



# EFFECTS OF SADNESS ON AGGRESSION

<sup>1</sup>Ms. Diya Chawla, <sup>2</sup>Dr. Pankaj Singh

**Abstract:** The purpose of this thesis is to a) Examine the differences in pre and post intervention aggression scores among experimental group and control group. b) Test hypothesis - H1- There will be significant difference in pre and post aggression scores of experimental group among young adults. H2 - There will be no significant difference in pre and post aggression scores of control group among young adults. H3 - There will be no significant difference in post intervention aggression scores of experimental group and control group among young adults. Aggression and depression are discussed extensively by examining a broad range of literature that points to environmental, social, individual, psychological, and biophysiological influences. First, aggression and depression are discussed separately in terms of their underlying theory, biosocial perspectives, typologies, behavioral and personality abnormalities, brain structures related to each, and neurochemical/neurological influences. The final sections of the literature review discuss how aggression and depression intersect. These subsections are meant to provide the reader with different lenses through which to frame a deeper understanding of aggression and depression and to expose the reality that aggression and depression are highly complex behavioral outputs for which there are a multiplicity of causes. A methodological outline including hypotheses, research design, sample characteristics, measurements of aggression and depression and covariates, and an analytical strategy frame this study. Lastly, results from the analyses are reported and discussed, contextualizing the findings drawn in this paper in light of extant research

## I. INTRODUCTION

The instinct to be aggressive may be an automatic response that is hard-wired into humans as a means of self-protection, such as when faced with a fight-or-flight situation. Defensive aggression refers to the expression of anger in response to a perceived threat, much like how animals behave when encountering predators. According to the American Psychological Association (APA), sadness is an emotional state of unhappiness, ranging in intensity from mild to extreme and usually aroused by the loss of something that is highly valued (e.g., by the rupture of a relationship).

### DIFFERENCE BETWEEN SADNESS AND DEPRESSION

Although sadness and depression are often conflated and depression is often thought of being in an extreme state of sadness, there is a significant difference between the two. While sadness is a natural human emotion and a common response to painful experiences, depression is a physical illness with a broader range of symptoms than just feeling down. This research primarily focuses on the emotion of sadness. Sadness is a commonly encountered emotion that affects both the body and the mind, lasting for varying durations, ranging from a few seconds to multiple hours. It is considered an adaptive emotion that may have been preserved by evolution along the phylum (Nesse, 1990). In humans, sadness is characterized by specific behaviors, such as social withdrawal and lower reward seeking, as well as physiological changes, such as changes in heart rate and skin conductance (Chentsova-Dutton & Rottenberg, 2019). Furthermore, it leads to physiological changes such as heart rate and skin conductance, and cognitive or subjective processes. Sadness may also be accompanied by additional sensations of loneliness, distress, depression, anxiety, grief, and anguish, leading to psychological pain (Kashdan, 2004). For example, listening to sad music is often regarded as a pleasant and moving experience, especially when perceived as non-threatening and aesthetically pleasing (Sachs et al., 2015).

Sadness can affect not only one's emotional and physiological state but also cognitive processes. It can lead to a narrowing of attention and a focus on detail-oriented processing, affecting information processing (Schwarz, 2012; Andrews & Thomson, 2009). Studies on incidental cognition have shown conflicting findings on the information processing strategies employed by people when

they are experiencing sadness. Sadness induction enhanced memory by reducing the inclination to incorporate misleading information in memory reports (Forgas, Laham, & Vargas, 2005, study 1; similar results were obtained in Forgas et al., 2005, study 2).

Understanding the relationship between sadness and aggression has important implications for both theoretical and practical reasons. Recent research has suggested that sadness may reduce aggression by modulating cognitive and physiological processes that are involved in the expression of aggressive behavior. Sadness can have significant impacts on the human body. For example, it can lead to changes in heart rate, blood pressure, and respiration (Chentsova-Dutton & Rottenberg, 2019). One theory is the cognitive theory of sadness, which posits that negative thinking patterns and biases contribute to the experience of sadness. Another theoretical framework that explains the experience of sadness in psychology is latent trait theory.

Empirical evidence suggests that sadness can be related to aggression. Visceral responses during emotional reactions activate brain dynamics, which can affect behavior. The dimensional theory also suggests that the valence and arousal of emotions, which are fundamental dimensions, can have an impact on aggression.

Aggression is a phenomenon that is influenced by several factors, including emotions. One emotion that has been found to have a significant impact on aggression is sadness.

There are several theories of sadness that attempt to explain why humans experience this emotion. Here are a few examples:

## THEORIES OF SADNESS

The cognitive theory of sadness suggests that negative thoughts and interpretations of events lead to sadness. The evolutionary theory of sadness proposes that sadness is an adaptive response to loss or separation from important individuals or resources. The psychodynamic theory of sadness suggests that unresolved emotional conflicts or unmet needs can lead to sadness. The diathesis-stress model, which is crucial to understanding depression, postulates that depressive episodes are brought on by a combination of stressful life events and vulnerability factors (referred to as "diathesis") that make the person vulnerable to depression. We have focused on the above theories in our research.

The main characteristics of sadness and depressive episodes include self-referential thoughts, feelings, and excessive ruminating (negative introspection, self-reflection).

According to the Cognitive Theory of Depression, which was first put forth by Aaron Beck in 1967 (as quoted in McLeod, 2015), self-evaluations of one's value and worth, unfavourable personal views, and persistently unfavourable interpretations of oneself are what constitute cognitive depression. Three cognitive pathways are typically regarded as the main contributors to the onset of depression. The cognitive triad, unfavourable self-schemas, and logical errors are these three mechanisms. The sense of complete helplessness about one's identity, the state of the world as it affects oneself, and one's capacity to change future trajectories is a central emotion driving and giving substance to these three viewpoints (McLeod, 2015). Later, Beck and Alford (2009) would observe that certain types of thought content, such as "ideas of personal deficiency, impossible environmental demands and obstacles, and nihilistic expectations" (p. 240), are foundational in depression as precipitated by helplessness. Individual cognitive stability is compromised as the three components of the cognitive triad intersect, creating circumstances that are favourable to depressive behaviour.

There are several factors that can impact sadness, including:

Life events such as loss, trauma, and stress can trigger feelings of sadness. Research has also suggested that there may be a genetic component to sadness and mood disorders. Hormonal imbalances, such as those related to thyroid function, can impact mood and contribute to feelings of sadness. Imbalances in neurotransmitters, such as serotonin and dopamine, have been linked to mood disorders and may contribute to feelings of sadness.

Furthermore, negative thought patterns and beliefs, such as pessimism and hopelessness, can contribute to feelings of sadness and depression.

Social isolation and lack of social support have been linked to an increased risk of depression and feelings of sadness.

Moreover, many cultural norms and values can impact how individuals experience and express sadness, and may influence the ways in which individuals seek help and support for their emotional distress.

## AGGRESSION

Anger is not one of the nine primary symptoms of depression listed in the most recent edition of the "Diagnostic and Statistical Manual of Mental Disorders (DSM-5)".

Nevertheless, the manual does stress that many individuals with major depressive disorder (MDD) experience lingering feelings of rage, irritability, and frustration. Aggression is a common and often harmful behavior that can have serious consequences for individuals and society as a whole. While many factors can contribute to aggressive behavior, such as personality traits, situational factors, and cultural norms, emotions are also thought to play an important role. One emotion that has received particular attention in the context of aggression is sadness. A study by Painuly et al. (2011) and another by De Bles et al. (2019) found that anger outbursts are common in people who aren't just depressed. They may also have an impact on your social skills and general well-being.

This paper uses a tool that accesses 4 categories of aggression.

**Physical Aggression:** This refers to any form of physical behavior that is intended to harm or injure another person, such as hitting, pushing, slapping, or kicking. **Verbal Aggression:** This refers to the use of language or words that are intended to harm or insult another person, such as name-calling, teasing, or threatening. **Anger:** This is a strong emotion that is often associated with feelings of frustration, annoyance, or irritation. **Hostility:** This refers to a general attitude of negativity, suspicion, and resentment towards others. Hostility can be directed towards individuals or groups, and can manifest in a variety of behaviors, such as sarcasm, criticism, or exclusion.

## THEORIES OF AGGRESSION

There are several theories of aggression like Instinct Theory of Aggression (Thanatos Theory) and Konrad Lorenz on Freud's Theories of Aggression. One of the prominent theories, Social Learning Theory, suggested that aggressive behaviour is a learnt trait. Simply because they are copying what they have seen, children might be aggressive. Furthermore, Frustration-Aggression Theory has a simple premise of the frustration-aggression theory that frustration leads to aggression. Aggression is likely to result from frustration, but if a person has higher degrees of self-awareness or self-control, it need not.

Considering the Big 5, the Big Five personality traits were examined by psychologists in relation to violence. Examination unveiled that Aggression is most often indicated by agreeableness, and Neuroticism is a sign of anger and irritability, though not always of violent behaviour.

Our emphasis on the mental processes that underlie aggressive behaviour does not in any way diminish the contribution of a variety of additional causal elements. The cognitive-ecological model of aggressiveness places a strong emphasis on the function of event scripts, or schema, in dictating behaviour. A script is a set of simpler schemas that link together to express a series of expected events and behaviours.

Aggression is a complex behavior that can be influenced by a variety of factors. Some of the most commonly cited factors that impact aggression include biological, psychological, and social factors. Biological factors that can influence aggression include genetics, hormones, and brain structure and function. Psychological factors that can impact aggression include personality traits, cognitive processes, and emotional states. Social factors that can impact aggression include environmental factors, cultural norms, and interpersonal relationships. It is important to note that these factors do not operate in isolation, but rather interact with each other to impact aggression.

Prolonged sadness has been found to have a significant impact on aggression. Studies have shown that individuals who experience prolonged sadness may be more prone to exhibiting aggressive behavior, particularly if they feel as though their sadness is not being addressed or resolved.

Research has also found that certain types of aggression may be more closely linked to prolonged sadness than others. For example, reactive aggression, which is characterized by impulsive and emotionally-driven behavior, may be more strongly associated with prolonged sadness than instrumental aggression, which is more calculated and deliberate.

It is important to note, however, that the relationship between prolonged sadness and aggression is complex and multifaceted. Other factors, such as individual differences in personality, life experiences, and environmental stressors, may also play a role in shaping this relationship.

## II. RESEARCH METHODOLOGY

### Aim

The purpose of this thesis is to examine the differences in pre and post intervention aggression scores among experimental group and control group.

### Hypothesis

H1 - There will be significant difference in pre and post aggression scores of experimental group among young adults.

H2 - There will be no significant difference in pre and post aggression scores of control group among young adults.

H3 - There will be no significant difference in post intervention aggression scores of experimental group and control group among young adults.

### Population and Sample

Through convenience sampling, 124 Participants were examined one-on-one using the Buss and Perry Aggression Questionnaire in the first phase. Following a thorough analysis of the data, 60 persons who shown above average aggression (i.e., 87 or more) were chosen for the study. It was completely voluntary and anonymous.

60 participants were chosen from SGT University Gurugram, Amity University Gurugram, and Northcap University Gurugram. They were young adults between the ages of 20 and 35. Each participant gave their written agreement to participate in the study. For all phases, demographic data on sample participants was gathered. Inclusion criteria: individuals aged 18 or above, no history of mental health disorders, no recent experience of major life events

- Participants will be randomly assigned to either the Sad group or the Neutral group
- Participants were debriefed and provided with resources for psychological support if necessary
- Participant confidentiality and anonymity will be ensured

### Description of the tool

Buss – Perry Aggression Questionnaire (1992)

The Buss-Perry Aggression Questionnaire (1992) is a commonly used self-report measure of aggression in social psychology research. It was developed by Arnold Buss and Mark Perry to measure trait aggression, or the general tendency of an individual to behave aggressively across different situations.

The questionnaire consists of 29 items, each of which describes a specific aggressive behavior, such as physical aggression, verbal aggression, anger and hostility. Participants are asked to rate how often they have engaged in that behavior on a 5-point Likert scale ranging from "Extremely uncharacteristic" to "Extremely characteristic". The responses are then summed to create an overall aggression score for the individual.

The Buss-Perry Aggression Questionnaire has been widely used in research on aggression and has been found to have good internal consistency and test-retest reliability. It has also been used in cross-cultural studies and has been translated into several languages. The questionnaire has been criticized for its narrow focus on physical aggression and for its reliance on self-report measures. However, it remains a widely used and well-established tool in the field of social psychology.

The Buss-Perry Aggression Questionnaire has the "Physical Aggression" subscale, "Verbal Aggression" subscale, "Anger" subscale, and "Hostility" subscales. The Physical Aggression subscale assesses a person's propensity for physically aggressive actions like pushing or striking other people. The Verbal Aggression subscale measures how often a person yells or employs other verbally aggressive behaviours, including name-calling, towards other people. The Hostility subscale gauges a person's hostile and cynical views towards others, whereas the Anger subscale gauges how frequently and intensely they feel angry. These subscales are frequently employed in studies to evaluate various facets of aggressive behaviour and attitudes.

### Procedure and Theoretical Framework

Experimental Design and Procedures

Variables-

1. Sadness (Independent)
2. Aggression (Dependent)

STAGE 1 – Buss – Perry Aggression Questionnaire (1992) for sample selection of above average aggression scores. i.e. 87 or above.

STAGE 2 – Their division into 2 groups.

GROUP 1: Experimental group

GROUP 2: Control group.

Group 1 was shown a sad video and was asked to recall and write about an event that made them really sad and no video shown to group 2 to examine the regulatory effect of this emotion on anger and aggressive behavior at the third stage.

STAGE 3 – Buss – Perry Aggression Questionnaire (1992)

Measures of aggression

Buss – Perry Aggression Questionnaire (1992)

### III. DATA ANALYSIS

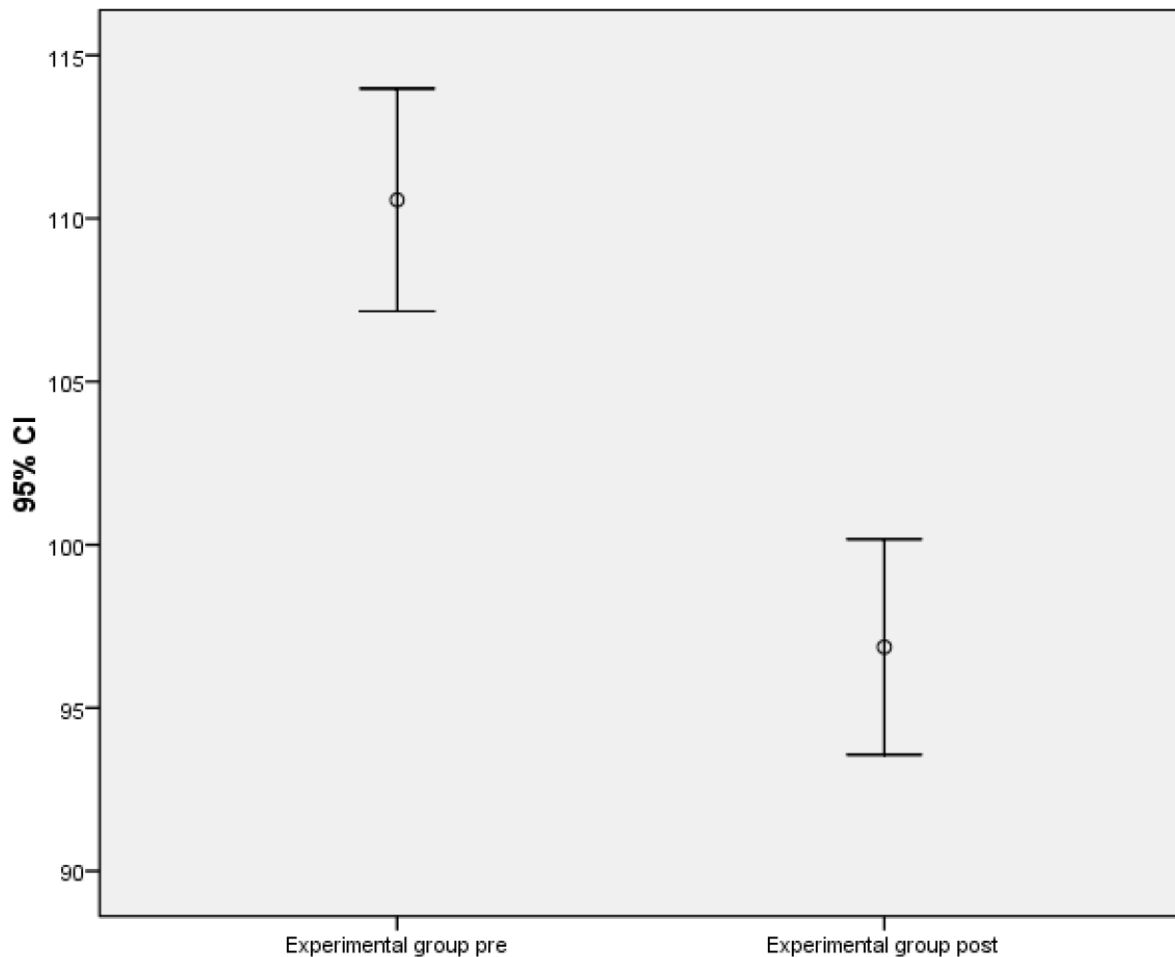
H1- There will be significant difference in pre and post aggression scores of experimental group among young adults. H2 - There will be no significant difference in pre and post aggression scores of control group among young adults.

| Group                   | Mean   | SD    | t     | p    |
|-------------------------|--------|-------|-------|------|
| Experimental Group pre  | 110.57 | 9.141 | 22.94 | .000 |
| Experimental Group post | 96.87  | 8.85  |       |      |

Table – Paired samples t-test between pre and post intervention scores of experimental group

A Paired samples t-test was conducted to determine the difference between the pre and post intervention scores on aggression of the experimental group (N= 30). The results indicate that there is a significant difference between the aggression scores of the experimental group pre (M = 110.57, SD = 9.14) and post intervention (M = 96.87, SD = 8.85),  $t(29) = 22.94, p < .01$ . The mean difference between conditions is 13.70. The 95% confidence interval of the difference between the means ranged from [12.48 to 14.92] and indicated a significant difference between the means of the samples. The effect size is also large. ( $d = 1.53$ )

Based on the results of the paired samples t-test, we accept the hypothesis that there is a significant difference in pre- and post-intervention aggression scores of the experimental group among young adults.

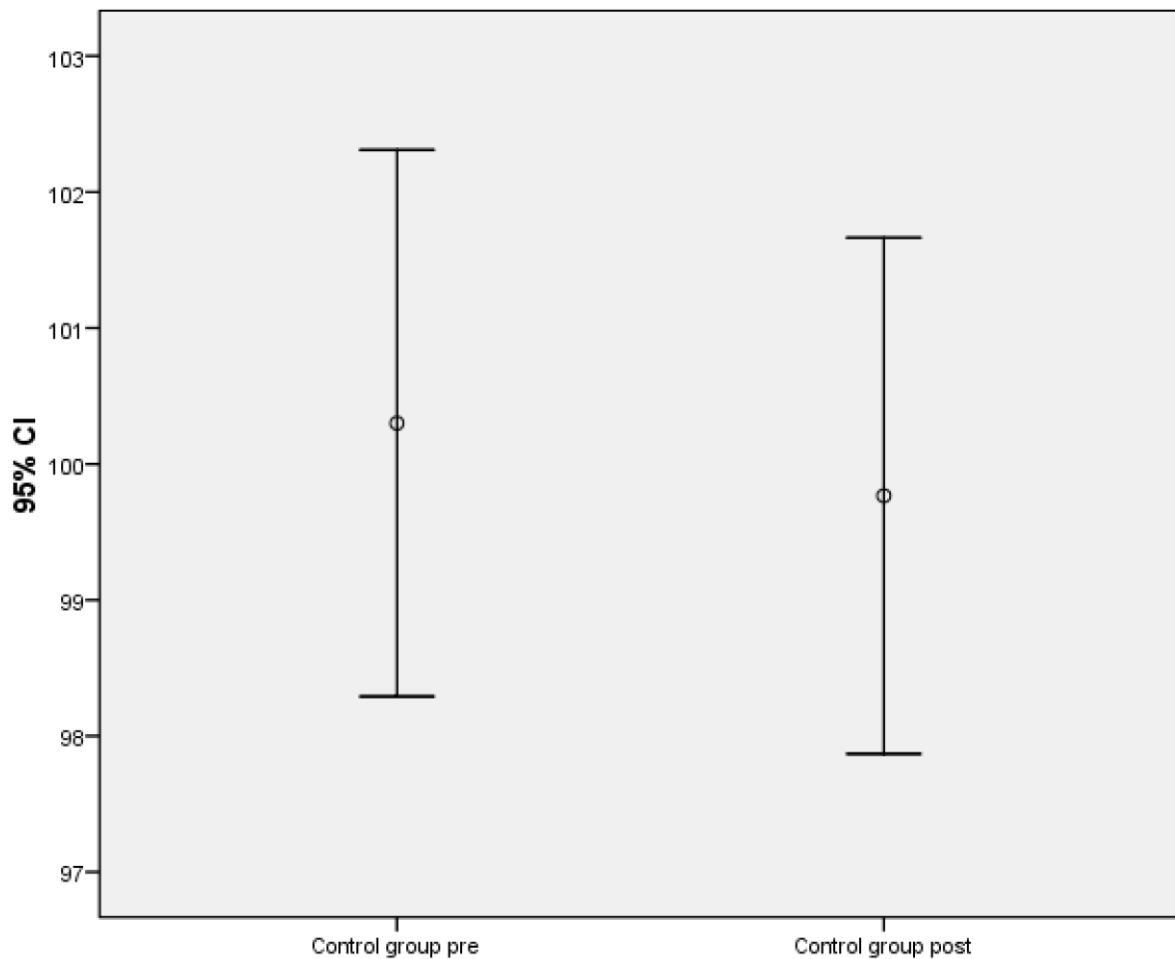


| Group              | Mean   | SD   | t     | p    |
|--------------------|--------|------|-------|------|
| Control Group pre  | 100.30 | 5.38 | 1.034 | .310 |
| Control Group post | 99.77  | 5.08 |       |      |

Table – Paired samples t-test between pre and post intervention scores of control group

A Paired samples t-test was conducted to determine the difference between the pre and post intervention scores on aggression of the control group (N= 30). The results indicate that there is no significant difference between the aggression scores of the control group pre (M = 100.30, SD = 5.38) and post intervention (M = 99.77, SD = 5.08), [t(29) = 1.034, p = .310]. The mean difference between conditions is .533. The 95% confidence interval of the difference between the means ranged from -.522 to 1.588 and indicated that no significant difference exists between the means of the samples. The effect size is 0.10.

Based on these results, we accept the hypothesis that there is no significant difference in pre and post aggression scores of the control group among young adults. These findings suggest that the experimental intervention, which involved the induction of sadness in the experimental group, was responsible for reducing aggressive behaviour, rather than other external factors or chance in first hypothesis.

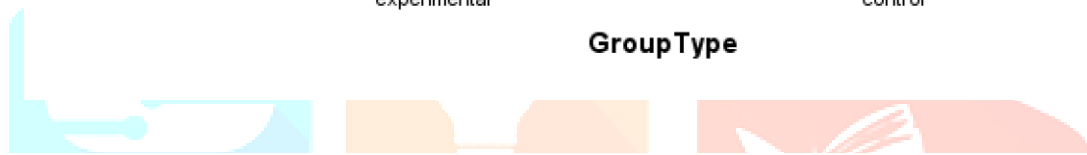
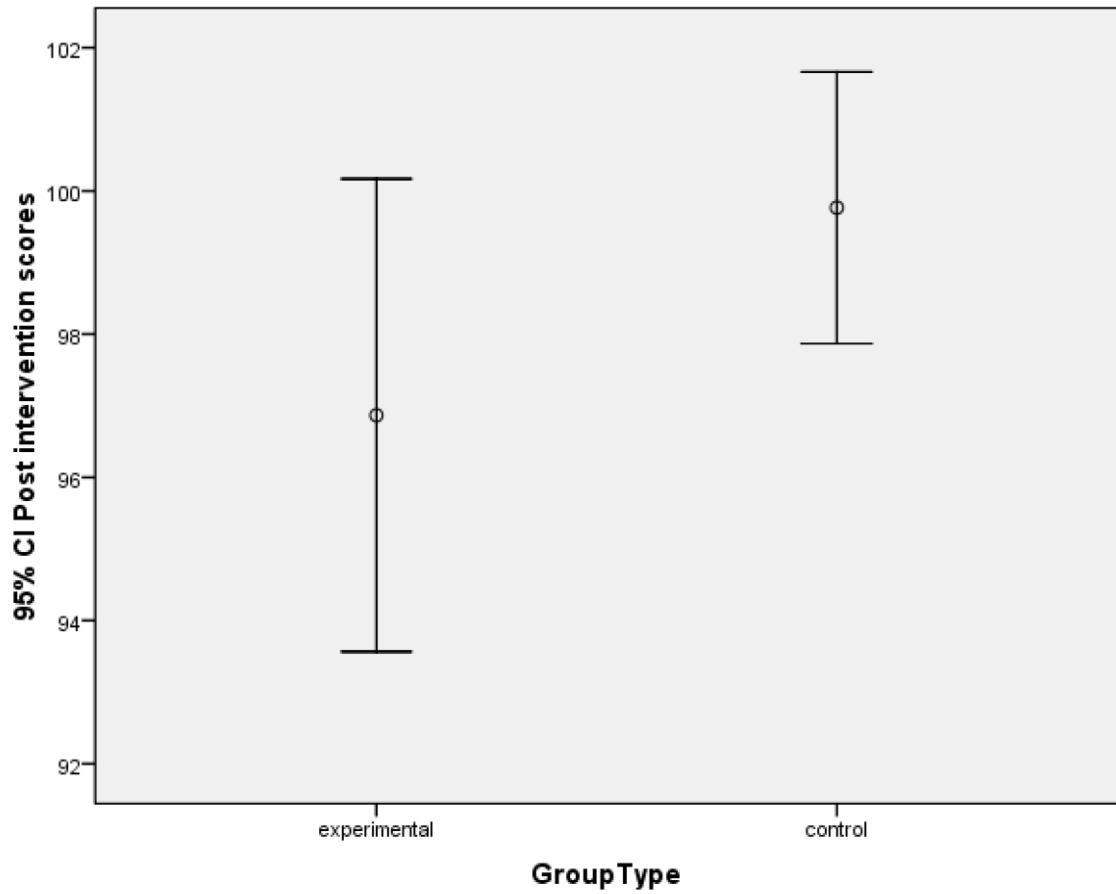


H3 - There will be no significant difference in post intervention aggression scores of experimental group and control group among young adults.

| Group                              | t      | df | p    |
|------------------------------------|--------|----|------|
| Post intervention scores of groups | -1.557 | 58 | .125 |

Table – independent samples t-test between post intervention scores of experimental and control groups

An independent sample t-test was conducted to compare the experimental group and control group post intervention. The control group (M = 99.77, SD = 5.083) has a higher score in comparison to the experimental group (M = 96.87, SD = 8.85). The mean difference between the groups is -2.90 and the 95% confidence interval for the estimated population mean difference is between -6.63 and 8.3. The effect size was 0.42. An independent t test showed that the difference between the scores of the experimental and control group post intervention was insignificant (t = -1.557, df = 58, p = .125).



Group Statistics

|                          | GroupType    | N  | Mean  | Std. Deviation | Std. Error Mean |
|--------------------------|--------------|----|-------|----------------|-----------------|
| Post intervention scores | experimental | 30 | 96.87 | 8.846          | 1.615           |
|                          | control      | 30 | 99.77 | 5.083          | .928            |

Independent Samples Test

|                          |                             | Levene's Test for Equality of Variances |      | t-test for Equality of Means |        |                 |                 |                       |   |       |
|--------------------------|-----------------------------|---|------|------------------------------|--------|-----------------|-----------------|-----------------------|---|-------|
|                          |                             | F                                       | Sig. | t                            | df     | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference |       |
|                          |                             |   |      |                              |        |                 |                 |                       | Lower                                     | Upper |
| Post intervention scores | Equal variances assumed     | 10.235                                  | .002 | -1.557                       | 58     | .125            | -2.900          | 1.863                 | -6.629                                    | .829  |
|                          | Equal variances not assumed |   |      | -1.557                       | 46.269 | .126            | -2.900          | 1.863                 | -6.649                                    | .849  |



**Group Statistics**

|                         | Group Type   | N  | Mean   | Std. Deviation | Std. Error Mean |
|-------------------------|--------------|----|--------|----------------|-----------------|
| Pre intervention scores | experimental | 30 | 110.57 | 9.141          | 1.669           |
|                         | control      | 30 | 100.30 | 5.383          | .983            |

**Independent Samples Test**

|                         |                             | Levene's Test for Equality of Variances |      | t-test for Equality of Means |        |                 |                 |                       |   |        |
|-------------------------|-----------------------------|---|------|------------------------------|--------|-----------------|-----------------|-----------------------|---|--------|
|                         |                             | F                                       | Sig. | t                            | df     | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference |        |
|                         |                             |   |      |                              |        |                 |                 |                       | Lower                                     | Upper  |
| Pre intervention scores | Equal variances assumed     | 8.364                                   | .005 | 5.301                        | 58     | .000            | 10.267          | 1.937                 | 6.390                                     | 14.144 |
|                         | Equal variances not assumed |   |      | 5.301                        | 46.953 | .000            | 10.267          | 1.937                 | 6.370                                     | 14.163 |

**Paired Samples Statistics**

|                               | Mean   | N  | Std. Deviation | Std. Error Mean |
|-------------------------------|--------|----|----------------|-----------------|
| Pair 1 Experimental group pre | 110.57 | 30 | 9.141          | 1.669           |
| Experimental group post       | 96.87  | 30 | 8.846          | 1.615           |
| Pair 2 Control group pre      | 100.30 | 30 | 5.383          | .983            |
| Control group post            | 99.77  | 30 | 5.083          | .928            |

**Paired Samples Correlations**

|   | N  | Correlation | Sig. |
|---|----|-------------|------|
| Pair 1 Experimental group pre & Experimental group post | 30 | .934        | .000 |
| Pair 2 Control group pre & Control group post           | 30 | .856        | .000 |

**Paired Samples Test**

|        |  | Paired Differences |                |                 |   |        | t      | df | Sig. (2-tailed) |
|--------|--|--------------------|----------------|-----------------|---|--------|--------|----|-----------------|
|        |  | Mean               | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference |        |        |    |                 |
|        |  |                    |                |                 | Lower                                     | Upper  |        |    |                 |
| Pair 1 | Experimental group pre - Experimental group post | 13.700             | 3.271          | .597            | 12.479                                    | 14.921 | 22.940 | 29 | .000            |
| Pair 2 | Control group pre - Control group post           | .533               | 2.825          | .516            | -.522                                     | 1.588  | 1.034  | 29 | .310            |

| Tests of Normality      |                                 |    |                   |              |    |      |
|-------------------------|---------------------------------|----|-------------------|--------------|----|------|
|                         | Kolmogorov-Smirnov <sup>a</sup> |    |                   | Shapiro-Wilk |    |      |
|                         | Statistic                       | df | Sig.              | Statistic    | df | Sig. |
| Experimental group pre  | .196                            | 30 | .005              | .906         | 30 | .012 |
| Experimental group post | .129                            | 30 | .200 <sup>*</sup> | .956         | 30 | .243 |
| Control group pre       | .146                            | 30 | .105              | .952         | 30 | .191 |
| Control group post      | .136                            | 30 | .165              | .951         | 30 | .185 |

a. Lilliefors Significance Correction

\*. This is a lower bound of the true significance.

#### IV. DISCUSSION -

Hypothesis 1, 2 and 3 have been accepted.

H1- There will be significant difference in pre and post aggression scores of experimental group among young adults. H2 - There will be no significant difference in pre and post aggression scores of control group among young adults. H3 - There will be no significant difference in post intervention aggression scores of experimental group and control group among young adults. (Due to decrease in post intervention aggression scores of experimental group and no significance difference in pre – post aggression scores of control group.)

In this study, there was an experimental group of 30 participants to assess the impact of an intervention on aggression scores. The pre and post intervention scores were collected for each participant, and the difference in scores was calculated.

Two participants showed a high difference of 19 in their pre and post intervention scores. Additionally, the majority of participants (26 out of 30) showed a difference in scores ranging from 10-19, while only 4 participants showed a difference of less than 10. This suggests that the intervention had a significant impact on the majority of participants, resulting in a decrease in aggression scores.

Interestingly, the fall in aggression scores following a sad video was applicable to all participants, indicating that this may be a promising approach for managing aggression in a broader population.

The study included a control group of 30 participants who did not watch the sad video. The pre and post intervention scores were collected for each participant in the control group, and the differences in the scores were analyzed.

Unlike the experimental group, the control group did not show a unidirectional change in their pre and post intervention scores. Instead, there were both increases and decreases in scores observed in the control group. The maximum difference in scores was only 7, which was observed in one participant. In contrast, 29 participants had a score variation ranging from 0-1, indicating minimal changes in their aggression scores.

Additionally, two participants had no difference in their scores, indicating that the intervention did not have any impact on their aggression levels. Furthermore, nine participants had a score variation of only 1, suggesting a minor impact of the intervention on their aggression scores.

Overall, the findings from the control group indicate that the sad video intervention had a significant impact on reducing aggression levels in the experimental group, as compared to the control group. However, the control group findings also suggest that there may be other factors that influence aggression levels in individuals, which need to be explored in further research.

Sadness and decreased aggressiveness have a well-documented relationship, according to psychological research. The affect regulation hypothesis postulates that people use their experiences of various emotions to control or modulate their behaviour, thoughts, and physiological responses (Tamir & Ford, 2012). As it encourages withdrawal and avoidance behaviours, lowers arousal, and sharpens self-focus, sadness is a negative affect that frequently curbs violence (Tamir & Ford, 2012).

However, it should be noted that the statistical significance of the pre-intervention differences does not necessarily mean that they are clinically significant. It may be helpful to compare the mean aggression scores to established norms or benchmarks in order to better understand the practical significance of the differences.

In light of these results, it will be important to consider the pre-existing differences in aggression levels between the experimental and control groups when interpreting the results of the post-intervention comparison. It may also be useful to explore potential

reasons for the pre-existing differences, such as differences in demographics or prior experiences, in order to better understand the characteristics of the study population.

Tice, Baumeister, Shmueli, and Muraven (2007) looked at the connection between aggressive behaviour and negative affect, such as melancholy. In a laboratory exercise, individuals who experienced negative affect, such as sadness, exhibited less violent behaviour towards an opponent than people who did not experience negative affect.

Error bars are used to graphically represent the variability or uncertainty of data. They are typically used on graphs or charts to indicate the estimated error or standard deviation of a particular data point or group of data points. Error bars can help to show the level of uncertainty associated with a measurement, the level of agreement between measurements, or the degree of variability within a particular sample or population.

They are often used in t-test results to visually represent the confidence interval of the mean difference between two groups. The length of the error bars can be calculated using standard error, which takes into account the sample size and variability of the data. In a t-test, the error bars are usually plotted on a bar graph, with the mean values for each group represented by a bar and the error bars extending above and below the bar. The length of the error bars indicates the level of uncertainty or variability in the data, and can help to indicate whether the difference between the means of the two groups is statistically significant.

If the error bars for two groups do not overlap, it suggests that the difference between the means of the two groups is statistically significant. On the other hand, if the error bars do overlap, it suggests that there may not be a significant difference between the two groups.

Overall, error bars can provide a useful visual aid when interpreting t-test results and can help to communicate the level of uncertainty and variability in the data.

A t-test might show how much difference and how statistically different two means and groups are. But we also need to know the effect size of this difference. That is signified by Cohen's  $d$  value and is called effect size. The effect size tells us how big an effect we can expect from an intervention, treatment, manipulation of an independent variable or difference between groups. Classification - .2 = small; .5 = medium; .8 and above = large. The effect size you have obtained in your study have been medium and large.

### **Limitations**

Since the study relies on self-report measures of aggression and sadness, participants may not be entirely truthful or accurate in their responses. This could lead to measurement error and reduced internal validity.

Based on the results of the independent sample t-test, it can be concluded that there is a significant difference in pre intervention aggression scores of experimental group and control group among young adults. Specifically, the experimental group had a significantly higher mean score than the control group, with a mean difference of 10.27 and a large effect size of 1.41.

These findings suggest that the groups were not equivalent in terms of their pre intervention aggression levels. This may have implications for the interpretation of post-intervention results, as any observed differences between the groups could be attributed to pre-existing differences in aggression levels rather than the intervention itself.

In this study, the sample size is small i.e. 60, it may limit the generalizability of our findings. A larger sample size would have help to increase the external validity of the study.

This study uses a between-subjects design, there may be individual differences in aggression that are not accounted for in the study. A within-subjects design may be better suited to control for individual differences.

The study only measures aggression of the subject on a particular day, it may not account for other factors that could impact aggression, such as anxiety or stress.

### **Conclusion**

In conclusion, this study found that sadness has a well-documented relationship with decreased aggressiveness. The affect regulation hypothesis postulates that people use their experiences of various emotions to control or modulate their behaviour, thoughts, and physiological responses. Sadness, being a negative affect, frequently curbs violence as it encourages withdrawal and avoidance behaviours, lowers arousal, and sharpens self-focus.

In conclusion, the study found that watching a sad video can be an effective approach for managing aggression in young adults. The study's findings support the use of affect regulation strategies to reduce aggressive behaviour. However, the findings also suggest that there may be other factors that influence aggression levels in individuals, which need to be explored in further research. Additionally, it may be useful to explore potential reasons for the pre-existing differences in aggression levels between the experimental and control groups.

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