

# Research on Cognitive Reappraisal and Expression Inhibition Under the Background of Chinese Culture

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## ABSTRACT

According to the emotional regulation model proposed by Gross in 2007 [1], the two main emotional regulation strategies are cognitive reappraisal and expression inhibition respectively. Previous studies have suggested that cognitive reappraisal has a better emotional regulation effect than expression inhibition, and expression inhibition has a negative effect on psychological function. However, in recent years, more and more experiments have proved that this conclusion is culturally specific, and the conclusion may be different for subjects in western culture and Eastern culture. In this paper, the ERP method was adopted to adjust 28 Chinese college students, and the eeg data under two emotional regulation strategies were collected and analyzed. The study found that for the subjects in the Chinese cultural background, both expression inhibition strategies and cognitive reassessment strategies can effectively reduce negative emotional experience. In addition, Chinese subjects used expression inhibition strategy to reduce negative emotions significantly faster than cognitive reappraisal, but expression inhibition regulation required more cognitive resources.

**Key words:** *Cognitive reappraisal, expression inhibition, event-related potential, emotion regulation, cultural background*

## 1. INTRODUCTION

Emotional regulation is an ancient and modern at home and abroad for a long time unchanged topic. In traditional Chinese medicine, emotional regulation is placed in a very important position. For example, the view of "anger harms the liver and worry injures the spleen" reflects the original psychological immunity thought and the understanding of the relationship between emotional regulation and physical and mental health. Therefore, in the face of the constantly changing living environment, people's ability to regulate negative emotions is very important. Gross et. al divided emotional regulation strategies into ante-focus strategies and reaction-focus strategies, according to the differences in the time points at which a strategy produces regulatory effects [2]. The former is represented by cognitive reappraisal, which requires individuals to interpret emotional stimuli and correct emotional responses in a separate and unrelated way for emotions that have not yet been fully revealed. On the contrary, the latter is by adjusting the emotional expression in the late emotional response behavior to adjust emotional response. Expression suppression is a typical example of reaction focusing strategy.

There is a big difference in both the regulatory strategy and the regulatory effect (including physiological response, social behavior, and emotional level). Gross has concluded in the past that cognitive reappraisal was better at regulating emotions than expression inhibition. However, in recent years, more and more studies have questioned this conclusion and supplemented it to some extent,

believing that this conclusion is culturally specific and age-specific. For example, under the cultural background of China, expression inhibition has a stronger effect on the arousal level of suppressing negative emotions. The significance of this paper lies in the new assessment of the effects of cognitive reappraisal and expression inhibition in the context of Chinese culture, which complements the culture-specific part of emotion regulation model.

## 2. ANALYSIS ON NEURAL BASIS AND REGULATORY EFFECTS OF THE TWO EMOTIONAL REGULATION STRATEGIES

### 2.1. Neural Basis of Cognitive Reappraisal and Expression Inhibition

The brain areas associated with cognitive reappraisal and expression inhibition strategies were approximately the same, but activation levels were different in some brain areas, such as the medial orbitofrontal cortex, indicating that the two emotional regulation strategies had different effects on certain cognitive activities.

In the neuro-basic research of cognitive reevaluation strategy, some scholars use neuro-physiological technology to study from the perspective of the whole cognitive processing process. In general, studies using functional magnetic resonance imaging (fMRI) have highlighted links between cognitive reassessment strategies and brain regions such as the prefrontal cortex,

amygdala, and medial orbitofrontal cortex. Based on many cognitive science models and models of emotion and emotional regulation, the researchers hypothesized that the interaction between cognitive control and emotional processing systems involved in these brain regions forms the basis for cognitive reappraisal [3].

The neural basis of expression inhibition is mainly studied from the perspective of cognitive process. Studies have shown that the medial ventral orbitofrontal cortex is activated when individuals adopt expression inhibition strategies for emotional regulation. Since this region is related to the evaluation of emotion, there are differences in the evaluation of emotion processing between these two emotion regulation strategies. In addition, the regions involved in expression inhibition also include the dorsolateral and ventral prefrontal cortex (DLPFC&VLPFC), especially the DLPFC on the right and the VLPFC on the left, which are considered to be involved in the active behavioral control of emotions.

## ***2.2. Different Effects of Cognitive Reappraisal and Expression Inhibition on Emotional Experience, Behavioral Expression and Physiological Response***

The main goal of emotional regulation is to modify emotional response, while cognitive reappraisal and expression suppression, two specific emotional regulation strategies, have different effects on subsequent emotions. Most studies have shown that cognitive reappraisal reduces emotional psychological experience, behavioral expression, and physiological responses. Although the expression inhibition will reduce the expression of emotional behavior, it will lead to the enhancement of physiological response [4].

### ***2.2.1. Effects of cognitive reappraisal on emotional experience, behavioral expression and physiological response***

So far, most of the research in the field of cognitive reappraisal has been done in the context of negative emotional stimuli. For example, studies have shown that cognitive reappraisal reduces the experience and behavioral expression of disgust, but does not have a significant effect on sympathetic activation of the cardiovascular and cutaneous electrical systems. What is more, cognitive reappraisal is effective and flexible in downgrading negative emotions, and it is frequently applied in daily life. People tend to use cognitive reappraisal in our daily lives because it can lead to positive psychosocial outcomes. Compared with expression inhibition, habitual use of cognitive reappraisal does not result in loss of limited cognitive resources, and individuals will have better interpersonal relationships and report higher levels of happiness. Some researchers believe

that negative emotions such as anger have a strong cognitive component. Therefore, if individuals can reconstruct the meaning of negative emotional stimulation cognitively, it is more likely to reduce the intensity of negative emotional stimulation and lead to positive psychosocial results.

### ***2.2.2. Influence of expression inhibition on emotional experience, behavioral expression and physiological response***

Current research results consistently indicate that although expression inhibition may reduce individuals' behavioral expression of emotional stimuli, it may also lead to an enhanced physiological response. However, there are some differences in the research results on the influence of expression inhibition on emotional experience. Studies have found that expression inhibition can significantly reduce the psychological experience of positive emotions, but not negative emotions. Other researchers hold the opposite view, believing that suppression of expression will lead to a reduction in negative emotional experience [5]. In the author's opinion, this is caused by individual and cultural differences. For example, in the research to be mentioned later in this paper, subjects in Chinese cultural background showed a high degree of consistency, and expression inhibition led to the reduction of negative emotional experience.

## **3. NEW RESEARCH IN THE CONTEXT OF CHINESE CULTURE**

### ***3.1. Research Background***

East Asian collectivist culture emphasizes avoiding hurting others and striving to maintain harmonious relationships, so the function of suppressing negative emotions is particularly important. So far, evidence that expressive suppression is less effective than cognitive reappraisal in reducing negative emotions comes mainly from western cultural backgrounds. In fact, a growing number of studies have shown that expression suppression is culturally specific for the regulation of negative emotions. For example, in the context of east Asian cultures, expression suppression linked to better social function. Butler et al. studied cultural regulation and the effect of negative emotions on expression inhibition [6]. The results show that for European Americans, expression suppression has a negative influence on psychological function, but the link does not exist in China. In addition, the study reveals the expression suppression reduced the level of negative emotion among Asian Americans, which confirms the inhibition under the background of Oriental culture have positive effect. Evidence suggests that suppression of expression helps reduce negative emotional experiences and improve social functioning in Asian cultures, so the

results from western participants may not be applicable to China. Based on a large body of evidence, it can be concluded that Chinese people are likely to use expressive suppression to regulate negative emotions and cognitive reappraisal effectively or better than cognitive reappraisal.

### **3.2. Discussion on the Tools Used in the Study**

An important basis of previous studies supporting the superiority of cognitive reappraisal over expression inhibition is that expression inhibition induces stronger peripheral physiological responses (such as enhanced skin electrical and heart rate levels) and stronger limbic system activation (such as insula, amygdala, and orbitofrontal cortex) than cognitive reappraisal [7]. However, many studies have confirmed that these reactions are not necessarily the result of emotional arousal. In complex tasks, these responses may also be triggered by an increase in cognitive load. However, fMRI studies are difficult to distinguish limbic system activation induced by cognitive load from limbic system activation induced by emotional arousal in the same task. Thus, it is necessary to explore the emotional regulation effects of cognitive reappraisal and expression inhibition with high temporal resolution technology, so as to achieve the separation of emotional arousal indicators and cognitive load indicators. Obviously, event-related potential technology can meet this purpose. Previous studies have shown that inhibiting dominant behaviors induces a larger P3 in the central frontal lobe 400ms after stimulation, suggesting that the inhibition process takes up more cognitive resources. However, cognitive reappraisal strategies do not need to monitor dominant emotional expression behaviors. Therefore, expression inhibition is likely to induce a larger P3 component in the center of the forehead than cognitive reassessment [8].

On the contrary, many studies have shown that late positive potential (LPP) reaches its maximum peak at 500-700ms after stimulation, lasting for several hundred milliseconds, and LPP amplitude under emotional stimulation is significantly greater than that under neutral stimulation. Therefore, LPP is suitable for studying the characteristics of emotional arousal over time under cognitive reassessment and expression inhibition strategies.

## **4. EXPERIMENTS**

### **4.1. Study the Subjects**

A total of 280 college students, including 145 male and 135 female, aged (21.6±2.8) years and years of education (15.6±1.9) years, were recruited as volunteers in this experiment. All participants were right-handed, had normal vision or corrected visual acuity, and had no history of mental or neurological disease.

### **4.2. Research Hypothesis**

LPP amplitude is an effective indicator of emotional arousal level, and it is predicted that the reduction in LPP amplitude of expression inhibition may occur earlier than that of cognitive reappraisal.

### **4.3. Results**

- (1) Reappraisal and suppression strategies reduced subjective negative emotions to a similar degree.
- (2) Expression inhibition induces greater P3 amplitude than cognitive reassessment in the central-frontal region, which has been proved to reflect the processing of response inhibition.
- (3) The effect of the inhibition condition on the amplitude of LPP was earlier than that of the specific gravity assessment condition, indicating that for the Chinese, the speed of expression inhibition on negative emotions was faster than that of cognitive reassessment.

### **4.4. Summary**

Both expression inhibition strategies and cognitive reappraisal strategies can effectively reduce negative emotional experience. Moreover, Chinese subjects use expression inhibition strategies to reduce negative emotions significantly faster than cognitive reappraisal, but expression inhibition regulation needs to consume more cognitive resources.

## **5. DISCUSSION**

As a research field, there are still many deficiencies in the current research field of emotion regulation strategies, which also provide directions for future research.

### **5.1. To Develop a Practical Experimental Paradigm of Emotion Regulation Strategy**

In terms of research paradigm, most of the current studies only control the differentiation of different emotional regulation strategies through different guidance words, but do not reflect this process in explicit experimental tasks. Emotional experience was also evaluated only by questionnaire so the development of a practical experimental paradigm of emotion regulation strategy is another direction of future research. For instance, eeg was used to determine the success of cognitive reappraisal and the difference between the two emotion-regulation strategies. Or the use of FMRI to measure the level of emotion is a possible development direction in the future experimental paradigm. In recent years, ERP technology has been used to explore the eeg characteristics of cognitive reassessment strategies. It was pointed out that

the implementation of cognitive reappraisal strategy would affect the early components of emotional processing whether the reappraisal was successful or not, and the modulation effect of reappraisal on the early components of LPP was both "elevated" and "decreased". However, only the "elevated" modulation of the early components of LPP was significantly correlated with the success of reassessment, reflecting the positive correlation between the physiological characteristics of cognitive reassessment and emotional response [9].

### ***5.2. Possible Applications in the Field of Education***

From the perspective of educational neuroscience, the theoretical and practical significance of neurobasic research on emotional regulation strategies can be reconsidered and reviewed. Education neural science is an applied cognitive neuroscience and behavioral methods to study the development of mental representation, represents the psychological cognitive orientation of research in the field of a developing trend, if the results of the study in the field of emotion regulation strategies can be combined with education practice, cognitive neuroscience and education of two-way communication, its scientific significance and value is enormous. For example, researchers studying emotional regulation strategies through the neurophysiological paradigm should aim to identify some of the signature neurological indicators associated with emotional regulation disorders. In this way, remedial measures can be taken before formal education to reduce or eliminate the occurrence of mood regulation disorders to some extent.

### ***5.3. Gender and Emotional Regulation Strategies***

In terms of research objects, the differences of different groups in the use of emotional regulation strategies should be considered. For example, in view of the hot issue of gender in recent years, more in-depth research is made on the preference of gender in emotional regulation strategies and the implementation effect. Current studies have used event-related potential technology and found that for men, the amplitude of LPP induced by negative images (2000-4000 ms) was significantly reduced when compared with the free viewing condition under expression inhibition, but the above effect did not occur in women. In addition, at each time window of LPP, there was no significant gender difference when cognitive reappraisal strategy was used for emotional regulation. He believed that when using expression inhibition strategy to regulate negative emotions, males had better regulatory effect than females, which suggests that men are more suitable than women for daily emotional management by means of inhibiting emotional expression [10]. This gender advantage may stem from different social expectations of male and female

gender roles. There is not much research in this area, and it is an area worth exploring, which complements the current tension between gender social relations and power issues.

## **6. CONCLUSION**

In the past, Gross et al. concluded that cognitive reappraisal had a better emotional regulation effect than expression inhibition, and expression inhibition had a negative effect on psychological function. However, in recent years, more and more experiments have proved that this conclusion is culturally specific, and the conclusion may be different for subjects in western culture and Eastern culture. In the context of Chinese culture, studies have shown that both expression inhibition strategies and cognitive reappraisal strategies can effectively reduce negative emotional experience. Moreover, Chinese subjects use expression inhibition strategies to reduce negative emotional experience significantly faster than cognitive reappraisal, but expression inhibition regulation needs to consume more cognitive resources. There are still some shortcomings in empirical research in this paper, such as the small number of subjects adopted and the small number of problem areas selected for research. In the future, further research can be conducted according to the possible research directions given above.

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