



# *Impact of expressive suppression as an emotional regulation strategy on Cognitive Reserve*

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**Abstract :** There are various techniques for dealing with emotions or arousal states considering the various other environmental factors. Importance of flow of emotions in a regulated manner makes the basis of several mood and cognitive disorders. This study aims to investigate how suppressing emotions can be detrimental for cognitive reserve. Cognitive reserve is a brain's ability to resist and adapt to neurological damage via using Cognitive reserve index questionnaire (CRIQ) by Nucci et.al.(2011) and Emotional Regulation questionnaire (ERQ) by Gross and John (2003) the two parameters are measured. ERQ consists of two components/strategies of emotional regulation i.e. expressive suppression and cognitive reappraisal. A response from 75 participants were collected out of which 35 scored high on expressive suppression and 40 scored higher on cognitive reappraisal. To maintain homogeneity across the groups 35 each are taken. The research aims to compare the cognitive reserve of the two groups of young and middle age healthy adults. One group dominantly uses cognitive reappraisal and another one is using expressive suppression as an emotional regulation strategy. The aim is to also find the correlation between Cognitive reserve and emotional regulation strategies. The result of the study indicates that there is a significant difference (t value: 3.39,  $p < 0.05$ ) between the CRIQ Scores of both the groups. Also there is a moderate positive correlation between emotional regulation and cognitive reserve ( $r: 0.57$  and  $p < 0.05$ ) & in between cognitive reappraisal and cognitive reserve ( $r: 0.65$  and  $p < 0.05$ ). On contrary there is a highly negative correlation between expressive suppression and cognitive reserve ( $r: -0.70$  and  $p < 0.05$ ) In conclusion, the findings suggest cognitive reappraisal can be an ideal way of dealing with emotional adversities and in maintaining and enhancing the good levels of cognitive reserve.

**Index Terms - Cognitive Reserve, Cognitive Reappraisal, Expressive suppression, emotional regulation.**

## INTRODUCTION

The human brain is an intricate and extraordinary organ responsible for various cognitive functions. Over the past few decades, researchers have made significant advancements in understanding the brain's structure and function. One captivating phenomenon that has gained attention in recent years is the concept of cognitive reserve. Cognitive reserve refers to the brain's ability to tolerate the effects of aging and neuropathology, allowing individuals to maintain cognitive function despite the presence of brain damage or degeneration.(Stern, 2002) Two key psychological ideas that have been extensively researched in recent years are cognitive reserve and emotional control. Cognitive reserve, which can assist prevent the cognitive decline brought on by ageing and neurological illnesses, is the brain's capacity to adjust to and make up for harm or dysfunction(Stern Y, 2009). On the other hand, emotional regulation refers to the methods through which people control their emotions, including the control of emotional experiences, expression, and behaviour(Gross J.J 2016).

The relationship between cognitive reserve and emotional regulation has been the subject of numerous studies, and the results point to a potential critical role for cognitive reserve in the control of emotions. For instance, studies have indicated that those with greater cognitive reserves may be better able to control their emotions in reaction to stressful situations, which can help lessen the detrimental effects of stress on both mental and physical health (von Gunten et al., 2018). Additionally, some research has indicated that cognitive reserve may assist people in preserving emotional stability and better managing their emotions as they age (Opdebeeck et al., 2016).

The concept of cognitive reserve was first introduced by Stern in 2002 (Stern, 2002), and has since been widely studied in the field of neuroscience and psychology. Similarly, emotional regulation has been a topic of interest in psychology for many years, with researchers exploring various aspects of emotion regulation, including cognitive, behavioral, and physiological processes (Gross, 2015).

The concepts of cognitive reserve and emotional regulation are important areas of research in the field of psychology, with implications for understanding how individuals cope with stress and manage their emotions throughout the lifespan. By better understanding the relationship between these two concepts, researchers may be able to develop new interventions and therapies to promote healthy aging and emotional wellbeing.

Emotional regulation techniques refer to the strategies that individuals use to manage their emotions in a healthy and adaptive way. There are several evidence-based techniques available that can help individuals regulate their emotions more effectively. (Parmentier,2019)

One such technique is mindfulness, which involves focusing on the present moment without judgment or distraction. Practicing mindfulness can help individuals become more aware of their emotional experiences and regulate their emotions more effectively (Keng et al., 2011). Another technique is cognitive reappraisal, which involves changing the way one thinks about a situation or event in order to alter one's emotional response. This can involve reframing the situation in a more positive light, or adopting a more objective perspective (Gross & John, 2003). Expressive writing is also an effective technique that involves writing about one's emotional experiences in order to process and regulate emotions more effectively. Writing about negative experiences in a structured way has been shown to improve emotional regulation and reduce symptoms of depression and anxiety (Smyth, 1998). Physical exercise is another technique that has been shown to have numerous benefits for emotional regulation, including reducing stress and anxiety, and improving mood (Salmon, 2001). Social support from friends, family, or other sources can help individuals regulate their emotions more effectively by providing a sense of comfort and validation. Having someone to talk to or lean on during difficult times can help individuals manage their emotions more effectively (Taylor, 2011).

Emotional suppression and cognitive reappraisal are two techniques of emotional regulation that individuals commonly use to manage their emotions. Emotional suppression involves intentionally suppressing or hiding one's emotional expression, while cognitive reappraisal involves changing the way one thinks about a situation in order to alter one's emotional response. (Cutuli,2014)

One of the studies has shown that emotional suppression can have negative effects on both physical and psychological health, including increased physiological arousal and decreased subjective well-being (Gross & John, 2003). In contrast, cognitive reappraisal has been found to have numerous benefits for emotional regulation, including reduced negative affect, increased positive affect, and improved overall emotional well-being (Gross & John, 2003; Ochsner & Gross, 2008). Studies have also demonstrated that the effectiveness of these techniques may depend on various factors, including the context, individual differences, and the type of emotion being regulated (Gross, 2015). For example, while cognitive reappraisal may be more effective for regulating negative emotions, emotional suppression may be more effective for regulating certain types of positive emotions, such as pride (Gross & John, 2003; English et al., 2012). In older people with depression, Butters et al. (2013) looked into the connection between schooling and cognitive impairment. Even after age, the intensity of the depression, and other factors were taken into account, the study found that more education was linked to improved performance on cognitive tests. In a study, Researchers conducted a Magnetoencephalography while performing a memory task (Sternberg's task) on healthy elderly people where the results showed that people with low level of education and occupational attainment showed greater connectivity while performing the task which suggests that they need more efforts while doing a task. People with low CR need great effort and show more connectivity while performing any cognitive function. More efforts while performing a task suggest that it was much more difficult for the people with low educational levels to do that task and also, they have low CR levels. (Lopez et.al. (2014). The moderating role of education on cognitive impairment in late-life depression was not particularly examined in the study, though. Education level can also help in the potential risks of operative ailments. A metanalysis study suggests, patients with better education are at reduced risk of post-operative cognitive dysfunction as compare to patients with low levels of education or no education; which further indicates towards better cognitive reserve due to significantly higher education. (Feinkohl& Winterer (2017)

In order to better understand the connections between emotional control, cognitive reserve, and depressive symptoms in older persons, Opdebeek et al. (2015) carried out a study. The study discovered that people with greater cognitive reserve were better at controlling their emotions and had lower levels of depression symptoms. The results imply that cognitive reserve may act as a safeguard for older persons' emotional wellbeing.

Similarly, Besser et al. (2020) looked into the connection between emotional control and cognitive reserve in healthy older individuals. According to the study, people who had larger cognitive reserves had superior emotional regulation skills, such as increased emotional awareness and more adaptable emotion management techniques. These results imply that higher emotional management skills in older persons may be correlated with cognitive reserve.

In summary, emotional suppression and cognitive reappraisal are two commonly used techniques of emotional regulation, with varying effects on emotional well-being. While emotional suppression may have negative

consequences for individuals, cognitive reappraisal has been shown to have numerous benefits for regulating emotions.

## RESEARCH METHODOLOGY

### AIM:-

1. To study the level of cognitive reserve in healthy young adults.
2. To study the level of expressive suppression and cognitive reappraisal as an Emotional Regulation in healthy young adults.
3. To study the effect of cognitive reserve on emotional regulation in healthy young adults.
4. To study the Effect of expressive suppression as an emotional regulation strategy on cognitive Reserve in healthy young adults.

### OBJECTIVE

The study is to compare the Cognitive reserve index quotient (CRIQ) of two groups of healthy young and middle age adults where one group is utilising Cognitive reappraisal as an emotional regulation strategy and another group is utilising expressive suppression as an emotional regulation strategy dominantly.

Second objective of this study is to find the relationship between cognitive reserve and both the emotional regulation strategies in order to find out the ideal one. To find out relationship Pearson correlation was used.

### Hypothesis

H<sub>01</sub>- There will be no significant difference between the CRIQ Scores of both the groups, i.e. expressive suppression group and the cognitive appraisal group.

H<sub>02</sub>- There will be no significant correlation between cognitive reserve and cognitive reappraisal.

H<sub>03</sub>- There will be no significant correlation between cognitive reserve and expressive suppression.

### Sampling Technique

Present study was carried out by using convenience sampling technique to identify desired sample.

### Sample Size

The sample for the present study was identified from Ahmedabad city in Gujarat state. Total 70 participants were selected 35 from each cognitive reappraisal and expressive suppression group.

### Inclusion and Exclusion criteria:

Following criteria were taken into consideration for current study:

#### Sample Inclusion Criteria

- Healthy young and middle age adults: Young adults 18-35 Middle age adults 36-55 (Petry,2002)
- People who are well versed with Hindi or English language. People who have completed minimum Elementary schooling as per National Education Policy of India i.e 8<sup>th</sup> Standard.

#### Sample Exclusion Criteria

- Individuals suffering from any kind of Psychiatric illness. Below 8<sup>th</sup> Standard individuals were not included in this study.
- People below 18 and above 55 years were not included.

### Tools used for the study

- **Cognitive Reserve- Cognitive Reserve Index questionnaire (CRIq)** by Nucci, Mapelli and Mondini. (2011) was used to identify cognitive reserve among participants.
- **Emotional Regulation- Emotional Regulation Questionnaire** by Gross & John (2003) was used to identify emotional regulation strategy among participants.

### Procedures

The data was of 75 samples was collected from Three Districts (Gandhinagar, Mehsana & Ahmedabad). The consent and demographic details of every participants were taken which explained their levels of education, medical and

psychiatry history. Then the tests of emotional regulation and cognitive reserve were administered. After scoring for emotional regulation test, Two groups were formed on the basis of scoring two groups were identified. One group who predominantly used cognitive reappraisal as an emotional regulation strategy (N=40) another group who predominantly used expressive suppression as an emotional regulation strategy (N=35). To maintain homogeneity, 35 each in both the groups were taken for further analysis.

### **Statistical Analysis**

**Differential Statistics**- Mean and Standard Deviation was carried out to check the level of average and deviation from participants

**Inferential statistics** – **t-test** was used to identify the differentiation in scores of Cognitive Reappraisal and Expressive suppression among groups and **Pearson correlation coefficient** was used to identify the correlation level of Cognitive Reserve & Emotional regulation and Cognitive Reserve & Cognitive reappraisal.

### **RESULTS AND DISCUSSION**

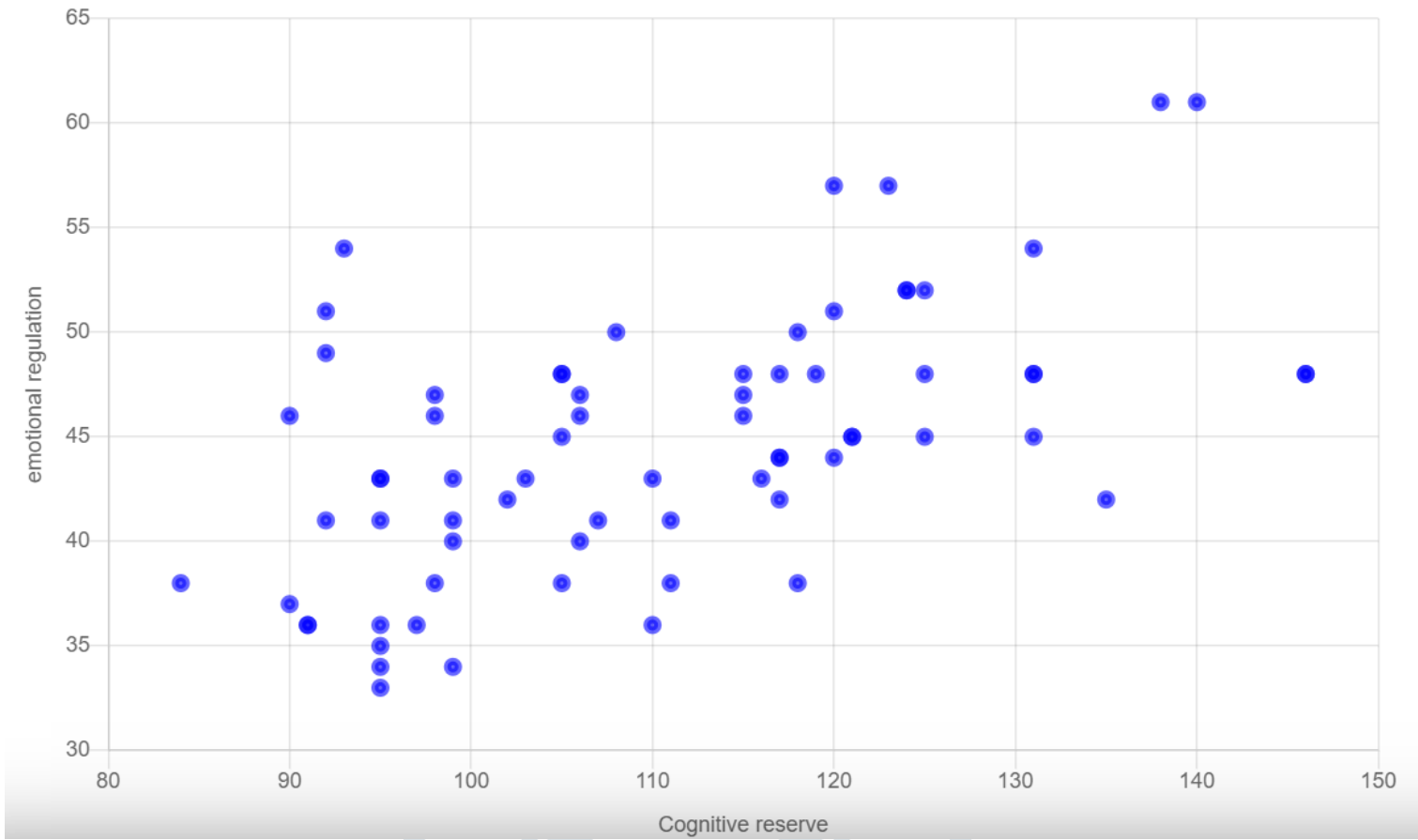
The t-test comparison scores between cognitive reserve index quotient scores (CRIQ Scores) of Cognitive reappraisal (CR) and expressive suppression (ES) comes out to be 3.39 ( $p \leq 0.05$ ). Which suggest that there is a significant difference between CRIQ Scores of group which uses CR more prominently as a emotional regulation technique and the group which uses ES more as compare to CR. (Table 1)

Group	N	Mean	SD	't' Value	Level of Sign.
CRIQ- CR	35	116.03	15.62	3.39	0.05 *
CRIQ- ES	35	104.77	11.92		

\* $p < 0.05$

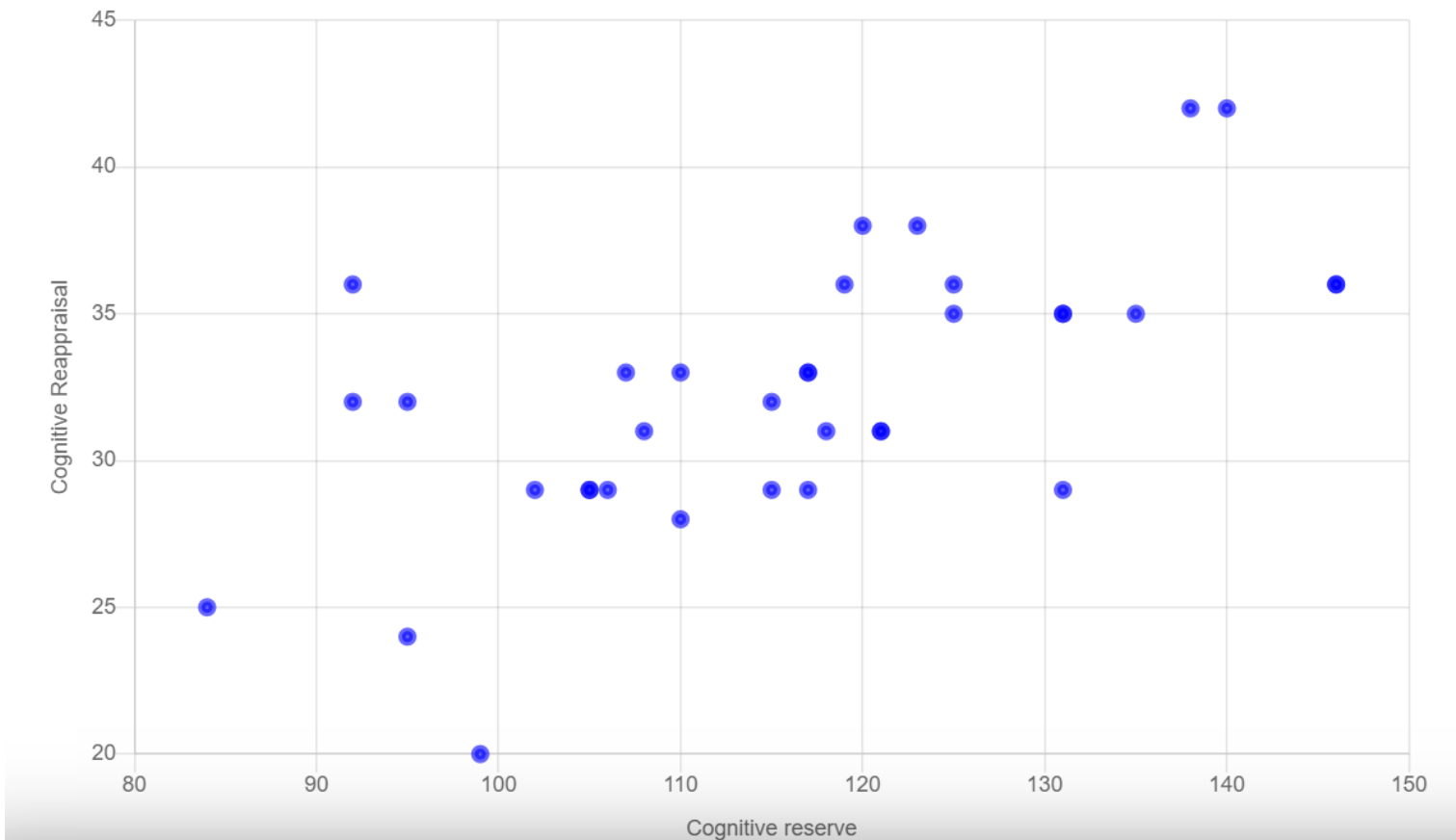
Table 1: t-test comparison between CRIQ Scores of Cognitive Reappraisal and Expressive suppression group

The Pearson correlation values between Cognitive Reserve & Emotional regulation is  $r=0.57$  which indicates moderate positive correlation. On that account if the emotional relation increases, cognitive reserve also increases. (Graph 1)



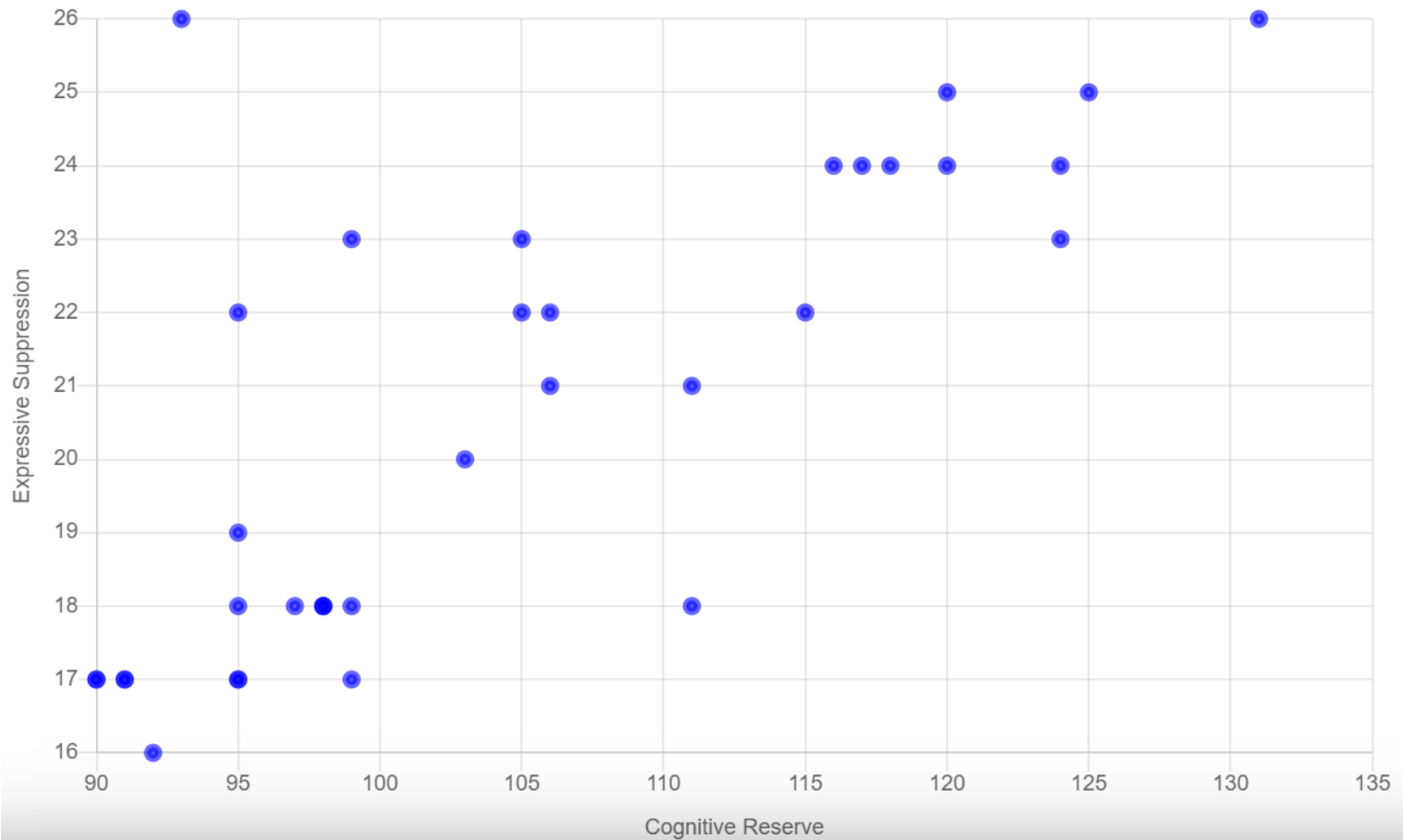
Graph 1- Correlation Value for Cognitive Reserve & Emotional regulation

I. Furthermore, The Pearson correlation value for Cognitive Reserve & Cognitive reappraisal is  $r=0.65$ , which indicates utilisation or practising cognitive reappraisal has some positive effects on cognitive reserve. (Graph



**Graph 2- Correlation Value for Cognitive Reserve & Cognitive reappraisal**

On contrary to the previous moderate positive correlations amongst the variables, The Pearson scores for cognitive reserve and expressive suppression indicates highly negative correlation ( $r=-0.71$ ), which clearly indicates the negative impacts of practising suppression as an emotional regulation strategy and its adverse effects on cognitive reserve.

**Graph 3- Correlation Value for Cognitive Reserve & Emotional Suppression****Discussion**

The present study was aimed to identify the most favourable technique of regulating emotion which can be advantageous in terms of enhancing cognitive reserve. In this study a comparison between two types of emotional regulation strategies has been observed and then the correlation between both the emotional regulation strategies and cognitive reserve was established. The result of this study indicates that there is a significant difference between the CRIQ of both the groups. Also, there is a highly negative correlation between emotional suppression and cognitive reserve, which is an inverse relation between both the variables ( $r = -0.71$ ) suggesting that if an individual is utilizing emotional suppression more as an emotional regulation technique as compare to cognitive reserve, they are more likely to have declined cognitive reserve. There is Moderately positive correlation between cognitive reappraisal and cognitive reserve ( $r=0.65$ ), implying that individuals using cognitive reappraisal more as an emotional regulation strategy helps an individual in maintaining or developing better cognitive reserve. The study conducted by Besser et al. (2020) supports the results of present study by suggesting people who had larger cognitive reserves had superior emotional regulation skills, such as increased emotional awareness and more adaptable emotion management techniques. These results looked into the connections between emotional control and cognitive reserve in healthy old adults and implied that higher emotional management skills in older persons may be correlated with cognitive reserve. Overall there is moderately positive correlation between emotional regulation and cognitive reserve ( $r = 0.57$ ) attributing that better emotional regulation can indeed enhance the cognitive reserve and utilizing a correct way of regulating emotions can be even more fruitful and constructive.

**Conclusion**

The study indicates that there is a significant difference between the cognitive reserves of people using expressive suppression and people using reappraisal as a way of stabilising their emotions. There is highly inverse correlation between emotional suppression and cognitive reserve. Whereas there is moderate positive correlation between overall emotional regulation with cognitive reserve & in between cognitive reappraisal and cognitive reserve. Utilising alternative and better ways for regulating emotions can impact cognitive reserve in positive ways rather suppressing the emotions. Hence dealing with emotional outbursts in healthy manner can be tailored accordingly.

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