



Culture moderates the cardiovascular consequences of anger regulation strategy[☆]

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ABSTRACT

Purpose: This research examined cultural differences in experiential and cardiovascular outcomes of three anger regulation strategies (expression, suppression and reappraisal).

Methods: Forty-five Chinese and 45 Caucasian females participated in a laboratory experiment in which role play was used to induce anger. During this role play participants were instructed to either express or suppress their feelings or engage in cognitive reappraisal. Emotional experience was measured before and after the role play. Cardiovascular indices were measured continuously during the experiment.

Results: Significant interactions were obtained such that Caucasians showed stronger cardiovascular responses to suppression than expression of anger whereas the opposite was true for Chinese.

Conclusions: These results demonstrate that physiological consequences of emotion regulation strategies vary by cultural background. Possible reasons as well as implications of these findings are discussed.

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1. Introduction

Anger is a negative emotion which people experience from time to time in daily life. The successful regulation of anger is essential to the maintenance of good social relationships (Tavris, 1989) and there is also reason to believe that anger and its regulation are related to cardiovascular disease (CVD) risk (Kawachi et al., 1996; Williams et al., 2000). In particular, a high propensity to anger is believed to result in unhealthy levels of cardiovascular reactivity (CVR) which in turn accelerates the rate of atherosclerosis (Kamarck et al., 1997; Siegman and Smith, 1994). As such it is important to understand the processes involved in the experience and regulation of anger and to explore their cardiovascular consequences.

The Process Model of emotion regulation, proposed by Gross and his colleagues (Gross, 1998; Gross and Levenson, 1993, 1997; John and Gross, 2004) traces the experience and regulation of emotion through a series of stages beginning with the selection and perception of situations, moving through the meanings given to those situations, and the resulting emotions. The regulation of emotion is an integral part of this process with emotion regulation strategies divided into those that focus on antecedents to emotions (antecedent-focused strategies) and those in which the person attempts to regulate the emotional response (response-focused strategies). Response-focused strategies, such as suppression, are concerned with modifying the expression of an emotion that is already experienced by the person whereas antecedent-

focused strategies, such as cognitive reappraisal, are concerned with modifying one's interpretation of the situation so as to change emotional experience.

Research to date has suggested different consequences for different emotion regulation strategies. In particular, suppression, while it may be successful in reducing the outward expression of negative emotions, has been found to have a number of negative side effects. Habitual use of suppression has been found to be related to negative affective, cognitive, social and physiological effects (John and Gross, 2004). Individuals who more frequently engage in suppression have been found to continue to experience negative emotions, have heightened physiological reactivity to emotion evoking events, reduced memory for social information and experience disruption in social relationships. In contrast, individuals that are more prone to use reappraisal for dealing with negative emotions have shown reduced experience of negative emotion, increased positive emotion, and also reduced physiological reactivity (Gross, 1998; John and Gross, 2004; Mauss et al., 2007).

Although the results to date have been generally consistent in demonstrating negative effects for suppression and positive effects for reappraisal, cultural differences in the effects of emotion regulation strategies have been relatively unexplored. A large body of literature provides evidence for the universality of many emotions (Ekman, 1992, 1994; Scherer and Wallbott, 1994) but also points to the fact that those emotions show substantial cultural variation with respect to their antecedents and expression (Kitayama and Markus, 1994; Scherer, 1997; Scherer and Wallbott, 1994; Scherer et al., 1988). One key factor in this is the existence of culturally determined display rules that dictate when it is or is not appropriate to exhibit a particular emotion (Ekman, 1993; Friesen, 1972). In this respect there are notable differences between North Americans and East Asians in emotion display rules with East Asians being much more likely to suppress negative

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emotions, particularly when interacting with strangers, than is the case for North Americans (Kitayama and Markus, 1994). Similarly, Gross and John (2003) report that Asian Americans score higher on a questionnaire measure of emotional suppression than do European Americans. These cultural differences raise the question of whether the effects of different emotion regulation strategies might differ between cultures. In cultures where emotional suppression is favored it can be expected that suppression would become relatively automatic for the person and thus require less effort. Under such circumstances it would seem to follow that the negative effects of suppression described above might be attenuated or even eliminated. Consistent with this Butler et al. (2007) found that when European-Americans engaged in suppression during a laboratory task they showed reduced interpersonal responsiveness whereas this was not true for Asian-Americans. Further, the same authors (Butler et al., 2009) found that when European-American women discussed a disturbing film their expression of negative emotion was negatively related to blood pressure whereas this was not true for Asian-American women.

In line with these considerations the research reported here examined differences in cardiovascular responses to different emotion regulation strategies in response to anger among Chinese and Caucasians in Singapore. Kitayama et al. (2006), note that anger can be considered to be a socially disengaging emotion that is grounded in independence and autonomy of self. In the Chinese cultural context, social harmony is highly valued with an emphasis on maintaining interpersonal harmony by avoiding conflicts. Open expression of anger is considered inappropriate in most social situations. Because of this “other orientation” including high conformity and strong concern about social norms (Yang, 1995), Chinese regard controlling the impulse to express anger as a good quality and pursue it as an achievement. Even when they feel angry, there is a tendency to hide the emotion and avoid open expression. Further, since Chinese receive positive reinforcement when they suppress anger, the usage of suppression can be expected to be more frequent than would be the case in individualistic cultures. In addition, with their emphasis on social harmony Chinese can be expected to be more attuned to what others are feeling and to use reappraisal more in situations of conflict. Evidence for this pattern is provided by Matsumoto et al. (2008) who found that cultures emphasizing social order had higher scores on measures of both suppression and reappraisal as strategies for regulating emotions. In line with this, participants from China in their research had higher suppression and reappraisal scores than did participants from the USA. As such we expect that Chinese participants in this study will report more use of both suppression and reappraisal as anger regulation strategies than will Caucasian participants.

More importantly, we expect that these differences in habitual use of emotion regulation strategies will have an impact on the cardiovascular consequences of engaging in those strategies. Evidence from studies done in North America shows higher physiological reactivity to negative emotions when participants are instructed to suppress their emotions (Gross, 1998; Gross and Levenson, 1997). This makes sense in the context of social norms encouraging the expression of emotion. In a society that emphasizes the suppression of negative feeling, however, this pattern may well not be found. Among Singapore Chinese where norms favor the public suppression of negative emotions such as anger and where expression of such emotions is frowned on it may well be the case that the physiological consequences of emotion regulation strategies will be different. One way of approaching this difference comes from work showing differential cardiovascular responses as a function of task engagement. As proposed by Obrist (1981) and elaborated by Wright and Kirby (2001) tasks requiring greater engagement tend to produce greater activation of the sympathetic nervous system (SNS), particularly for beta-andrenergically mediated responses such as cardiac output (CO) and pre-ejection period (PEP). In line with this since suppression tends to be habitual in Chinese societies it can be expected that Singapore Chinese participants will require less engagement to

suppress their emotions and will show lower levels of SNS response to the suppression of emotion than has been found in studies in North America. With expression, however, the opposite effect can be expected in that expression of emotion for Chinese participants can be expected to require more engagement than is the case for cultures, such as in North America, where expression of emotion is encouraged. As such the purpose of present study is to examine the experiential and cardiovascular outcomes of three specific anger regulation strategies (expression, suppression and reappraisal) in a laboratory environment and to compare these outcomes between Chinese and Caucasians.

Three hypotheses are tested. First, because of an emphasis on harmony in relationships and restraint of emotion expression, Chinese participants should be more likely to suppress anger across situations compared with their Caucasian counterparts. This will be indicated by higher scores on a measure of emotional suppression. Second, Chinese participants should be more likely to engage in reappraisal in anger situations as indicated by higher scores on a measure of reappraisal. Third, and most importantly, culture will have a moderating effect in the relationship between emotion regulation strategies and CVR. Overall, Caucasians are expected to have greatest CVR, particular for beta-andrenergically mediated responses such as CO and PEP when assigned to anger suppression, followed by the expression and reappraisal conditions. In contrast, because of an emphasis on harmony in relationships and restraint of social expression, Chinese participants are expected to show the strongest CVR when assigned to anger expression, followed by the suppression and reappraisal conditions.

2. Method

2.1. Participants

Forty-five Chinese and 45 Caucasian female undergraduates attending the National University of Singapore were recruited for the experiment. Chinese participants were required to have two Chinese parents and to have been born and raised in Asia. Caucasian participants, all of whom were exchange students, were required to have two European or European-American parents and to have been born and raised in either North America or Europe. None of the participants had been diagnosed with heart disease or hypertension and none were taking medications which might affect cardiovascular indices. Examination of possible differences in age by ethnicity and condition found no differences in age among the six ethnicity by condition groups, all $ps > 0.50$. Mean age across all groups was 20.91. Further, no differences were obtained for self-reported family history of CVD by either ethnicity or condition, both $ps < .50$. Examination of body mass index (BMI) by ethnicity and condition found no differences for condition or the interaction of ethnicity by condition, both $ps > .10$. However, there was a significant difference by ethnicity (20.41 vs. 21.75), $F(1, 81) = 4.04$, $p = .0481$, $\eta^2 = .047$.

2.2. Materials

2.2.1. Emotion rating scale

Before and after the role play participants were asked to rate on a 7-point Likert scale the degree to which they felt a series of 13 emotions. These emotions were divided into three components: anger (angry, frustrated, and annoyed), positive emotions (happy, joyful, and pleased) and negative emotions (nervous, sad, anxious, guilty, ashamed, worried, and afraid) as defined by Mauss et al. (2007). Internal consistency for these indices for both baseline and task ratings were as follows: anger Cronbach's $\alpha = .68$ (baseline) and $.83$ (task); positive emotions, $\alpha = .85$, $.86$; negative emotions, $\alpha = .84$, $.83$.

2.2.2. Emotion regulation questionnaire (ERQ)

Items of the ERQ (Gross and John, 2003) were adapted to measure habitual usage of suppression and reappraisal in the context of anger

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