



Research paper

The Suppression Paradox: A Cross-Cultural Comparison of Suppression Frequency, Suppression Ability, and Depression

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ABSTRACT

The habitual use of expressive suppression (suppression frequency) is consistently associated with a number of negative outcomes, but paradoxically, the ability to suppress when there is a situational need (suppression ability) is usually linked to positive outcomes. The two sides of the paradox, suppression frequency and suppression ability, have been found to be unrelated. Given that these findings have emerged in largely western samples, the present studies examined whether the coupling of suppression frequency and ability depends on cultural contexts, and whether this can explain the previously established cultural difference in the costs of suppression frequency. In an initial study, we examined the relations among suppression frequency, suppression ability, and depression in a Chinese sample (Study 1; N = 310), and then, using two new samples, we compared these relations between Chinese and the US samples (Study 2; N = 392). Results showed that suppression frequency was related to depression in two distinct ways. In both cultures, suppression frequency had a direct, positive association with depression. In Chinese culture only, however, suppression frequency also had an indirect association, such that higher suppression frequency was related to higher suppression ability and in turn related to fewer depressive symptoms. Our findings show that suppression frequency is related to suppression ability only among Chinese participants, and can serve as a potential explanation for why suppression frequency is less related to depression in Chinese culture.

An abundant body of research has focused on the consequences of suppressing the expression of emotion. This behavior, generally operationalized as the inhibition of ongoing emotional expressions when one is emotionally aroused (Gross & John, 2003), has been researched primarily in between-subjects experimental tasks where the consequences are compared for suppressing and non-suppressing participants, and in questionnaire studies that tap participant's self-reported frequency of engaging in expressive suppression. This research has nearly uniformly demonstrated the costs of **suppression frequency**. Considerable evidence has, for example, linked greater suppression frequency to increased physiological and cognitive costs (Gross & Levenson, 1997; Richards & Gross, 2000), increased depressive symptoms and decreased well-being (Gross & John, 2003), as well as decreased positive emotions, self-esteem, and psychological adjustment (Brans, Koval, Verduyn, Lim, & Kuppens, 2013; Farmer & Kashdan, 2012; Nezlek & Kuppens, 2008).

A more recent body of research, informed by flexibility models that emphasize both regulatory behaviors and the context in which they are adopted, has begun to examine not only suppression frequency, but also

the ability to suppress displayed emotions when there is a situational need (i.e., **suppression ability**; Bonanno & Burton, 2013; Cheng, Lau, & Chan, 2014; Kashdan & Rottenberg, 2010). The findings of this research suggest something of a paradox: whereas suppression frequency has been linked to poor adjustment, suppression ability has been associated with positive clinical and social outcomes (Bonanno, Papa, Lalande, Westphal, & Coifman, 2004; Gupta & Bonanno, 2011; Westphal, Seivert, & Bonanno, 2010). For example, the ability to suppress emotion, measured experimentally in the aftermath of the September 11th attack, predicted better adjustment several years later (Bonanno et al., 2004). A more recently developed, scenario-based measure of suppression ability, the Flexible Regulation of Emotional Expression (FREE) scale, produced similar findings (Burton & Bonanno, 2016; Chen, Chen, & Bonanno, 2018). This self-report measure was well-validated against experimental paradigms. In fact, suppression ability score on the FREE scale predicted participants' actual suppression ability evaluated by independent raters, while suppression frequency on the Emotion Regulation Questionnaire (ERQ) did not predict suppression performance during the laboratory task, again

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suggesting that suppression frequency and ability are indeed different constructs.

The aim of the current studies was to shed light on the suppression paradox by examining the relationship between suppression frequency and suppression ability in two cultures that have shown different propensities around emotional suppression, specifically the United States and the People's Republic of China.

Suppression across Cultures

Emotion regulation studies conducted in China have shown, similar to findings derived from US samples, that greater suppression ability was associated with reduced depressive and anxious symptoms (Chen et al., 2018), and better peer relations prospectively (Wang & Hawk, 2019). However, cultural contexts have also been found to moderate the effect of suppression frequency on life satisfaction, depression, and negative emotion such that suppression frequency is more maladaptive for European Americans than for Asian Americans or Hong Kong Chinese (Butler, Lee, & Gross, 2007; Kwon & Kim, 2019; Nam, Kim, & Tam, 2018; Soto, Perez, Kim, Lee, & Minnick, 2011; Su, Lee, & Oishi, 2013). Thus far, in studies that attempted to explain these cultural differences, they have been mainly considered as a result of cultural values and self-construal. From this perspective, western cultures are characterized by individualistic cultural values and uninhibited emotional expression; in contrast, eastern cultures are influenced by collectivistic cultural norms, which encourage and motivate the suppression of emotional displays, in order to maintain relational harmony (Matsumoto, Yoo, & Nakagawa, 2008; Soto, Levenson, & Ebling, 2005; Soto et al., 2011). Based on the idea that contextual norms and values surrounding emotional responses are different across cultures (Markus & Kitayama, 1991), people may be culturally trained and encouraged to act differently. Butler and colleagues (2007), for instance, showed that cultural values moderated the relationship between suppression frequency and negative emotion. Similarly, Su and colleagues (2013) found that the interaction between culture and suppression frequency on depression was indeed mediated by self-construal.

In both cultures, it appears that suppression frequency and ability have distinct effects on psychological adjustment. Considering the suppression paradox in a cross-cultural framework, however, also reveals some interesting differences. Whereas higher suppression frequency is maladaptive only in western cultures (Soto et al., 2011), higher suppression ability is consistently associated with better psychological functioning across cultures (Burton & Bonanno, 2016; Chen et al., 2018). Understanding how the two sides of the paradox (i.e., suppression frequency and suppression ability) are related may help develop a more nuanced understanding of suppression across cultures.

Suppression Frequency and Ability: Two Sides of the Paradox

As the evidence began to accumulate, suppression frequency and ability are believed to be distinct constructs (Burton & Bonanno, 2016; Chen et al., 2018). Even so, there are several avenues through which frequency of expressive suppression may be linked to one's perceived ability to enact that behavior, and vice versa. Individuals who regularly engage in suppression might employ use frequency as a key determinant when evaluating their ability in a given scenario, but in reality, these two were found unrelated, at least in US samples (Burton & Bonanno, 2016).

Although suppression frequency and ability were found unrelated in US samples, this may not necessarily apply to eastern samples such as Chinese, given the established link between emotion regulation frequency and ability in other studies. Research on cognitive reappraisal, for example, has observed a link between users' ability and self-reported frequency (McRae, Jacobs, Ray, John, & Gross, 2012). Though

no causal relationship was established, these authors implied that enhanced ability may be acquired as a result of increased frequency, and suggested that there may be moderators influencing the link between frequency and ability given these two are not highly overlapping. Given a number of cultural moderations of suppression observed in existing literature, the relationship between suppression frequency and ability is likely to differ across cultures. Exploring the potential role that culture plays in the relationship between suppression frequency and ability may be crucial in understanding the acquisition or improvement of suppression ability across cultures.

The acquisition of suppression ability may result from not only the practice of suppression but also the cultural backdrop that makes such translation possible. From the person-situationist perspective (e.g., Mischel, 1973), the efficacy of specific strategies, including suppression, varies markedly across contexts (Bonanno & Burton, 2013; Bonanno et al., 2004). Each cultural context is likely to have different characteristics that contribute to different behavior-situation fit. Culture creates the need for certain behaviors (e.g., suppression) that might first lead to opportunities for such behavior, and then people with better ability in suppression are more likely to meet situational demands, and thus will thrive (Kitayama & Uskul, 2011). In Chinese culture, there are likely to be more situations in which suppression is contextually adaptive, as compared with those in the US culture. Chinese people who frequently adopt suppression are more likely to meet contextual demands rooted in these situations, evidenced by enhanced ability to suppress their emotions. By contrast, in US culture, this link may be modest or even nonexistent, given that there may be fewer situations in the culture that favor suppression. Therefore, in US culture, increased suppression frequency does not necessarily translate into enhanced ability to suppress in situations of need.

If it is indeed the case that suppression frequency is related to suppression ability for Chinese but not US participants, suppression ability may offset or even reverse some of the negative effects caused by suppression frequency in Chinese culture. This may serve as an explanation for the previously demonstrated cultural difference in the association between suppression frequency and depressive symptoms (Soto et al., 2011; Su et al., 2013). In other words, the indirect effect of suppression frequency on depression through suppression ability may hold true for Chinese but not US participants.

The reasoning above is based on the assumption that suppression ability comes after the practice of suppression frequency under certain cultural contexts. What should not be ignored is that suppression ability is equally likely to precede suppression frequency, such that those who are more capable suppressors use suppression more frequently. Many studies have suggested that cultural values passed down indirectly or directly in a way that translates to the behavior we observe (e.g., Soto et al., 2005). Cultural values likely enhance the benefits that Chinese participants perceive while magnify the negative consequences that European American participants experience when they suppress in social interactions (Butler et al., 2007). From this perspective, it is likely that the increased ability of suppression could lead to using suppression more in eastern cultures.

The Current Investigation

Given the absence of relationship between suppression frequency and ability among US participants (Burton & Bonanno, 2016), we examined the relationship between suppression frequency, suppression ability, depressive symptoms in a Chinese sample in Study 1. Our major hypothesis is that, in Chinese culture, higher suppression frequency is related to greater suppression ability, and moreover, this favorable link can offset the relation between suppression frequency and depression. As previously mentioned, however, it is also likely that suppression frequency comes after suppression ability. To examine this possibility, we planned an alternative model in which the order of suppression frequency and ability was reversed.

In Study 2, we aimed to replicate and extend the findings by adopting a cross-cultural design, in which we directly tested whether cultural groups (i.e., Chinese versus Americans) moderated the link between suppression frequency and ability, and if so, whether the influence of cultural memberships on the association between suppression frequency and ability could serve as an explanation for the culturally distinct link between suppression frequency and depression. Similar to Study 1, we planned an alternative model that swapped the order of suppression frequency and ability.

These two studies, according to our knowledge, are the first that directly examined suppression frequency's association to suppression ability across cultures, and moreover, whether this association might account for the cultural difference in the association between suppression frequency and psychological adjustment. We hypothesized that suppressing one's emotion in a culture where emotional expressions are not encouraged (e.g., Chinese culture) may increase one's ability to meet contextual demands by suppression, making it less maladaptive than doing so in a culture that encourages emotional expressions.

In both studies, we adopted cross-sectional design with well-validated measures of suppression frequency, suppression ability, and depression. This was partially due to the consideration that both suppression frequency and ability are temporally stable among adults (Burton & Bonanno, 2016; Gross & John, 2003). Given that both studies are cross-sectional in nature, we tested alternative models in which suppression ability preceded suppression frequency. It should be noted that, however, either model at the best infers but does not support causal relationship.

Study 1

Introduction

Previous research has demonstrated cross-cultural differences in the relationship between suppression frequency and depression, such that suppression frequency is unrelated to depression among Chinese, but positively related to depression among European-Americans (e.g., Soto et al., 2011). In contrast to the relatively well-established cultural moderations, little research to date has focused on potential indirect effects that may explain why such cross-cultural differences emerge.

Here we propose that culture may shape the functions of suppression frequency by altering the link between suppression frequency and suppression ability. Specifically, in a Chinese cultural context, people learn and are encouraged to suppress emotions. Therefore, increased suppression frequency may have a desirable effect that enables individuals to better meet situational demands rooted in the culture, which then offset the potential psychological costs of suppression frequency. As an initial exploration, we attempted to address this potential mechanism as it may shed light on why suppression frequency is less strongly related to depression for Chinese participants.

In this study, we adopted frequently used self-report measures to measure suppression frequency and depression. In addition, we employed scenario-based self-report measures of ability for methodological equivalency. The measure that we chose was not only well-validated by experimental measure of suppression ability (Burton & Bonanno, 2016), but also validated in both Chinese and English (Burton & Bonanno, 2016; Chen et al., 2018).

Method

We used an existing dataset to examine if suppression frequency can decrease depressive symptoms via increasing suppression ability (Chen et al., 2018). A total of 310 Chinese undergraduate students who reported never travelling internationally were recruited to complete a survey including measures of suppression frequency, suppression ability, and depressive symptoms for either course credits or monetary

compensation (ten RMB). The sample was relatively evenly split by gender (47.10% female) and ranged in age from 18 to 24 ($M = 20.03$, $SD = 1.35$). The study was approved by the Institutional Review Board (IRB) at Tsinghua University. Participants provided informed consent prior to beginning the survey.

Suppression frequency was measured by the Suppression Subscale in the Emotion Regulation Questionnaire (ERQ, Gross & John, 2003; validated in Chinese by Wang, Liu, Li, & Du, 2007; $\alpha = .73$). Participants were asked to respond to descriptions such as "When I am feeling negative emotions, I make sure not to express them" and rate the extent that they apply on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The higher the sum score, the more frequently one would suppress their emotional expressions.

Suppression ability was measured by the Suppression Ability Subscale in the Flexible Regulation of Emotional Expression Scale (FREE; Burton & Bonanno, 2016; validated in Chinese by Chen et al., 2018; $\alpha = .78$). This scale provided standardized hypothetical scenarios (e.g., While having dinner with a friend who has just recently lost their job, you receive a phone call from your boss stating you will get a raise) to assess participants' perceived ability to suppress their emotional expressions in situations that require it. After reading each scenario, participants rated to what extent they would be able to conceal their expressions compared to how they are actually feeling on a 6-point scale, ranging from 1 (*unable*) to 6 (*very able*). The higher the sum score, the more able one could suppress their expressions to meet contextual demands.

Depression is measured by Beck Depression Inventory-II (BDI-II; Beck et al., 1996, 1996; validated in Chinese by Wang et al., 2011; $\alpha = .91$). Participants provided rating from 0 (e.g., *I do not feel sad*) to 3 (e.g., *I am so sad and unhappy that I cannot stand it*) on a list of 21 depressive symptoms to indicate the severity that best captured their experience in the past two weeks. All item scores were summed up to reflect the severity of depressive symptoms. Scores of BDI-II range from 0 to 63, with high scores indicating greater depressive symptoms (Beck et al., 1996).

Analytic Plan

We first examined descriptive statistics, and then, to test our major hypothesis that suppression frequency has an indirect effect on depression through suppression ability, we conducted a mediation analysis using Process 3.1 (Hayes, 2012). This approach is a more recommended approach than traditional mediation analysis (Baron & Kenny, 1986), because it allows bootstrapping and examination of indirect effect in the absence of significant total effect (Hayes, 2009, 2013). In the model, we specified depression as the dependent variable, suppression frequency as the independent variable, and suppression ability as the mediator, and controlled for age and gender. We also tested an alternative model in which suppression frequency served as the mediator, and suppression ability was the independent variable. In both models, we selected gender and age as control variables in order to rule out the potential influences of these two may have on suppression and depression (Nolen-Hoeksema & Aldao, 2011).

Results and Discussion

Descriptive Statistics and correlation findings were shown in Table 1. Suppression ability was associated negatively with depression, $r(309) = -.31$, $p < .001$, but positively with suppression frequency, $r(309) = .19$, $p < .01$. Contrary to previous research, suppression frequency was positively related to depressive symptoms, $r(309) = .13$, $p = .02$, although this effect size was relatively small. This difference from previous research may be due to the larger sample size in the present study (Taylor, 1990).

The primary mediation analysis revealed both a direct and an indirect effect of suppression frequency on depression (see Figure 1). On

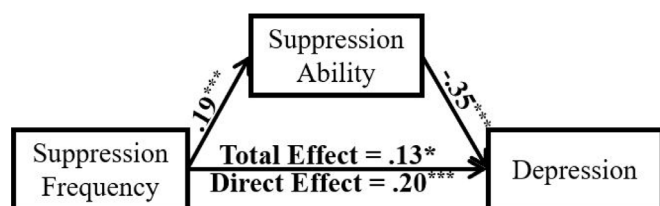
Table 1
Descriptive Statistics and Zero-order Correlations in Study 1 and 2

Study 1- Chinese Sample					
	<i>M (SD)</i>	<i>Range</i>	1	2	3
1 Suppression Frequency	14.25 (4.55)	[4 26]			
2 Suppression Ability	31.07 (6.05)	[9 46]	.19**		
3 Depression (BDI-II)	9.55 (7.52)	[0 60]	.13*	-.31***	
Study 2- US Sample					
	<i>M (SD)</i>	<i>Range</i>	1	2	3
1 Suppression Frequency	15.28 (4.86)	[4 27]			
2 Suppression Ability	30.49 (6.98)	[16 48]	.13		
3 Depression (CES-D)	17.20 (10.62)	[0 51]	.26***	-.21***	
Study 2- Chinese Sample					
	<i>M (SD)</i>	<i>Range</i>	1	2	3
1 Suppression Frequency	15.77 (5.07)	[4 28]			
2 Suppression Ability	31.16 (6.24)	[10 47]	.30***		
3 Depression (CES-D)	16.94 (12.17)	[0 46]	.05	-.27***	

*** $p < .001$,

** $p < .01$,

* $p < .05$ Note.



Indirect Effect = $-.07$, CI $[-.14, -.02]$, Significant

Figure 1. Mediation Model among Chinese participants (Study 1). Please note that the indirect effect analysis does not produce an exact p value and only the 95% CI. * $p < .05$; *** $p < .001$

the one hand, there was a direct effect of suppression frequency on depression, where more frequent suppression was associated with greater depressive symptoms, *direct effect* = $.20$, $SE = .05$, 95% CI $[.09, .31]$, $p < .001$. On the other hand, suppression frequency had an indirect effect on depression via suppression ability, such that more frequent suppression was related to greater suppression ability, and then related to fewer depressive symptoms, *indirect effect* = $-.07$, $SE = .03$, 95% CI $[-.14, -.02]$. This indirect effect of suppression frequency weakened its direct effect, resulting in a smaller total effect, *total effect* = $.13$, $SE = .06$, 95% CI $[.02, .20]$, $p = .02$. In other words, suppression ability appeared to offset some adverse effects that suppression frequency had over depression.

We also examined an alternative model where suppression frequency served as the mediator between suppression ability and depression. The indirect effect was significant, *indirect effect* = $.03$, $SE = .02$, 95% CI $[.01, .07]$. The direct effect of suppression ability on depression was significant, *direct effect* = $-.34$, $SE = .05$, 95% CI $[-.45, -.24]$. The indirect effect of this model was far smaller in size of the total effect, *total effect* = $-.31$, $SE = .06$, 95% CI $[-.42, -.20]$. Although we could not fully rule out the possibility that suppression ability may precede suppression frequency given that our results seemed to support both models, we favored the main model because of its larger indirect effect size, and consistency with our hypothesis that suppression ability may reverse the effect of suppression frequency on depression in Chinese culture. Nevertheless, further examination and comparison of both possibilities are necessary in determining the most replicable and robust model.

Hayes (2009) noted that a total effect is the sum of many different paths of influence, and these paths may operate in opposite directions. In the current study, suppression frequency was positively associated with both suppression ability and depression. Suppression ability, in

turn, was negatively associated lower depression. Thus, suppression frequency had effects on depression in two distinct ways. As a direct effect, higher suppression frequency was related to more depressive symptoms. As an indirect effect, however, higher suppression frequency was related to fewer depressive symptoms via the co-occurring higher suppression ability.

This study showed that, among Chinese participants, suppression ability is a psychological mechanism that weakens the adverse effect of suppression frequency on psychological adjustment. Findings from this study suggests that suppression frequency may favorably influence depressive symptoms, via suppression ability, among Chinese participants. However, it remains unknown whether this indirect effect is unique in Chinese culture, or, alternatively, consistent across Chinese and American cultures. A more exacting answer to this question will require direct cross-cultural comparison.

Study 2

Introduction

In our second study, we extended the findings in Study 1 in two ways. First, we attempted to replicate the indirect effect using a new, more diverse sample other than undergraduate students. Second, we examined whether this indirect effect was unique in Chinese culture by conducting a cross-cultural comparison between Chinese and US samples. If we were to find that suppression ability offset the adverse effect of suppression frequency only among Chinese participants, this may serve as a potential explanation for why suppression frequency was less associated with depression in Chinese than in US population.

Method

A total of 392 participants (200 from US, 192 from China) were recruited to complete measures of suppression frequency, suppression ability, and depression in this study. All participants provided informed consent prior to beginning the survey.

For US participants, we used an existing dataset from a previous study (Study 1; Burton & Bonanno, 2016), which were recruited using SocialSci, an online survey tool where researchers can upload and distribute surveys to a preexisting national pool of participants who complete study procedures from their personal computers. The majority of the sample was female (61%) and age ranged from 18 to 40 ($M = 26.52$, $SD = 5.09$). Our Chinese participants were recruited using Questionnaire Star, an online survey tool similar to SocialSci. The majority of the sample was female (62%), and age ranged from 24 to 50 ($M = 28.32$, $SD = 5.90$).

All participants completed the measures of **suppression ability** and **suppression frequency** using the same instruments mentioned in Study 1. Internal consistency measures were good for both the FREE suppression ability subscale ($\alpha = .70$ for US participants, $\alpha = .79$ for Chinese participants), and ERQ suppression subscale ($\alpha = .79$ for US participants, $\alpha = .77$ for Chinese participants).

Depression was measured by the Center for Epidemiological Studies- Depression (CESD; Radloff, 1977; Wang et al., 1999; $\alpha = .93$ for US participants, $\alpha = .91$ for Chinese participants), a 20-item measure that asks participants to rate the frequency of symptoms associated with depression (e.g., I was bothered by things that usually don't bother me) during the past week from 0 [*Rarely or none of the time (less than 1 day)*] to 3 [*Most or all of the time (5-7 days)*]. Four items were reversed coded, after which all item scores were summed up to reflect the severity of depressive symptoms. Scores of CESD range from 0 to 60, with high scores indicating greater depressive symptoms (Lewinsohn, Seeley, Roberts, & Allen, 1997).

Analytic Plan

First, we examined descriptive statistics and correlation findings to demonstrate the nature of variables as well as relation among these variables in both cultures, separately. Next, we used independent t-test to compare suppression frequency, suppression ability, and depression between two cultures. We conducted this analysis to rule out any other preexisting group differences than culture that may confound our findings. Then, we examined if culture moderated the link between any of the bivariate relationships between suppression frequency, suppression ability, and depression. We performed formal tests of cultural moderations as a way to determine the pathways in which culture play a role. This helped us specify our final model. Finally, to test our primary hypothesis that suppression frequency has an indirect effect on depression through suppression ability only in Chinese culture, we conducted analyses of conditional indirect effects using Process 3.1 (Hayes, 2012). In the model, we specified depression as the dependent variable, suppression frequency as the independent variable, and suppression ability as the mediator, culture as the moderator and controlled for age and gender. Given that in Study 1 we did not fully rule out the possibility of suppression frequency as the mediator between suppression ability and depression, we also tested an alternative model in which the order of suppression frequency and ability was switched. Similar to Study 1, we controlled for age and gender in both models due the potential influences of they may have on suppression and depression (Nolen-Hoeksema & Aldao, 2011).

Results and Discussion

Descriptive statistics and correlation findings were displayed in Table 1. Suppression frequency was positively associated with depressive symptoms in the US sample, $r(199) = .26, p < .001$, but not for the Chinese sample, $r(191) = .05, p = .53$. In both cultures, greater suppression ability was related to lower levels of depression, $p.s. < .001$. A positive association between suppression frequency and suppression ability was found among Chinese participants, $r(191) = .30, p < .001$, but this relation was only marginal in their US counterparts, $r(199) = .13, p = .07$.

A comparison of mean scores from Chinese and US samples showed no significant differences in suppression frequency, $t(390) = .97, p = .33$, suppression ability, $t(390) = .97, p = .34$, or depression $t(390) = -.23, p = .82$. On the one hand, these findings were encouraging, since it ensured that any differences observed in the relationships among suppression frequency, suppression ability, and depression resulted from cultural contexts, rather than the levels of these variables. On the other hand, this was inconsistent with previous research on the cultural differences in suppression. For instance, previous studies have shown cultural differences in both the suppression frequency (e.g., Soto et al., 2011) and the ability to suppress emotions (e.g., Murata et al., 2013). These discrepancies can be explained by the differences in samples and measures. In the study by Soto et al. (2011), they included college students from Hong Kong and US, whereas we used participants with a wider range of age and education from mainland China and US. In the study by Murata et al. (2013), they assessed suppression of internal emotions, whereas we assessed suppression of external, expressed emotions. Therefore, the absence or presence of cultural differences in suppression may depend on sample characteristics (e.g., subpopulation within each culture) and how researchers operationalize suppression (e.g., internal versus external).

To determine pathways in which culture may play a role, we performed a series of moderation tests. As the results showed, culture moderated the link between suppression frequency and depression, $\beta = .12, p < .05, 95\% \text{ CI } [.02, .22]$, such that higher suppression frequency was associated with more depressive symptoms for US participants, $\beta = .29, p < .001, 95\% \text{ CI } [.15, .42]$, but not Chinese participants, $\beta = .05, p = .46, 95\% \text{ CI } [-.09, .20]$. Culture also moderated

the link between suppression frequency and ability, $\beta = -.10, p < .05, 95\% \text{ CI } [-.20, -.01]$, such that higher suppression frequency was related to greater suppression ability for Chinese participants, $\beta = .31, p < .001, 95\% \text{ CI } [.17, .45]$, but not US participants, $\beta = .11, p = .11, 95\% \text{ CI } [-.03, .24]$. However, culture did not moderate the link between suppression ability and depression, $\beta = .01, p = .33, 95\% \text{ CI } [-.09, .10]$, such that higher suppression ability was consistently associated with fewer depressive symptoms across cultures. As such, in the following analyses, we no longer examined the possibility that culture may moderate the link between suppression ability and depression.

Our primary analyses examined whether and how culture moderated the indirect effect of suppression frequency on depression through suppression ability. We used the approach that was recommended by previous researchers to determine the significance of the conditional indirect effects (Hayes, 2013, 2015). When using culture as a moderator that influence the link from suppression frequency to depression via suppression ability, the index of mediated moderation was significant, $Index = .05, 95\% \text{ CI } [.01, .13]$. The indirect, favorable effect of suppression frequency on depression via suppression ability was significant for Chinese, $Indirect \text{ Effect} = -.08, SE = .03, 95\% \text{ CI } [-.15, -.04]$, but not for US participants, $Indirect \text{ Effect} = -.03, SE = .02, 95\% \text{ CI } [-.07, .01]$ (see Figure 2).

We also tested an alternative model in which suppression frequency served as the mediator and suppression ability served as the independent variable when culture still acted as the moderator. In this model, however, the index of mediated moderation was not significant, $Index = -.03, 95\% \text{ CI } [-.08, .02]$, suggesting that there was no significant cultural moderation of this indirect effect. The indirect effect was .06 for Chinese participants, $SE = .02, 95\% \text{ CI } = [.03, .10]$, and .03 for US participants, $SE = .02, 95\% \text{ CI } = [-.01, .07]$. These suggested that culture did not moderate the process in which suppression ability is related to depression via suppression frequency.

Together, these results replicated the findings showing that in Chinese participants greater suppression frequency was linked to fewer depressive symptoms through greater suppression ability. Moreover, by

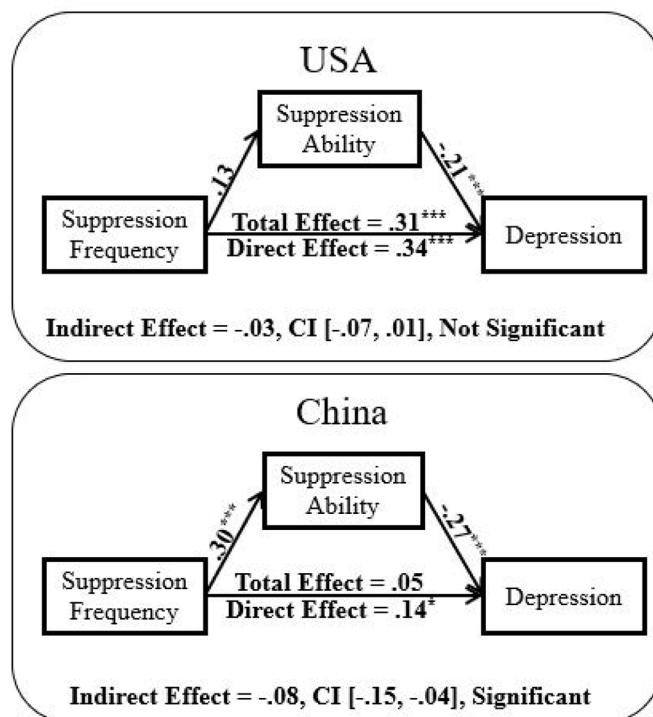


Figure 2. Mediation Models by Cultures (Study 2). *Index of Mediated Moderation* = .05, 95% CI [.01, .13]. Please note that the indirect effect analysis does not produce an exact *p* value and only the 95% CI. * $p < .05$; *** $p < .001$

adopting a cross-cultural design, our study suggested that this indirect pathway was unique in Chinese culture, mainly because only in this culture was higher suppression frequency related to higher suppression ability. Our findings provided one potential explanation for why the association between suppression frequency and depression was weaker for Chinese than for US participants.

General Discussion

Our results demonstrated an indirect, protective effect of suppression frequency on depression through suppression ability but only among Chinese participants. That being said, for Chinese but not American participants, increased suppression frequency was associated with higher ability to suppress in contextually appropriate scenarios, which in turn makes the habitual use of suppression associated with fewer depressive symptoms. These findings highlight one potential explanation for why suppression frequency was not found maladaptive in Chinese cultures (Soto et al., 2011).

Previous research examining the potential mechanisms underlying the culturally different suppression frequency-depression link has mainly focused on cultural norms of collectivism and individualism (Eng, 2012; Matsumoto et al., 2008; Su et al., 2013). This line of research provided important insights into values and attitudes toward emotional suppression depending on one's cultural membership (Eng, 2012). What this previous line of research appears to overlook is, however, that culture may also affect whether increased use of suppression contributes to enhanced perceived ability of suppression when contextually appropriate. As a supplement to this gap, our study provides a possible explanation for why habitual suppression is less maladaptive in China than that in the US. In Chinese culture, emotional expressions are not particularly encouraged, and suppression is thereby often adopted to meet contextual needs. This difference reduces the negative impact of suppression on mental health outcomes in China as compared to US culture where emotional expressions are more openly encouraged. In other words, the link between suppression frequency and ability is only robust in Chinese culture.

From a basic science perspective, our studies contribute to a growing body of literature that emphasize the effect of contexts on the adaptiveness of a given regulatory process (for reviews, see Aldao, 2013; Bonanno & Burton, 2013). As an important contextual factor, culture has been found to shape the adaptiveness of emotional suppression (Butler, Lee, & Gross, 2009; Soto et al., 2011). Endeavors in understanding how such differences may emerge will therefore be critical in moving forward this line of work. From an applied science perspective, our studies shed light on not only whether, but also *why*, it may be helpful for people from certain cultural background to suppress or not. As emotion regulation is increasingly recognized as a transdiagnostic mechanism underlying most psychopathology (Aldao, Nolen-Hoeksema, & Schweizer, 2010), it is critical to identify cultures and contexts where expressive regulation is contraindicated or, at minimum, adapted.

The advances suggested by our findings should be understood in context of several methodological limitations. First, the cross-sectional nature of our data does not allow us to rule out the possibility that increased depressed mood among US participants may lead to greater use of suppression and lower suppression ability. However, prospective and experimental data from other studies (Aldao & Nolen-Hoeksema, 2012; Bonanno et al., 2004; Westphal et al., 2010) support the directional pathway we had observed. Moreover, the measure of depression in the current study (CESD) assesses symptoms within the past week and the ERQ and FREE ask about general suppression frequency and ability, further supporting the study's model. Second, in terms of whether suppression frequency or suppression ability should be a mediator, using suppression ability as mediator yielded a better model fit, and was more in line with our theoretical reasoning. Finally, although our data suggest that the interconnection between suppression

frequency, suppression ability, and psychopathology operates in a distinct manner between Eastern and Western samples, we did not provide direct empirical evidence that this results from perceived cultural demands between the two. Future research should employ experimental or ecological momentary assessment methods to more explicitly assess individual goals and perceived efficacy of employing expressive suppression in the specific contexts of Chinese and US cultures (Millgram, Joormann, Huppert, & Tamir, 2015).

Within the context of these limitations, our findings advanced previous research in three ways. First, we extended previous findings showing suppression frequency is more maladaptive for US than for Chinese participants. Second, we provided new evidence that the ability to suppress in appropriate and necessary situations is generally adaptive across both collectivistic and individualistic cultures. Third, and most importantly, our findings suggested suppression ability as one mechanism that may account for the cultural difference in suppression frequency's association with depression.

Contributors

SC designed the study and analyzed the data under the supervision of CB and GB. SC, CB, and GB discussed the results and wrote the paper together.

Data Transparency

The current studies were not preregistered. However, all the data used in this paper are publicly available through the Open Science Foundation (<https://dx.doi.org/10.17605/OSF.IO/57U98>).

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Declaration of Competing Interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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