

Effects of anger regulation and social anxiety on perceived stress

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Abstract

The mediating role of social anxiety was explored within the effect of anger regulation on perceived stress in the national sample of American and Japanese older adults. Results indicated that anger suppression is a significant factor in perceived stress mediated by social anxiety. Anger suppression was also directly related to perceived stress. The correlation of anger suppression with social anxiety was stronger in Japan than in the United States. Understanding both universal and culture-specific aspects of emotion regulation and perceived stress will be essential for the development of sound theory, future research, and effective prevention and intervention efforts.

Keywords

anxiety, culture, emotions, stress, well-being

Introduction

In emotion regulation, the term *emotion suppression* includes “unhealthy emotion regulation” as one of its common forms (John and Gross, 2004). Emotion suppression produces more negative, not positive, emotions and more inauthentic feelings (Cheung and Park, 2010; Gross and John, 2003; Park et al., 2010). From these negative psychological aspects, suppression relates to higher levels of depressive symptoms, lower levels of life satisfaction, and less social support (English et al., 2012; Gross and John, 2003). Despite its common occurrence, emotion suppression involves psychological, social, cognitive, and physiological costs, contributing to higher levels of stress. Nevertheless, relatively few theory-driven studies have examined how emotion regulation serves as an explanatory mechanism in the etiology of specific psychological disorders such as perceived stress. However, during the last few decades, research on anger regulation within emotion regulation has increasingly focused on perceived stress.

According to Spielberger (1999), the definition of anger regulation applies to those people who often experience anger; however, people do not always express their anger outwardly. In fact, the various ways in which one can express anger are critical variables. Therefore, in this study, it is essential to distinguish expressions of anger, social

anxiety, and personality differences in an individual’s proneness to anger regulation in its effect on perceived stress. The exploratory function and role of anger regulation can be divided into three dimensions: anger suppression, outward anger expression, and controlled anger expression. However, the effects of these dimensions of anger regulation—anger suppression (anger-in (AI)), outward anger expression (anger-out (AO)), and control of anger expression (anger control (AC)) together—individually and socially, as mediated by social anxiety on perceived stress, have not been extensively examined in cross-cultural research.

Therefore, this study examined the cultural underpinnings of these three approaches to anger regulation and perceived stress, mediated by social anxiety. First, the study reviews the social science literature regarding relationships

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among the three approaches in anger regulation and social anxiety. Second, it attempts to explain the three approaches from a cross-cultural perspective. Third, it examines stress and health from a cross-cultural perspective. Fourth, the study proposes a cross-cultural approach, specifying its influence on perceived stress. Fifth, the study explores the conceptual model and analyzes results. The concluding section discusses this research's implications and limitations, including directions for future research.

Culture and emotional control: anger regulation

Culture plays an important role in socially shared and transmitted information systems, which are reinforced by norms, values, beliefs, and everyday practices. *In general*, people in European–American cultures differ widely from people in East Asian cultures in how they view emotions, *mostly* urging other members of their culture to control feelings through emotional regulation. Cultures are characterized by emphasis on either independence or interdependence (Markus and Kitayama, 1991, 1994). Markus and Kitayama (1991, 1994) suggest that independent self-construal refers to autonomy, uniqueness, and the personal aspects of one's self-concept, such as traits. In contrast, interdependent self-construal refers to interpersonal aspects of self-concept, such as social expectations, social harmony, and social *and* group memberships. European–American cultures, which value highly independent self-construal, are more likely to emphasize the self as separate from the social context *and* to focus on autonomy, independence, and individual self-esteem, which constitute independent self-construal. East Asian cultures, which encourage highly interdependent self-construal, are more likely to emphasize the self as a constituent of a broader social context. East Asian cultures' concept of self encompasses characteristics and qualities of the social environment, social expectations, social harmony, social and group memberships, and collective self-esteem, which constitute interdependent self-construal (Singelis, 1994).

People in East Asian cultures tend to control their emotions and feelings more frequently than do people in European–American cultures. In East Asian cultures, emotional control can have various meanings. A more concrete and differentiated theoretical framework for addressing individual differences could focus on emotional control in emotional regulation, particularly anger regulation. For example, people in European–American cultures with high independence are more likely to value uniqueness *and* individual self-expression strongly, and they are more likely to encourage other members of their culture to express their inner thoughts *and* feelings openly. However, people in East Asian cultures with high interdependence are more likely to treat the self as fundamentally connected to others. Thus, people in East Asian cultures are more likely to value conformity *and* cooperation strongly, and they are more likely to encourage other members of their culture to

control thoughts *and* feelings that might interfere with interpersonal harmony. Therefore, people in European–American cultures are less likely to use anger suppression frequently than are people in East Asian cultures. Such regulation influences anger expression of core aspects, such as emotions linked to self-construal (English et al., 2012; Gross and John, 2003).

Anger regulation refers to regulation of one emotion. In this study, anger regulation is divided into three types: anger suppression (AI), outward anger expression (AO), and controlled anger expression (AC). First, anger suppression (AI) is defined as the inhibition of anger. In suppressing anger, individuals regulate their feelings in their minds; for example, they withdraw from others, pout, or sulk (Spielberger, 1999). Anger suppression is recognized as one function of anger regulation, but it has also been associated with conflict avoidance, guilt, irritability, rumination, depressive symptoms, and decreased life satisfaction and subjective well-being (Gross and John, 2003; Martin and Dahlen, 2007; Park et al., 2010). Therefore, anger suppression might be related to mental health problems that lead to high levels of perceived stress. Second, outward anger expression (AO) is defined as the expression of anger toward others. In this case, individuals express their feelings of anger outwardly; for example, they slam doors and say nasty things. Previous research findings show that outward expression of anger is likely to reduce negative emotions and paradoxically promotes higher levels of well-being and lower perceived stress (English et al., 2012; Gross and John, 2003). Third, controlled anger expression is defined as the primary reduction of the internal experience of anger, and run the risk of ignoring the adaptive functions of anger. These experiences of anger are more likely to fail to recognize the importance of experience of anger in order to allow the physiological and psychological processes with the accompanying the anger experience to affect their experience. Thus, the difficult emotions and complexities can be absorbed, and other experiences and behaviors can proceed as normal (Whelton, 2004).

Proposed model

This study aims to obtain a better understanding of the relationship role among three types of anger regulation—anger suppression (AI), outward anger expression (AO), and controlled anger expression (AC)—and social anxiety on perceived stress for older American and Japanese adults in a cross-cultural context. In particular, this study seeks to ascertain the degree to which people engage in social anxiety as mediator and then determine influences that such thought processes exert on levels of perceived stress. Thus, the study expects three types of anger regulation and social anxiety to be associated with levels of perceived stress across cultures. The study's measures might address the role of the cross-cultural outlook as it influences reports of

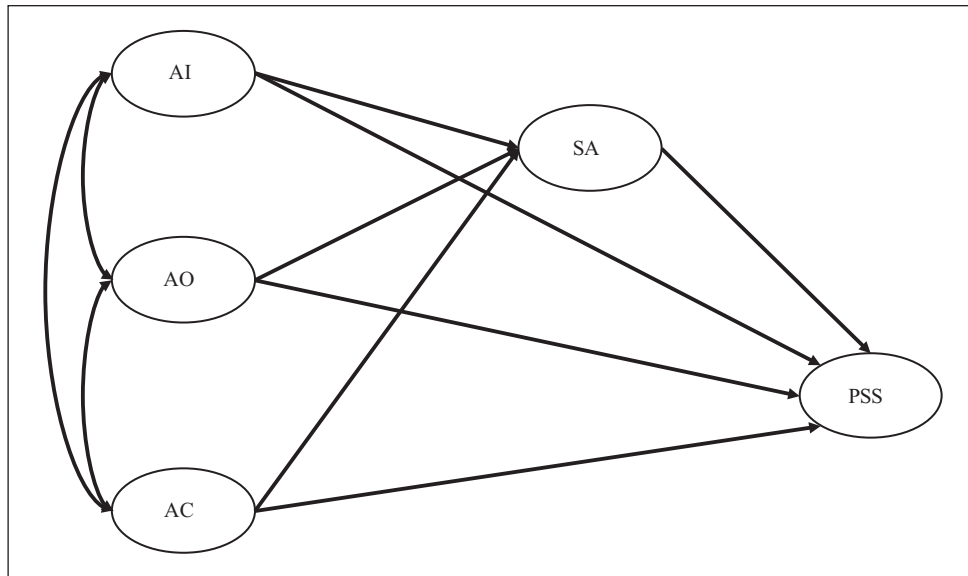


Figure 1. Proposed model.

AI: anger-in; AO: anger-out; AC: anger control; SA: social anxiety; PSS: perceived stress scale. This is the hypothetical model.

perceived stress. Figure 1 provides a graphical presentation of the conceptual model that links these factors.

Method

Participants

This study used mainly Midlife in the United States (MIDUS) Project 4 of the second wave of MIDUS (i.e. MIDUS II) for US participants. MIDUS II contains longitudinal follow-up data from MIDUS I. For the US participants of MIDUS II, the subsample ($N=1255$) of the original MIDUS study (MIDUS I) was used. This study can use only MIDUS II Project 4 since some measurements and scales of MIDUS I are irrelevant to this study. In this study, the US participants were 542 males and 713 females, aged 35–86 years ($M=57.32$, standard deviation (SD)=11.5). The Japanese participants were the parallel data set of MIDUS, called Midlife in Japan (MIDJA) ($N=1027$). Japanese participants were 505 males and 522 females aged 30–79 years ($M=54.3$, $SD=14.1$).

In 2008, a comparison sample of middle-aged Japanese adults was obtained. Many of the same psychological variables measured in the MIDUS II data set were measured in the Japanese data set, including the measures of independent and interdependent self-construal. Original MIDUS scale items were translated and then back-translated by native Japanese speakers (Park et al., 2013).

Analysis plan

This study aimed to explore the relationship among anger suppression, outward anger expression, and controlled

anger expression in anger regulation, social anxiety, and perceived stress. We developed a model using structural equation modeling (SEM) to specify relationships among these variables. Then, we examined findings to determine whether the model was equal to pass coefficients from each factor among older American and Japanese adults. Next, we examined whether all-factor patterns appeared among older American and Japanese adults. To address this issue, we tested the model by conducting an SEM analysis with the software AMOS SPSS for Windows (Bentler, 1990). Regarding the model fit index scores, for example, we calculated the goodness of fit (GFI) using a covariance matrix. Raykov et al. (1991) suggested calculating SEM results using four fit indices—GFI and comparative fit index (CFI)—and the root mean square error of approximation (RMSEA). A model fit of .95 and above and an RMSEA of .06 or less signify a good model fit (Bentler, 1990; Bollen, 1989; Hu and Bentler, 1999). Akaike information criterion (AIC) is a comparative measure of fit, and so it is meaningful only when two different models are estimated. Lower values indicate better fit, and so the model with the lowest AIC is the best (Akaike, 1973). Finally, our data analysis relied primarily on the pass coefficient significance test and the critical ratios for differences between parameters to address culturally specific pathway models and culturally different patterns.

Measurement instruments

This study assessed anger regulation to measure angry feelings with the State Trait Anger Regulation Inventory (STAXI; Spielberger, 1999). The STAXI integrates two previously developed inventories: the State Trait Anger

Scale and the Anger Regulation (AX) Scale. Five independent subscales constitute the STAXI: state anger, trait anger, anger suppression (AI), outward anger expression (AO), and controlled anger expression (AC). A sixth scale constitutes three subscales designed to measure patterns of anger suppression and outward anger expression (AI and AO), as well as the frequency of an individual attempting to control his or her anger expression (AC), with each statement on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Anger suppression (AI) refers to the extent to which one can control one's angry feelings or suppress angry or furious feelings, or lose one's mind. The anger suppression (AI) scale has eight subscale items. These items are as follows: in general, when I feel angry or furious (1) I withdraw from people; (2) I pout or sulk; (3) I am angrier than I am willing to admit; (4) I am secretly critical of others; (5) I boil inside, but do not show it; (6) I harbor grudges; (7) I keep things in; and (8) I am irritated more than others are aware. Outward anger expression (AO) refers to the extent to which one can express one's angry or furious feelings, or lose one's mind. The outward anger expression (AO) scale has eight subscale items. These items are as follows: in general, when I feel angry or furious (1) I slam doors; (2) I say nasty things; (3) I make sarcastic remarks; (4) I argue with others; (5) I lose my temper; (6) I strike out at whatever infuriates me; (7) I express my anger; and (8) If someone annoys me I tell them how I feel. The controlled anger expression (AC) refers to one's ability to control one's angry or furious feelings, or lose one's mind, in the context of physical or verbal expression and communication. The controlled anger expression (AC) scale has four subscale items. These items are as follows: in general, when I feel angry or furious (1) I control my temper; (2) I keep my cool; (3) I calm down fast; and (4) I make threats. Cronbach's alphas were .80 (AI), .75 (AO), and .69 (AC) in the United States and .75 (AI), .80 (AO), and .70 (AC) in Japan. Thus, these measurement models were accepted because all the relevant indices had good values in this study. The mean scores were 14.65 (AI), 12.01 (AO), and 9.92 (AC) in the United States and 14.16 (AI), 12.17 (AO), and 7.94 (AC) in Japan.

This study used the Liebowitz Social Anxiety Scale to measure social anxiety, that is, a comparison of the psychometric properties of self-report and clinician-administered formats (Fresco et al., 2001). This scale has nine subscale items, and we asked the participants to indicate their degree of agreement with each statement on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). It has nine subscale items: (1) Talking to people in authority; (2) Going to a party; (3) Working while being observed; (4) Calling someone you don't know well; (5) Talking with people you don't know very well; (6) Being the center of attention; (7) Expressing a disagreement or disapproval to people you don't know very well; (8) Returning goods to a store; and (9) Resisting a high-pressure salesperson.

Table 1. Means and standard deviations for study measures in the United States and Japan.

	United States			Japan		
	N	M	SD	N	M	SD
1. AI	1255	14.65	4.16	1027	14.16	3.67
2. AO	1255	12.91	3.30	1027	12.17	3.43
3. AC	1255	9.92	2.28	1027	7.95	2.54
4. SA	1255	1.83	0.55	1027	1.81	0.55
5. PSS	1255	22.24	6.34	1027	26.11	5.77

AI: anger-in; AO: anger-out; AC: anger control; SA: Social Anxiety Scale; PSS: Perceived Stress Scale.

Cronbach's alphas were .85 in the United States and .89 in Japan. Thus, these measurement models were accepted because all the relevant indices had good values in this study. The mean score was 1.83 in the United States and 1.83 in Japan.

In addition, this study employed the Perceived Stress Scale to measure stress status (Cohen et al., 1983). This scale has 10 subscale items, and we asked the participants to indicate their degree of agreement with each statement on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree): In the last month, how often have you (1) been upset because of something that happened unexpectedly? (2) felt that you were unable to control the important things in your life? (3) felt nervous and stressed? (4) felt confident about your ability to handle your personal problems? (5) felt that things were going your way? (6) found that you could not cope with all the things that you had to do? (7) been able to control irritations in your life? (8) felt that you were on top of things? (9) been angered because of things that were outside of your control? (10) felt difficulties were piling up so high that you couldn't overcome them? Cronbach's alphas were .86 in the United States and .76 in Japan. Thus, these measurement models were accepted because all the relevant indices had good values in this study. The mean score was 22.24 in the United States and 26.11 in Japan.

Results

Preliminary analyses

Descriptive statistics for this study's sample are presented in Table 1. The study used SEM to develop a model that specifies relationships among the relevant variables. We then analyzed findings to determine whether SEM results were equal to pass coefficients for each factor among the samples of older American and Japanese adults. In addition, we examined whether all-factor patterns emerged among the samples. Confirmatory factor analysis specified the model using AMOS 18 (Arbuckle, 2009); chi-square and GFI values of data were then used in conjunction with

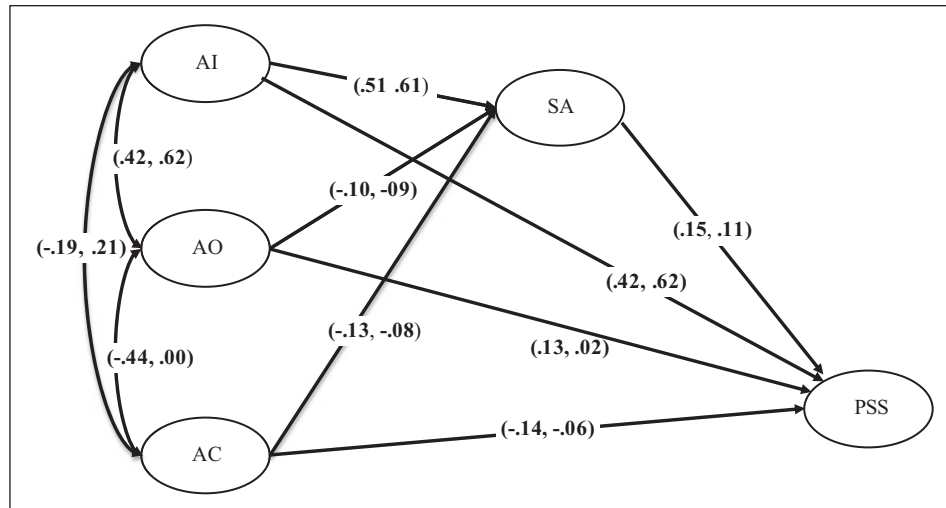


Figure 2. Final model.

AI: anger-in; AO: anger-out; AC: anger control; SA: social anxiety; PSS: perceived stress scale.

The path coefficients which are significant at $p < .01$ level are in boldface. The path coefficients in the left side are the United States. The path coefficients in the right side are Japan.

Unconstrained model: $\chi^2(1072) = 6533.379$, $p < .001$ (CFI = .812, GFI = .846, RMSEA = .047).

Constrained model: $\chi^2(1101) = 6878.024$, $p < .001$ (CFI = .801, GFI = .839, RMSEA = .048).

the model (Byrne, 2001). Since previous cross-cultural research findings generally identify cross-cultural differences between individualistic and collectivistic groups in terms of perceived stress levels and assessments, differences were possible between older American and Japanese adults in our sample in terms of anger regulation and relationships among these variables.

We tested whether patterns of all-factor loadings were identical between older American and Japanese adults; in addition, confirmatory factor analysis established measurement equivalence of anger expression between these two cultural groups. Two hierarchically nested models were compared as follows: an unconstrained model (free constrained model), in which no constraints were placed on factor loadings between the two cultural groups, and a constrained one, in which the factor loadings were constrained to be equal for the two groups. First, the unconstrained model (free constrained model) provided a good fit for the chi-square test: $\chi^2(1072) = 6533.379$, $p < .001$ (CFI = .812, GFI = .846, RMSEA = .047; AIC = 6769.379). Second, when the factor loadings were constrained to be equal between the two cultural groups, the fit was no worse for the chi-square test: $\chi^2(1101) = 6878.024$, $p < .001$ (CFI = .801, GFI = .839, RMSEA = .048; AIC = 7056.024). Results scarcely differed from those for the unconstrained model (free model) (Figure 2).

These findings establish factor equivalence between the two cultural groups. The results indicate that the measurement model was metrically equivalent between the two cultures and that it could thus serve as a baseline in subsequent analyses (Cheung and Rensvold, 2002). The covariance among AI, AO, and AC was significant at $p < .001$, save for

AO to AC for the older Japanese adult sample. This is the most parsimonious model still to provide excellent data (Byrne, 2001; Hoyle, 1995).

Confirmatory factor analysis was used to assess correlation analysis with the key (latent) variables in the American and Japanese samples. Table 2 displays the study's correlation matrix; as one can see, most of the correlations were significant at $p < .001$. Ultimately, this study explored the relationship between each of the three types of anger regulation (AI, AO, and AC) and social anxiety in terms of perceived stress.

Main analyses

Our intention was to develop an anger regulation mediation model using a cross-cultural approach, with social anxiety serving as a mediator between anger regulation (AI, AO, and AC) and perceived stress. To test for any culture-specific pathways in the proposed path model, we constrained all paths to be equal across the US and Japanese samples. The study's primary objective was to propose and test a model delineating the process by which the three types of anger suppression—AI, AO, and AC—influence perceived stress. The model also incorporates social anxiety as the potential mediating factor for perceived stress. The study performed a path analysis to test the integrated model.

Figure 2 lists the path coefficients within such a model. As shown in Figure 2, for American older adult samples, anger suppression (AI) positively influenced social anxiety ($\beta = .51$, $p < .01$), outward anger expression (AO) negatively affected social anxiety ($\beta = -.10$, $p < .01$), controlled anger expression (AC) related negatively to social anxiety ($\beta = -.13$,

$p < .01$), and social anxiety was positively associated with perceived stress status ($\beta = .15, p < .01$). Anger suppression (AI) positively influenced perceived stress status ($\beta = .42, p < .01$), outward anger expression (AO) related positively to perceived stress status ($\beta = .13, p < .01$), and controlled anger expression (AC) negatively affected perceived stress status ($\beta = -.14, p < .01$). There was covariance between anger suppression (AI) and outward anger expression (AO) ($\beta = .42,$

$p < .01$). There was also covariance between outward anger expression (AO) and controlled anger expression (AC) ($\beta = -.44, p < .01$). Moreover, there was covariance between anger suppression (AI) and controlled anger expression (AC) ($\beta = -.19, p < .01$).

As shown in Figure 2, for the older Japanese adult samples, anger suppression (AI) positively affected social anxiety ($\beta = .61, p < .01$), outward anger expression (AO) did not have an effect on social anxiety ($\beta = -.09, ns$), controlled anger expression (AC) negatively affected social anxiety ($\beta = -.08, p < .01$), and social anxiety positively influenced perceived stress status ($\beta = .11, p < .01$). Furthermore, anger suppression (AI) positively affected perceived stress status ($\beta = .62, p < .01$), outward anger expression (AO) did not influence perceived stress status ($\beta = .02, ns$), and controlled anger expression (AC) did not have an effect on perceived stress status ($\beta = -.06, ns$). There was covariance between anger suppression (AI) and outward anger expression (AO) ($\beta = .62, p < .01$). There was also covariance between outward anger expression (AO) and controlled anger expression (AC) ($\beta = .00, ns$). Moreover, there was covariance between anger suppression (AI) and controlled anger expression (AC) ($\beta = .21, p < .01$).

To address cross-cultural differences and commonalities in cross-cultural variations in the proposed model, the study employed critical ratio tests to calculate and evaluate the difference between the two cultural groups, using the same parameters. The results showed culturally general or similar processes and culturally different processes in the path model (Figure 3). Furthermore, the results identified the role of social anxiety as a mediator in the relationship

Table 2. Correlation between the key (latent) variables in the United States and Japan.

	1	2	3	4	5
1. Anger-in					
United States	–	.07**	-.06**	.09**	.16**
Japan		.11**	.07**	.11**	.20**
2. Anger-out					
United States		–	-.18**	.09**	.14**
Japan			-.00**	.07	.27
3. Anger control					
United States			–	-.17**	-.19**
Japan				.02**	.17*
4. SA					
United States				–	.15**
Japan					.19**
5. PSS					
United States					–
Japan					

AI: anger-in; AO: anger-out; AC: anger control; SA: Social Anxiety Scale; PSS: Perceived Stress Scale.

* $p < .05$; ** $p < .01$.

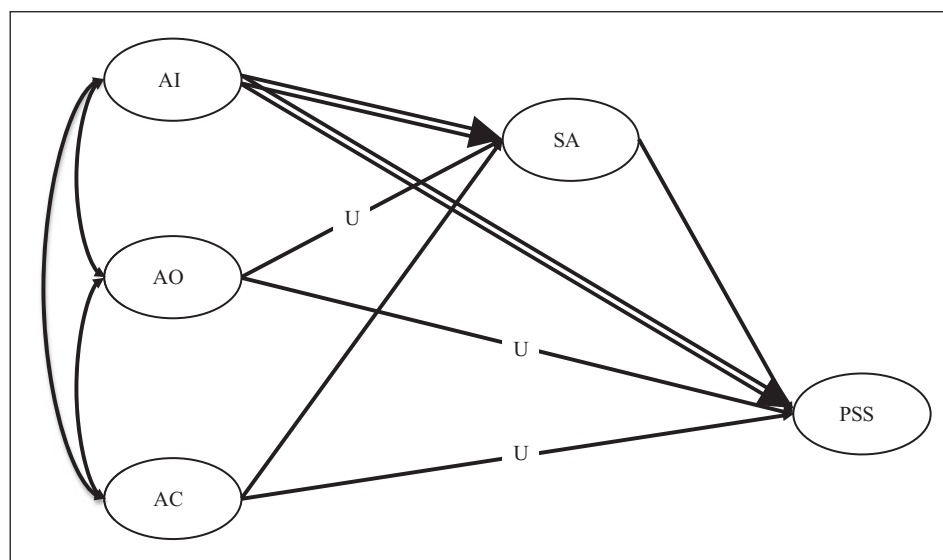


Figure 3. Culturally equality and difference between the United States and Japan in the path model.

AI: anger-in; AO: anger-out; AC: anger control; SA: social anxiety; PSS: perceived stress scale.

The double solid lines mean significant differences of path coefficients between the United States and Japan. The single solid lines mean non-significant differences of path coefficients between the United States and Japan. The broken lines mean non-significant effects in both countries. "U" means that only US path coefficient is significant.

between anger regulation (anger suppression, outward anger expression, and controlled anger expression) and perceived stress. For example, the common processes are the relationship between controlled anger expression and social anxiety in relation to perceived stress, and between controlled anger expression and perceived stress. The study also found cross-cultural differences in relationships between anger suppression and social anxiety in relation to perceived stress and between anger suppression and perceived stress. Cross-cultural differences emerged in the covariance between anger suppression and outward anger expression, between outward anger expression and controlled anger expression, and between anger suppression and controlled anger expression.

Discussion and conclusion

This study mainly clarified the role of social anxiety mediated by the relationship between the three types of anger regulation and perceived stress. The results indicated that the relationship between anger suppression (AI) and perceived stress mediated by social anxiety was the result of cross-cultural differences between the United States and Japan. Compared to people in the United States, people in Japan are more likely to suppress their anger and to experience social anxiety, leading to high levels of perceived stress. This study identified the role of social anxiety mediated by the relationship between AO and perceived stress in the United States, not in Japan, as an indirect effect. In the United States, people who tend to express their anger outwardly are less likely to feel social anxiety leading to high stress levels, but not in Japan. This study clarified the role of AO and perceived stress as the direct path effect in the United States, but not in Japan. This study also investigated social anxiety mediated by AC and perceived stress in the United States as an indirect effect, but not in Japan. In the United States, people who tend to control their anger are less likely to feel social anxiety, which leads to high levels of stress, but not in Japan. This study also identified the role of AC and perceived stress as direct path effects in the United States, but not in Japan.

This study identified pathways of the relationship between anger suppression (AI) in anger regulation and perceived stress mediated by social anxiety resulting from cross-cultural differences between the United States and Japan. Our theoretical framework led us to distinguish three approaches to anger regulation and to hypothesize the relationship among these approaches and perceived stress mediated by social anxiety. The study found that anger suppression was a significant factor in perceived stress mediated by social anxiety as the hypothesized indirect effect. Anger suppression was also related to perceived stress as the hypothesized direct effect. The correlation between anger suppression and social anxiety was stronger in Japan than in the United States. Thus, this study found

that, primarily, the role of anger suppression in the three approaches to anger regulation reflects cross-cultural differences between the United States and Japan.

This integrated approach allowed us to examine the theoretical model's external validity, as well as its culture-specific boundary conditions. The study's main findings are unique in that they represent the first attempt to explore this emotion regulation model with social anxiety of cross-culturally perceived stress among middle-aged people in the United States and Japan. The SEM results showed that anger suppression was a significant factor of the effects of social anxiety on perceived stress among middle-aged people in the United States and Japan.

These novel findings build upon, and are consistent with, emerging research in emotion regulation. First, our applied model, based on the model of emotion regulation (Gross and John, 2003), extends this theoretical work by providing initial empirical evidence of the model's applicability to older American and Japanese adults. The mediation model's generally good fit demonstrated that anger suppression does entail costs in regard to mental health outcomes—specifically, perceived stress. This is consistent with prior findings that emotion suppression is often associated with negative psychosocial consequences (Gross and John, 2003).

Third, the results represent an important contribution toward building an empirical knowledge base of three distinct approaches to anger regulation (anger suppression, outward anger expression, and AC). This study also found that, to reduce their social anxiety, those who have high anger suppression (AI) with independence and uniqueness tend toward low levels of perceived stress in US samples. This sample comprised middle-aged American and Japanese adults, and perhaps these age groups are more likely to be concerned with their in-group (e.g. family) counterparts than with younger generations.

Our findings might suggest that the dominant, self-focused manifestation relates to social anxiety as a social phobia within the Western cultural context. In contrast, the dominant other-focused manifestation relates to social anxiety as a social phobia within East Asian cultural contexts, such as Japan (Russell, 1989), which are more likely to be other-focused (Nakamura et al., 2002); this could be due to excessive concern about embarrassing oneself in public. The primary concern of socially anxious people is the potential to offend, which drives them to avoid others and causes trouble for others as a result of inappropriate behaviors (Norasakkunkit et al., 2012). This study's main contribution is to advance understanding of the function and role of anger suppression, outward anger expression, and social anxiety in regard to lower levels of perceived stress. The effects and role of anger suppression and outward anger expression on low levels of perceived stress were clarified. Our findings indicate that indirect effects of anger suppression and outward anger expression on perceived stress also

have a direct effect on anger suppression and perceived stress in older American and Japanese adult samples. The results indicate that anger suppression and outward anger expression should not be ignored when considering social anxiety as the key factor that triggers perceived stress (Bhawuk and Brislin, 1992).

Methodologically, this study addressed some gaps in the current literature on emotion regulation. Given prior recommendations (John and Gross, 2004), we closely examined regulation of one discrete emotion (namely, anger) rather than studying emotion regulation globally. The focus on anger was also advantageous from a cultural perspective, in that this emotion has demonstrated extensive variability across cultures in terms of its psychological and social impacts (Markus and Kitayama, 1991). Very little empirical research has investigated the role of cultural context; this study was, therefore, precisely designed to do so. Finally, we used confirmatory factor analysis to test the relationship between the variables of interest.

Overall, this study explored a theoretical model of emotion regulation (Gross and John, 2003) and its effects on perceived stress mediated by social anxiety in nationally representative older American and Japanese adult samples. These study findings are among the first to test this model's cross-cultural applicability. Moreover, the results highlighted the importance of cultural context in demonstrating moderation of the anger suppression–depression link based on interdependent self-construal. Understanding both the universal and the culture-specific aspects of emotion regulation's role in the development of depression and other forms of psychopathology is essential to enable effective prevention and intervention efforts across diverse populations.

Limitations and implications for future study

The study's limitations should also be explained to help advance further research. First, this study relied primarily on self-reported measures and scales, and thus, various data collection methods should be used to make the findings and information useful in further research. Second, since the nationally representative data sets were limited to the United States and Japan in terms of cultural variations, for further study, data should be obtained from different locations and regions, such as European countries, Asian countries (with the exception of Japan), and/or African countries. Third, this study indicates that anger suppression and outward anger expression have unique pathways to perceived stress mediated by social anxiety across cultures. Anger suppression and outward anger expression might not be contextual and culture-dependent, but rather universal, and they could be further elicited by environmental cues (Oyserman, 2011); therefore, this study could suggest implications of increasing and developing perceived stress

mediated by social anxiety. For example, since this study found associations among anger suppression, outward anger expression, controlled anger expression, and social anxiety and identified effects of perceived stress, such practical implications might be the necessary first step in further research. Fourth, the cross-sectional research design is limited to discerning causal foundations. To address this issue, a longitudinal research design and data should be used to identify causal foundations.

The findings in this study may have important clinical and practical implications. Further research should focus on health status. Interventions should be different across cultures with respect to health status and conditions. This study suggests that we need to create a counseling intervention program that considers cross-cultural differences and validations of symptoms of depression. For Euro-Americans, interventions should increase the sense of control, which may originally come from cultural affordances. For Asians, interventions should be based on relational orientations and socially supportive networks, which may originally come from cultural affordances. For example, according to Uchida, Kitayama, Mesquita, Reyes, and Morling (2008), indigenous psychotherapies in Japan, such as *naikan* therapy, are more likely to emphasize the cultivation of a patient's reflective awareness of his or her dependencies and indebtedness to others (Ishiyama, 1986). Such therapies and intervention programs in Japan may be effective and consistent with American therapies that focus on self-efficacy (Bandura, 1977).

Further research is needed with clinical populations. One salient idea is that developing compassion, which is an aspect of Buddhist theory, and understanding ideas of loving kindness toward self and others in counseling and therapy may be important for an individual in promoting emotional well-being and obtaining a better health status. In addition, further research is needed to explore how to achieve this, in that those who are highly self-critical and may have experienced little warmth in their daily lives may find it frightening to be compassionate to the self (Uchida et al, 2008).

In conclusion, this study might be able, conceptually and operationally, to increase our understanding of perceived stress in different cultural contexts; more specifically, the proposed model of perceived stress should focus on individuals' anger suppression, outward anger expression, and controlled anger expression because these self-views serve as clues to other cultural and individual values and behaviors that fit into perceived stress, health, and well-being.

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Declaration of conflicting interests

The authors declare that they have no competing interests.

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