the USA or in an East or South-East Asian country¹ (e.g., Japan, China, Vietnam) in six items that asked "In which country was your [family member] born?" EA background was operationalised as selecting "European/European American" to describe their ethnic background (as in Study 1). In addition, EA participants had to describe both parents' and grandparents' ethnicity as European or Caucasian as well as describe that their parents and grandparents were born in the USA or in Northern, Western, or Middle Europe (e.g., Germany, Britain, Sweden). Note that these criteria excluded participants whose background was South Asian (e.g., Indian) or South European (e.g., Italian), yielding relatively homogenous groups. This resulted in 28 AA participants from the full sample who qualified. Twenty-eight EA participants, matched to the AA participants on age and socioeconomic status (SES), were then randomly selected from 163 qualified participants. This matching was important because the original EA group differed from the AA sample on age and SES, which are known to affect anger responses (e.g., Manstead, Fischer, & Jakobs, 1999; Tiedens, Ellsworth, & Mesquita, 2000).

All participants spoke English fluently. Fifteen AA (54%) and two EA participants (7%) were not born in the USA. AAs not born in the USA had spent an average of 21.8 years ($SD = 4.3$) in the USA; EAs not born in the USA had spent an average of 21 years ($SD = 0$) in the USA. Because all participants were college students, a measure of orientation to European-American culture was used to confirm that AA participants were relatively less oriented towards European-American culture than EA participants. Participants differed significantly on this measure in the expected direction (see Table 1). Because of technical problems, five participants were not recorded on the video tapes and physiological data were faulty for three participants, resulting in missing values.

¹ Small cell sizes did not permit us to adequately test whether generation of ancestors born in the USA, country of origin, or years spent in the USA affected results.

Table 1. Means (standard deviations) of age, SES, and GEQ-A for AA versus EA groups in Study 2

Measure	AA	EA	<i>p</i> (<i>N</i>)
	Mean (SD)	Mean (SD)	
Age (years)	20.9 (3.4)	20.8 (4.3)	.98 (56)
Socioeconomic status (SES; 0–80)	55.2 (9.8)	55.1 (7.3)	.44 (49)
Orientation to European-American culture (GEQ-A; 1–5; 5 denotes greatest orientation to EA culture)	3.9 (0.5)	4.4 (0.4)	< .001 (56)

Note: *P* values are results from groupwise *t*-tests. GEQ-A = General Ethnicity Questionnaire – American version. AA = Asian American; EA = European American.

Procedure

In the experimental session, which was videotaped, participants were told that the study was concerned with cognitive performance and mood. After a research assistant attached physiological sensors, participants watched an emotionally neutral five-minute film while baseline responses were collected. Participants then reported on their frustration, annoyance, and anger experience (along with 14 distractor terms). Following Stemmler (1997), participants then performed a tedious counting task designed to induce anger. As part of this task, they were required to count backwards in steps of 7 (for the first two trials) or 13 (for the last trial) from large numbers (e.g., 18,652) during three 1-minute periods. The female EA experimenter briefly entered the subject room to introduce herself at the beginning of these tasks to enhance the realism of the experimental situation. Thereafter, the experimenter gave all instructions and remarks “over the intercom” from an adjacent room. All instructions were in reality pre-recorded sound files that were played according to a script over a laptop computer.

As part of this script, the experimenter interrupted the participant multiple times with remarks on her performance and co-operation, delivered in an increasingly impatient tone of voice. After the first task, participants were instructed that they were “producing artefacts” by “moving their hand” and that they had “to speak more loudly”. At the end of the anger provocation, the experimenter said, “Let’s just stop here. Just fill out the next section in your questionnaire packet”, with an irritated tone that

implied that the whole session had not gone properly. This procedure allowed us to maximally standardise the anger provocation and thereby minimise experimenter bias. The anger provocation took an average of eight minutes.

After the anger provocation, participants completed another emotion experience questionnaire. Sensors were removed, and a funnelled debriefing procedure was used to assess the extent to which participants were aware of the true nature of the task (cf. Bargh & Chartrand, 2000). Of the 56 participants, 37 (66%; 15 of them from the AA group) did not report any suspicion at all, 17 (30%; 12 of them from the AA group) reported some suspicion (e.g., when asked whether they thought the experimenter behaved strangely, agreeing without more specific suspicions), and 2 (4%; 1 of them from the AA group) reported strong suspicion. Note that our coding of suspicion was conservative to include even slight suspicion about any aspect of the procedures. For example, we counted as indicating “some suspicion” a comment by the participant after multiple prompts that the experimenter seemed “on edge”. A chi-square test confirmed that the two cultural groups did not differ in distribution of suspicion, $p = .16$. A *t*-test comparing participants with versus without suspicion confirmed that suspicion did not affect anger experience, $p = .91$. Secondary analyses were performed using only participants who reported no suspicion, and yielded results comparable to analyses that included participants with some suspicion. Therefore, results presented are based on all participants. Both AA and EA participants returned on average nine days later ($SD = 5$ in

both groups) to a second session, during which demographics and individual differences were assessed. We obtained these data after the anger provocation to minimise the likelihood that participants would become aware of the purpose of the anger provocation.²

Measures

Self-report measures. Ethnic background was assessed with three types of questions asking participants to identify their own and each of their parents' and grandparents' ethnic background. The questions are described in detail in the participants section. ECV were assessed using the scale described in Study 1 (alphas were .90 for AA and .85 for EA participants). In addition, in order to be able to control for effects of social desirability (which may overlap with emotion control values and/or bias self-reports of anger) we administered the Marlowe–Crowne scale (alphas were .74 for AA and .72 for EA participants; Crowne & Marlowe, 1960). Orientation to European–American culture was assessed with the European–American version of the General Ethnicity Questionnaire (GEQ–American version; alphas were .82 for AA and .77 for EA participants; Tsai, Ying, & Lee, 2000b). The GEQ–A assesses cultural orientation with items such as “I was raised in a way that was American”. Or “How much do you speak English at home?” Because participants were all college students, parents' rather than their own SES was assessed with the Hollingshead Index, which combines educational attainment and occupational status (Miller, 1977).

Emotional responding to the anger provocation. Measures from the laboratory anger provocation included self-reported anger experience, anger expressions, and autonomic physiological responding. *Anger experience* was assessed along with 14 distractor items after the baseline

and the anger provocation with ratings on 11-point Likert scales, ranging from 0 (*none at all*) to 10 (*extremely*). An anger experience composite was formed using the terms angry, annoyed, and frustrated (baseline: alphas were .71 for the AA group and .88 for the EA group; anger provocation: alphas were .87 for the AA group and .82 for the EA group).

Two judges blind to the hypotheses of this study coded the videotapes with respect to *anger expressions*. They provided codes for each of the three 1-minute counting tasks. We used a Gestalt coding scheme that took into account verbal and non-verbal expressive behaviours. We used a relatively global coding scheme that captured displays of anger that would be visible to untrained observers. However, some of the expressions that coders took into account (e.g., frowns, pursed lips) were derived from validated componential coding schemes (e.g., FACS; Ekman & Friesen, 1978). Specifically, coders took into account facially expressed anger (annoyed eye/eyebrow movements such as frowns or eye rolling, angry mouth movements such as pursed lips), body posture, tone of voice, loudness of voice, and comments (refusing to complete the task, cursing) to arrive at codes of global anger expressions from 1 (*none at all*) to 5 (*extremely angry*). The interrater reliability was adequate with intraclass correlations of .75 for the AA and .86 for the EA group for the anger provocation. Thus, ratings were averaged across the two judges to arrive at one index of anger expressions for the anger provocation.

Autonomic physiological responding. Autonomic physiological responding was measured with three measures that were sampled at 1000 Hz using laboratory software. These included heart rate (HR), mean arterial blood pressure (MAP), and cardiac output (CO), because they are involved in anger responding (Herrald & Tomaka, 2002; Stemmler, 1997). In addition, somatic activity,

² Portions of the data used in Study 2 are reported in Mauss, Cook, Cheng, and Gross (2007), Mauss, Cook, and Gross (2007), and Mauss, Evers, Wilhelm, and Gross (2006). These articles are concerned with questions different from the ones discussed in the present article; therefore, there is no conceptual overlap with the present article.

or the extent to which participants moved during the procedures, was assessed to control for the effects of body movement on cardiovascular activation. *HR* (beats/Min) was calculated from RR intervals in the electrocardiogram. *MAP* (mmHg) was obtained from the third finger of the non-dominant hand by means of the Finapres™ 2300 (Ohmeda, Madison, WI) system. From this signal, beat-to-beat stroke volume was measured using Wesseling's pulse-contour analysis method (BEATFAST, TNO-Biomedical Instrumentation, Amsterdam). *CO* (l/Min) was calculated as stroke volume \times heart rate. *Somatic activity* (*A-D units*) was measured by a piezo-electric device attached to the participant's chair. This device generates an electrical signal proportional to the participant's overall body movement in any direction. Established methods were applied for artefact control and data reduction (cf. Wilhelm, Grossman, & Roth, 1999).

To obtain an index of baseline responding, responses across the neutral 5-minute film clip were averaged. To obtain an index of responding to the anger provocation, responses during each of the three 1-minute counting tasks were averaged.

Data analysis

A univariate analysis of variance (ANOVA) was used to assess whether ethnic groups differed in ECV. A combination of univariate and multivariate ANOVAs was used to check that the anger provocation was successful and to test for ethnic-group differences in experience, expressive behaviour, and physiology at baseline and after the anger induction. Given that previous research often has failed to find group differences in actual emotional responding, particularly physiological responses, we followed up on non-significant multivariate effects with univariate tests to reduce type II error.

To assess whether group effects were mediated by ECV, we used mediation analyses based on Baron and Kenny (1986). Because our sample was relatively small, a bootstrapping method was used rather than Sobel's *Z* to establish statistical significance of the indirect effect. This approach has been shown to be more powerful and less

biased than the Sobel *Z* in small samples (Preacher & Hayes, 2004). Social desirability (Marlowe–Crowne scores) was included as a control variable for analyses predicting anger experience and expressions, and somatic activity was included as a control variable in all physiological analyses.

Results

Ethnic groups and ECV

As shown in Table 1, AA participants reported lower orientation to EA culture as measured by the GEQ-A ($M = 3.9$, $SD = 0.5$) than EA participants ($M = 4.4$, $SD = 0.4$); $t(53) = 3.7$, $p < .001$. As predicted, an ANOVA indicated that AAs ($M = 4.3$, $SD = 1.9$) more strongly endorsed ECV than EAs ($M = 2.9$, $SD = 1.6$), $F(1, 54) = 9.3$, $p < .01$, $\eta^2 = .14$. In addition, in the AA group, lower orientation to EA culture was associated with greater ECV scores, $r(27) = -.43$, $p < .05$. In the EA group, there was no significant association between ECV and orientation to EA culture, $p = .47$, a result likely due to restricted variance in GEQ-A in this group.

Effectiveness of the anger provocation

Two ANOVAs with Task (baseline vs. anger provocation) as a repeated-measures factor indicated that participants in both groups experienced more anger during the anger provocation than during the baseline, AA: $F(1, 28) = 52.7$, $p < .001$, $\eta^2 = .66$; EA: $F(1, 28) = 79.3$, $p < .001$, $\eta^2 = .73$ (see Table 2). Two multivariate analyses of variance (MANOVAs) with Task (baseline vs. anger provocation) as a repeated-measure and HR, MAP, and CO as dependent variables also revealed an effect of Task for each group, AA: $F(3, 55) = 65.1$, $p < .001$, $\eta^2 = .83$; EA: $F(3, 55) = 65.1$, $p < .001$, $\eta^2 = .83$. Six ANOVAs used to follow up on these effects revealed that participants in each group exhibited greater HR, greater MAP, and greater CO during the anger provocation than during the baseline, $F_s > 9.0$, $p_s < .01$, $\eta^2_s > .13$. These results indicate that the anger provocation was successful in terms of evoking anger experience and physiological indicators of anger for AAs and

Table 2. Means (standard deviations) of anger experience and physiological responses for AA versus EA groups during the baseline and the anger provocation in Study 2

Measure	Group	Baseline	Anger provocation
		Mean (SD)	Mean (SD)
Anger experience (0–10)	AA	0.9 (1.2)	3.6 (2.4)
	EA	0.9 (1.3)	4.9 (2.5)
Heart rate (HR; beats per minute)	AA	71.4 (10.2)	85.9 (14.9)
	EA	71.2 (11.8)	87.4 (16.9)
Mean arterial blood pressure (MAP; mmHG)	AA	82.4 (11.5)	104.0 (18.9)
	EA	88.2 (14.7)	109.8 (18.8)
Cardiac output (CO; l/min)	AA	4.4 (0.8)	5.7 (1.7)
	EA	4.9 (1.2)	6.1 (1.7)

EAs (cf. Cacioppo, Berntson, Larsen, Poehlmann, & Ito, 2000; Herrald & Tomaka, 2002; Stemmler, 1997). In addition, on average the self-reported anger experience scores are on the high end of those reported in other laboratory anger provocations (e.g., Bödecker & Stemmler, 2000; Evers, Fischer, Rodriguez Mosquera, & Manstead, 2005).

Emotional responding during the baseline

A MANOVA, followed by five univariate ANOVAs to minimise type II error, indicated that AAs and EAs did not differ in terms of anger experience or physiological responding during the baseline (all $F_s < 3.11$, $p_s > .11$,³ $\eta^2_s < .06$).

Emotional responding to the anger provocation

Anger experience. An analysis of covariance (ANCOVA) with ethnic group as the independent factor and baseline responding as a covariate suggested that AAs reported significantly smaller increases in anger experience than EAs, $F(1, 53) = 5.1$, $p < .05$, $\eta^2 = .08$ (see Table 2).⁴ Results remained comparable when controlling for age, SES, and social desirability by entering these variables as covariates in the analyses.

Anger expressions. An ANOVA suggested that AA participants exhibited significantly less intense anger expressions ($M = 2.20$, $SD = 0.22$) than EA participants ($M = 2.36$, $SD = 0.33$), $F(1, 49) = 4.1$, $p < .05$, $\eta^2 = .08$. Results remained comparable when controlling for age, SES, and social desirability.

Autonomic physiological responses. As predicted, a multivariate analysis of covariance (MANCOVA), including ethnic background and baseline physiology for the relevant variable as predictors and the three physiological measures as dependent variables, showed no main effects of ethnic group, $F(4, 47) = 1.2$, $p = .33$, $\eta^2 = .09$. To minimise type II error, ANOVAs were conducted for each of the physiological variables. These analyses also showed no main effects of group (all $F_s < 1.0$, $p_s > .34$, $\eta^2_s < .02$). Results remained comparable when controlling for somatic activity, age, and SES, and social desirability.

Mediation by ECV. Because anger experience and anger expressions yielded significant effects of ethnic background, mediation analyses were conducted for these two variables. Following the logic

³ The p value for CO was .11, with AA participants exhibiting a trend towards lower CO than EA participants. All other p_s were $> .18$.

⁴ Groupwise t -tests comparing AA and EA participants on non-target self-reported emotions indicated that there was a significant group difference in self-reported relaxation such that AA participants reported greater relaxation as compared to EA participants, $p < .05$. There were no significant cultural-group differences in non-target negative emotions, including guilt, $p = .35$, sadness, $p = .18$, shame, $p = .71$, or anxiety, $p = .74$.

of Baron and Kenny (1986), a sequence of analyses supported partial mediation. First, as our results have already shown, the “X” variable (ethnic group) must predict the “Y” variables (anger experience and expressions). Second, as our results also already have shown, the “X” variable must predict the “M” variable (ECV). Finally, the “M” variable should be a significant predictor of the “Y” variables when both the “X” and “M” variables are included in the equation. A bias corrected confidence interval for the indirect effect of X on Y through M can be generated using a bootstrapping approach (cf. Preacher & Hayes, 2004). Figure 1 panels (a) and (b) show that the bootstrap test with 5000 re-samples provided evidence for mediation of anger experience and expressions by ECV. The estimated indirect effect for experience was $-.25$, $SE = 0.14$, 95% CI (bias corrected) = $-.55$ to $-.03$; the estimated indirect effect for behaviour was $-.03$, $SE = 0.02$, 95% CI (bias corrected) = $-.08$ to $-.001$. The fact that neither of these intervals include zero suggests that the indirect effects were

negative and significant with a p value less than .05. However, note that the confidence interval for anger expressions bordered on zero. Together, these analyses indicate that the associations between ethnic background and anger experience and expressions were partially mediated by ECV.

GENERAL DISCUSSION

Despite long-standing interest in cultural differences in emotions (Darwin, 1872/1998; Ekman, 1992; Mesquita, 2003; Russell, 1994), a number of pertinent questions remain. Of particular interest here is whether emotion control values (ECV) play a mediating role in cultural differences in anger responding. The present research makes three key contributions to the literature. First, relatively few laboratory studies have examined cultural differences in responding to anger-eliciting events, particularly using an interpersonal laboratory anger provocation. Second, we measured multiple components of anger responding:

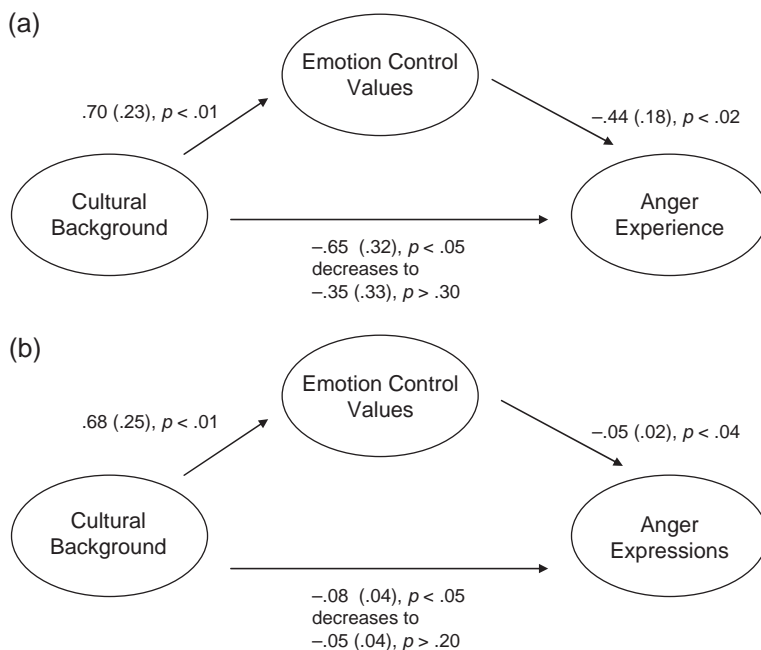


Figure 1. Mediation of the relationship between cultural background (AA versus EA) and anger experience (a) and anger expressions (b) by emotion control values (ECV; Study 2). Note: Values are un-standardised betas with standard errors in parentheses.

experience, expressive behaviour, and autonomic physiology. And third, we identified, measured, and examined the mediating role of values about emotion control.

Cultural background and anger responding

The fact that in Study 2 we identified differences between AA and EA groups in emotion experience and expressive behaviour supports the notion that laboratory emotion inductions involving personally relevant, intense, naturalistic scenarios might be more suitable to uncovering cultural differences in emotional responding than other stimuli such as film clips (Lazarus et al., 1966; Roberts & Levenson, 2006; Tsai et al., 2000a) or daily experience sampling studies (Oishi, 2002), which have in the past not always yielded cultural differences in emotional responding. Additionally, the emotion of anger might be particularly well suited to reveal cultural differences. Recent research suggests that socially disengaging emotions—with anger focally among them—may subserve the goals of independently oriented cultures that value individuation of the self but conflict with the goal of social harmony that is important in interdependent cultures (Kitayama et al., 2006). Consistent with this idea, AA participants experienced less anger and exhibited less intense anger expressions than EA participants. Such differences have not been found in other negative, socially engaging emotions such as guilt (Kitayama et al., 2006). Taken together, the present results support that relatively intense, personally relevant emotion inductions are conducive to reveal cultural differences, and that AA and EA women differ in anger responding.

The present research (Study 2) is consistent with prior work on other emotions in that AA and EA participants differed in experience and expressive behaviour but not physiological responding to the anger provocation (e.g., Tsai & Levenson, 1997). One possible explanation for this pattern of findings is that experience and expressive behaviour are more accessible to self regulation than autonomic physiological responses (e.g., Levenson et al., 2007; Mesquita, 2003;

Shweder & Haidt, 2000; Tsai & Levenson, 1997). Especially in light of the fact that results hold when controlling for social desirability, this does not imply that physiological measures are necessarily “truer” or more accurate measures of anger responding than experience and expressive behaviour, but simply that each measure reflects a different set of processes, some of which may be more susceptible than others to cultural influence (cf. Feldman Barrett, 2006).

Cultural background, emotion control values, and emotional responding

A second contribution of the present studies is that AA and EA participants differed in ECV. In Study 2 these differences partially mediated group differences in anger experience and expressions. This finding provides evidence that in addition to varying in values about specific emotions and specific aspects of emotional responding (e.g., display rules: Matsumoto et al., 1998), AAs and EAs differ in ideas about the extent to which emotions in general should be controlled. In addition, these data provide evidence for the notion that cultural differences in anger responding are in part due to differences in values, which in turn are shaped by people’s learning history. This does not imply that other factors such as genetic differences and temperament are not *additionally* involved; indeed, studies that have examined the relative contributions of these factors suggest that this is likely the case (Tsai et al., 2006b).

One important question is whether the present results would generalise to emotions other than anger. As we suggest above, we would indeed *not* expect to find the same group differences that we have observed for anger for all emotions. Why would cultural differences in ECV—values about how one should control emotions *in general*—not translate into differences in emotional responding for all emotions? To resolve this question it is important to keep in mind that ECV interact with other values that might at times conflict. In interdependent cultural backgrounds, ECV are aligned with the goal of promoting social harmony

in the context of socially disengaging emotions such as anger. Thus, in this context ECV clearly translate into a decrease of these emotions. We would therefore expect our results to generalise to these types of emotions. However, in other emotional contexts, ECV might conflict with other goals. For example, in the context of socially engaging emotions, ECV might conflict with the goal to promote social harmony, which in this case is served by *greater* emotional responding. The fact that other studies have found no or reversed group differences for socially engaging emotions is consistent with this hypothesis (e.g., Kitayama et al., 2006; Scollon et al., 2004). However, additional research is needed to untangle how multiple, sometimes competing cultural values interact in different emotional contexts. The present studies reveal, however, that in the context of anger ECV partially mediate cultural differences in emotional responding.

Limitations and future directions

The present study has three key limitations, which suggest directions for future research. A first limitation lies in the nature of our samples, namely female (for Study 2) AA and EA college students residing in the USA. Despite the advantages of assessing college students (e.g., language and familiarity with psychological paradigms are comparable across groups), future studies should investigate whether the present results extend to participants residing in their countries of origin, such as Asian participants residing in Asia and European participants residing in Europe. Similarly, it will be interesting to explore values regarding emotions and their correlates in a greater range of cultural groups, male participants, and participants from various age and socioeconomic groups (cf. Chentsova-Dutton & Tsai, 2007; Fischer, Rodriguez Mosquera, van Vianen, & Manstead, 2004; Snibbe & Markus, 2005). Conversely, while in some respects our sample was relatively homogeneous, other factors such as country (e.g., Japan vs. China) and region (e.g., the US South vs. the US North; Cohen, Nisbett, & Bowdle, 1996) of origin might have introduced

additional variance in ECV and anger responding that we did not assess. We note that despite these factors, systematic effects of cultural background did in fact emerge. Nonetheless, future studies should systematically examine contributions of country and region of origin.

A second limitation of the present research lies in our focus on anger. While anger constitutes a particularly interesting context in which to explore cultural differences, future studies should explore whether the present results extend to other emotions. Prior research suggests that different patterns of results might emerge for positive emotions and socially engaging emotions such as guilt (e.g., Eid & Diener, 2001; Kitayama et al., 2006; Roberts & Levenson, 2006; Scollon et al., 2004). Future studies should thus systematically examine additional emotions as well as different social contexts (cf. Matsumoto et al., 1998).

Third, it warrants further exploration how ECV lead to cultural differences in anger responding. One explanation for the observed associations is that cultural differences in ECV are associated with emotion regulatory tendencies, which in turn—either automatically or deliberately—lead to observed differences in anger responding. Indeed, in Study 1 we found that ECV were correlated with self-reports of habitual emotion regulation, and that ECV and one measure of emotion suppression showed parallel ethnic-group differences. Ultimately, however, converging evidence from studies that manipulate ECV as well as from studies that include comprehensive measures of emotion regulation are needed to strengthen conclusions about the causal role that ECV play in shaping cultural differences in emotional responses and the mechanisms that underlie these effects.

Despite these limitations, the present research suggests that female AA and EA participants differ in anger experience and expressions but not physiological responding to an anger provocation, and that observed differences are partially mediated by culturally specific values regarding emotion control. As such, the present findings contribute to a more complete understanding of how cultural background relates to emotions.

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