

Effect of Emotion Induction on the Cognitive Functioning of Graduate and Undergraduate Students: A Double-Blind, Parallel-Group, Randomized Controlled Trial

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Abstract

Background: The objective of this research was to investigate how different emotional states (specifically, sadness, neutrality, and laughter) affect the cognitive abilities of both graduate and undergraduate students. Additionally, the study aimed to determine whether laughter, employed as an intervention, could potentially improve the cognitive processing abilities of these groups of students.

Methods: Participants were assigned to conditions using a simple randomization process within a single-session, five-trial experimental setup, employing a double-blind approach, and utilizing a within-group design. The research incorporated three established psychological assessment tools to collect pertinent data concerning cognitive capabilities, mood states, and the induction of emotions across five separate trials. Additionally, three distinct mood states (sad, neutral, and laughter) were induced to investigate their influence on cognition. To derive the desired outcomes, the study employed a two-way factorial analysis of variance (ANOVA).

Results: The findings from this study revealed a notable and positive impact of laughter on the cognitive processes and mood of both graduate and undergraduate students ($F = 58.49$, $p = .000$, $\eta^2 = .38$). Specifically, laughter had significant effects on cognition ($F = 235.56$, $p = .000$, $\eta^2 = .71$), executive functioning ($F = 67.62$, $p = .000$, $\eta^2 = .42$), language ($F = 40.24$, $p = .000$, $\eta^2 = .30$), visual-spatial abilities ($F = 43.91$, $p = .000$, $\eta^2 = .32$), attention, concentration, and working memory ($F = 102.5$, $p = .000$, $\eta^2 = .523$). Furthermore, the study observed that participants exhibited increased vulnerability in both cognitive processes and emotional states when exposed to sadness induction.

Conclusions: The study's findings provide empirical support for the assertion that a depressive mood exerts a detrimental influence on the cognitive capabilities of students. Moreover, the results underscore the substantial impact of positive emotions on cognition, highlighting laughter as a potentially non-disruptive and readily implementable strategy to improve both students' emotional states and cognitive functioning by mitigating stress and academic workload.

Keywords: Emotion induction, cognitive process, humor intervention

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Background

Emotions can be defined as brief experiences that encompass both psychological and physiological aspects. Typically, emotions are characterized by their heightened intensity, transient nature, and distinctive cognitive components (Wu & Chen, 2019). As posited by Lemaire (2021), emotions play a pervasive role in educational settings, exerting functional significance on students' motivation, cognitive performance, and personality development. They possess the capability to guide students' thought processes and actions. Conversely, as Abbou (2021) notes, negative affect is a common experience among students globally, significantly contributing to the global burden of disease (Rezapour et al., 2022). Notably, research has shown a heightened prevalence of emotional issues among Pakistani students compared to their counterparts in other developing nations. Consequently, it is imperative to gain a comprehensive understanding of the intricate interplay between emotions and cognition, as well as the resultant effects of these interactions (Devis and Montag, 2020).

Previous research has further elucidated that positive emotions can enhance performance in cognitive tasks such as planning, task switching, and stimulus response. Conversely, negative emotions may impede concentration, problem-solving abilities, and the maintenance of working memory, particularly during examinations (Rczy & Orzechowski, 2021).

People typically take into account whether they are in a good or bad mood and that different mood states have distinct effects on cognition. Considerable amount of researches are focusing on how person's negative mood accommodates a great influence on cognitive decline, result in reduced functioning in mental processes (Liew, & Tan, 2016). In addition, according to broaden-and-build theory positive emotion, as opposite to negative emotion, broaden people's repertoire of thoughts and actions in order to acquire the desire task at time of need. High intensity negative fluctuations in mood turn into link with impairments in working memory and attention (Mikulincer, & Shaver, 2022). Moreover, emotional processing system may vary by a number of individual factors such as personality trait (Montag & Panksepp, 2017), intellectual ability and gender (Gray, & Holyoak, 2020).

There is a wide range of research on the effectiveness of humors on depressive mood and neutral mood by using humorous materials. Exercise, light therapy, caffeine, music, meditation, meditation and omega-3 fatty acids are some of the common treatments used to treat mood disorders.

In addition, there is a wide range of pharmacological treatments that have been used so far for mood-related issues (Cuicui, et al., 2022). But a study indicates that one in three patients showed

residual symptoms after taking pharmacological treatment (Croatto et al., 2023). However, different other cost-effective, easy-to-use, and well-tolerated treatments, including exercise, light therapy, caffeine, music, meditation, omega-3 fatty acids, and yoga (Rossella, Marco, 2022). Previous studies were generally used to treat mood disorder. Therefore, the present study investigated the effectiveness of laughter on sad and neutral moods by using humorous materials. Laughter through humor has been considered as a definitely accessible, non-pharmacological and non-invasive treatment being used throughout the world. The results of above findings are also in line with research by Bressington et al., (2018), which states that psychotherapeutic treatment of humor leads to psychological benefits of person.

Laughter through humor has been shown to have a great impact on immune system that induce natural killer cell, that are accompanied by reduction in stress level (Cha & Hong, 2015). The investigation conjointly proposes that being in a positive disposition broadens and enlarges the extensiveness of attentional domain of mental process (Gibson, 2020). Significant cognitive decline in students might result from emotional disorders. Around the world, emotional disturbances place a significant burden on students' psychological and mental health. As a result, researchers are working hard to understand these mechanisms and the effects of emotion on cognition (Wentura, 2019). Recently, a number of clinical studies have demonstrated links between mood and cognition, such as those in the areas of physical activity, music, caffeine, meditation, and yoga; however, humour can also incorporate the interaction between them. Therefore, the purpose of the current study was to examine how graduate and undergraduate students' cognitive processes were impacted by various artificially induced mood states as well as to assess efficacy of humour as an intervention.

Method

Research design

The study utilized a pre and post, double blinded, two-arm, parallel, cluster, randomized controlled design to investigate the effect of different mood states (sad, neutral) on the cognitive process across its domains (executive functioning, language, visual spatial, short-term memory, attention, concentration, and working memory, and temporal spatial orientation) in graduate and undergraduate students.

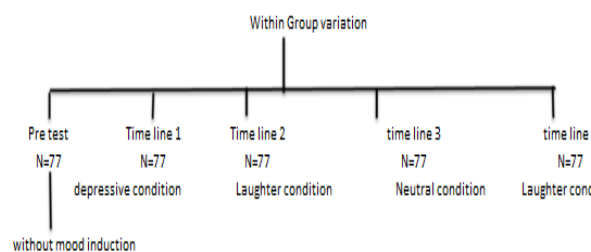
Research objectives

Based on these concerns, the purpose of this study was to investigate the effect of different mood states (sad, neutral) on the cognitive process across its domains (executive functioning, language,

visual spatial, short-term memory, attention, concentration, and working memory, and temporal spatial orientation) in graduate and undergraduate students. More specifically, we wanted to compare and investigate the effects of laughter on mood (sad, neutral) and cognitive process (executive functioning, language, visual spatial, short-term memory, attention, concentration, and working memory) in graduate and undergraduate students. The present study is planned to investigate the following hypotheses: Hypothesis 1 (H1): Inducing a sad mood has a negative effect on students' cognitive processes compared to inducing a neutral mood. Hypothesis 2 (H2): The laughter condition will extend the cognitive functioning of the sad and neutral mood induction groups.

Trail design

A within group 1-session, five time-line, double-blind, randomized controlled trial was conducted from July 2019 to August 2019. We did not interfere with any other type of help that the individual might have been receiving. All potential participants were given general description of the project and took interviews to assess their eligibility. If participants met the inclusion criteria, they have been requested to complete a psychological and a neuro-psychological assessment before starting pre-testing sessions (T-0). A medical examination includes many health components, such as current medical or physiological conditions, such as heart rate, blood pressure, allergies, and family and personal medical histories. An initial pre-test was done before inducing different mood conditions. Prior to T-1, 77 subjects were randomly assigned within one group to experience various mood states such as sadness, neutrality, and laughter over the course of a single session of five time-line trials. The whole trail design is summarized in Figure 1.



Participants

The current study included 77 participants ranging in age from 20 to 35 years (graduate $n = 42$ students; undergraduate $n = 35$). All research participants were recruited from the Foundation University Rawalpindi campus from July 2019 to August 2019. Each subject completed the session

with five time-line trials, and the session was approximately comprised of 90 minutes separately.

Eligibility Criteria

Inclusion criteria: Eligibility criteria were broad and reflected the real-world characteristics of graduate and undergraduate students who enrolled in the 7th and 5th semesters of the foundation university. Subjects have been eligible to contribute if they are aged 20–35 years and have not received a diagnosis of any neurological or psychiatric illness based on the Structured Clinical Interview for ICD-10 or DSM-V. They could also provide verbal and written informed consent. The participants were assured that their participation in the study was completely voluntary. And the information taken from them will be kept confidential.

Exclusion criteria: we excluded students who were unavailable to participate, who have been current diagnosis of a psychological disorders that interfere the Mood condition. The above screening was done with both Graduate and Under Graduate students. The study was sanctioned by the Department of Psychology Department, Foundation University Rawalpindi Campus, and Human Research Ethics Committee.

Randomization and Masking

Participants were randomly allocated within one group to receive different mood cognitions over the session of five time- line trials by using a computer-generated randomization schedule, supervised by an external independent statistician and with strict concealment of allocation. Randomization was balanced using randomly permuted blocks of sizes six, and eight participants, and was clustered by clinical canter. Participants and clinicians were masked to treatment allocation throughout the experiment.

Intervention.

Following the final screening, a total of 77 Graduate and Undergraduate subjects are eligible to receive the various mood interventions. They took part in a 1-day session as well as a 5-time trial programme lasting 1 hour and 30 minutes. At the same university, three mood interventions (sad, neutral, and humorous) were induced. a computer lab, as well as a hall dedicated to current research. Subjects were required to participate in all five trials of the session. They were otherwise excluded from the current study's analyses

Laughter.

Humorous material was given as an

intervention. The humor videos contained five clips taken from amusement shows publicly accessible on the Internet. Each clip was usually between 2 and 3 minutes long. All clips were presented to the participants via a Power Point presentation. Prior to the experiment, a sample of students (not participating in the experiments) rated each clip on how funny it is (1 = not at all funny to 5 = very funny). Solitary humorous resources were given the highest point, which is 5

Velten mood induction (VMIPS).

In the current study, a revised version of the Modified Velten Mood Induction was employed to create a sad and neutral condition (Sinclair et al., 1994). On PowerPoint slides, 60 cards are shown in this study once in every 15 seconds. Each statement was written in black Calibri font on a white background. Members were instructed to silently read each statement and emphasise it. The participants were given three minutes to shape their sad mood before being supplied with instructions meant to help with the mood's gestation. assert that the incubation phase is intended to extend the start period because it can increase the participation of an affective state.

Montreal Cognitive Assessment (MOCA).

This scale was developed by Nasreddine et al. (2005), to assess the cognitive abilities of the participant. The Montréal Cognitive Assessment (MOCA) test's Urdu translation was used to gauge the participant's cognitive capacity. The scale has six cognitive domains proposed by the authors (Nasreddine et al., 2005). All patients with a score of 26/30, adjusted for education (one score added if total years of formal education were less than 12 years), were considered to have cognitive dysfunction.

I-PANAS-SF.

In order to assess participant mood, Thompson developed the International Positive and Negative Affect Schedule Short Form (I-PANAS-SF) in 2007. The original 20 PANAS (Watson et al., 1988) item pool was used to create these ten things. "Active, determined, attentive, inspired, and alert" are the five positive affective states. "Afraid, nervous, upset, hostile, and ashamed" are the five negative affective states. In order to fully express how they felt at any particular time, participants were asked to use these positive and negative terms. one to gauge the beneficial effects, and the other to gauge the detrimental effects. Higher PA and NA

scores suggest a propensity to feel either positively or negatively. The items were rated by respondents on a 5-point scale.

Ethical Approval

Ethical Review Board of Foundation University, Rawalpindi Campus approved the project, and written informed consent was obtained from all participants before data collection.

Consort

The Consolidated Standards of Reporting Trials (CONSORT) were used for reporting parallel-group randomized controlled trials. Total, 77 participants gave their consent and were randomized. The flowchart of participants through the study is depicted in Figure 2.

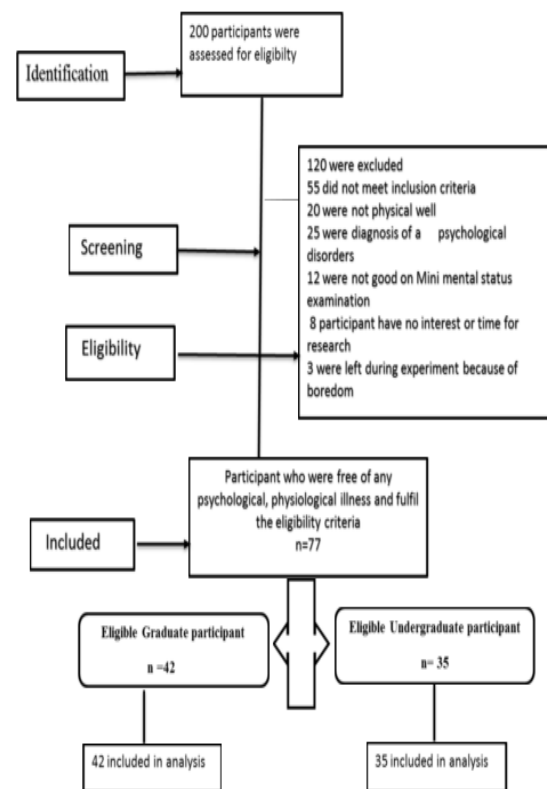


Fig. 2 Consort flow diagram

Procedure

Those participants who consented to take part in the study had their data collected inside the experimental room. Participants were shown two series of statements: a neutral series consisting of neutral statements and a sad series consisting of sad

statements, comprising 60 statements in each series. The statements were written separately on each slide. All instructions were presented at the beginning of the experiment as a section of a Power Point presentation. The study was carried out at four different times. An initial pre-test was done before inducing different mood conditions. The sad, neutral, and laughter conditions were induced later separately to see the effects on their positive and negative affect, along with their cognitive abilities. Participants were instructed to carefully repeat each of their statement, to focus on each one, and to internalize them as much as possible. Each statement was presented one at a time on a single slide for 15 seconds. Slides containing depressive and neutral inductions were shown to the participant. The subjects were instructed to carefully read and consider each statement on the slide. The experimenter also stressed that the subjects should raise their hands if they think they cannot continue, and they also explained that the subjects would concentrate within 3 minutes after incubation (incubation instruction (Sinclair et al., 1994).

Statistical methods

All statistical analyses have been carried out by IBM SPSS Statistics software v23. The normal distribution of the data was examined using the skewness and kurtosis of all the study variables. In order to reduce the influence of extreme outliers or a ceiling effect, Prior to conducting the analyses, all study variable scores were converted from raw scores to standardized Z-scores by pooling the pre-test trail 1 value (T-0), post-test trail 2 value (T-2), post-test trail 3 value (T-3), and post-test trail 4 value (T-4). Furthermore, the mean and SD of all values were computed. ANOVAs with repeated measures were used to determine the effect of intervention on cognitive process.

Consort: The consolidated standard of trials reporting (CONSORT) was used for reporting of randomized control trials. In totals of 77 students of Graduate (n=42), Under Graduate (n=35) were used. The flow of participant through the study is depicted in figure 2.

Results

A two-way factorial ANOVA between groups (undergraduates and graduates) was carried out with experimental conditions such as sadness, neutrality, and laughter and 5 time-lines such as the pre-line, time-line 1, time-line 2, time-line 3, and time-line 4. Both are considered independent variables (IVs), and the cognitive process along with their domains (executive functioning, language, visual-spatial perception, and mood swings) are considered dependent variables (DVs). At the pre-testing session (T-0), both in Undergraduate ($M = 26.40$, $SD = 2.55$) and Graduate ($M = 27.16$, $SD = 2.32$), and when sadness was induced in the participants (T-1), the participants were vulnerable on cognition across the cognitive domains (executive functioning, language, visual spatial, short term memory, and temporal spatial orientation in Table 3), whereas the positive and neoclassical participants were not. At the 2nd time point (T-2), laughter was induced in the same participants to provoke a happy mood, which resulted in significant improvements in positive affect and cognition in both undergraduates ($M = 31.08$, $SD = 31.08$). On the other hand, their negative mood swings were declined in favour of laughter. At the third time point (T-3), when the neutral mood was induced to balance the effect of the pre-given conditions and the consistency of the results, both undergraduate ($M = 28.41$, $SD = 1.82$) and graduate ($M = 29.30$, $SD = 1.64$) results showed increases in positive affect and cognitive abilities across its domains (executive functioning, language, visual spatial, short-term memory, and temporal spatial orientation in Table 3), but the increased cognitive abilities were not significant.

Table 1

Mean Differences between Intervention Conditions Such as (Sad, Neutral, Laughter) on Cognitive Domains Such as Executive Functioning, Language, Visual Spatial, Short Term Memory, Attention Concentration and Working Memory, Temporal Spatial Orientation and Mood Swings in Graduate and Under-Graduate University Students (N= 77)

[illegible]

P2	4.51	0.7	3.14	0.97											
P3	4.35	0.54	4.26	0.62											
P4	4.88	0.32	4.9	0.29											
ACWM															
Pre	6.14	1.03	6.4	1.14	102.5	0	0.52	0.82	0.36	0.002	0.29	0.88	0.003	6.22	6.45
P1	4.08	1.96	4.16	1.65											
P2	7.4	0.603	7.5	0.55											
P3	6.73	0.99	6.92	0.97											
P4	7.08	0.88	6.97	0.71											
TSO															
Pre	5.54	0.78	5.57	0.73	11.07	0	0.1	1.41	0.23	0.004	0.143	0.96	0.002	5.52	5.67
P1	5.77	0.42	5.11	1.4											
P2	5.73	0.44	5.85	0.35											
P3	5.73	0.44	5.88	0.32											
P4	5.62	0.68	5.8	0.5											
PW															
P1	24.88	6.09	25.26	5.75	58.49	0	0.385	1.52	0.217	0.004	0.939	0.442	0.01	28.06	28.9
P2	34.71	2.85	34.26	2.39											
P3	28.91	3.58	28.71	4.1											
P4	26.76	4.49	28.52	4.2											
PPOS															
Pre	14.34	4.65	14.52	4.44	25.29	0	0.213	10.63	0.001	0.028	2.745	0.028	0.029	16.45	17.03
P1	16.25	1.4	15.88	1.78											
P2	18.28	1.84	19.38	2.43											
P3	16.47	3.03	18.88	2.26											
P4	15.94	2.57	17.45	2.54											
PNEG															
pre	10.54	2.06	10.73	2.07	226.02	0	0.7	0.21	0.64	0.001	0.76	0.54	0.008	11.77	12.15
P1	17.91	2.02	17.52	1.53											
P2	10.62	2.47	10.57	2.45											
P3	10.38	1.75	11.02	1.6											
P4	10.11	1.15	10.16	1.12											

Note. WCO = Whole Cognitive; EF= Executive Functioning; Lang= Language; VS= Visual Spatial; STM= Short Term Memory; ACWM= Attention Concentration Working Memory; TSO= Temporal Spatial Orientation; PW= PANAS Whole; PPOS= PANAS Positive; PNEG= PANAS Negative. Wilks lambda $\lambda = .004^{***}$.

Figure 1. Mean differences between pre time line, timeline1, (Depressive Condition), time line 2 (Laughter Condition), time line 3 (Neutral Condition), and time line 4 (Laughter Condition), on cognitive processes of graduate and undergraduate students (N=77).

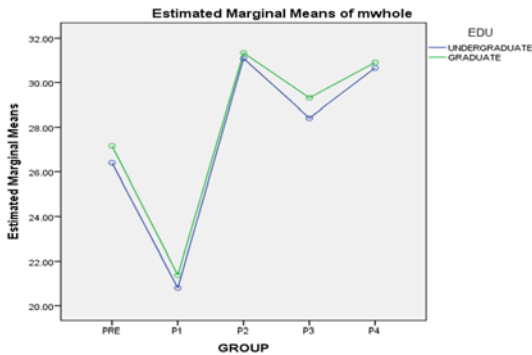


Figure 2. Mean differences between pre time line, timeline1, (Depressive Condition), time line 2 (Laughter Condition), time line 3 (Neutral Condition), and time line 4 (Laughter Condition), on executive functioning of graduate and undergraduate students (N=77).

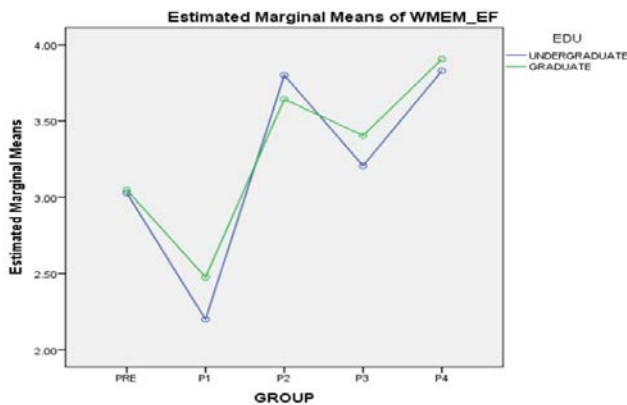


Figure 3. Mean differences between pre time line, timeline1, (Depressive Condition), time line 2 (Laughter Condition), time line 3 (Neutral Condition), and time line 4 (Laughter Condition), on language of graduate and undergraduate students (N=77).

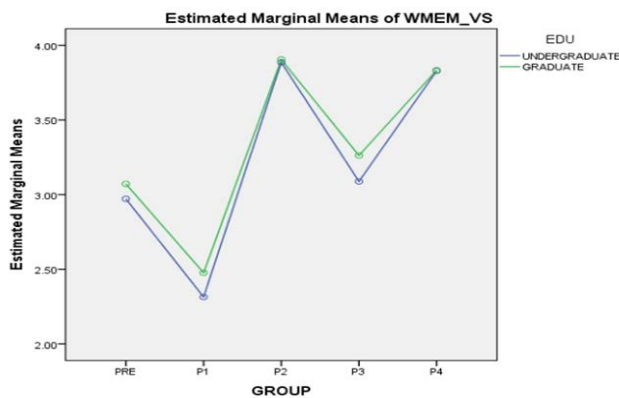


Figure 4. Mean differences between pre time line, timeline1, (Depressive Condition), time line 2 (Laughter Condition), time line 3 (Neutral Condition), and time line 4 (Laughter Condition), on visual spatial functioning of graduate and undergraduate students (N=77).

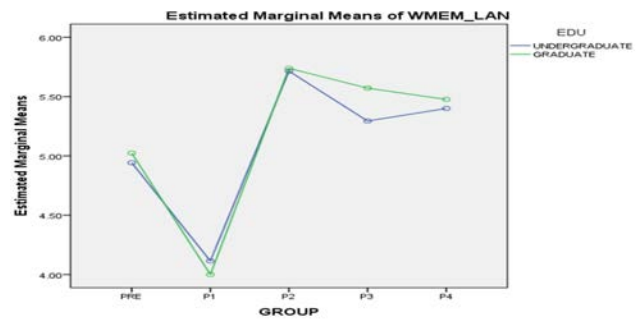


Figure 5. Mean differences between pre time line, timeline1, (Depressive Condition), time line 2 (Laughter Condition), time line 3 (Neutral Condition), and time line 4 (Laughter Condition), on short term memory of graduate and undergraduate students (N=77).

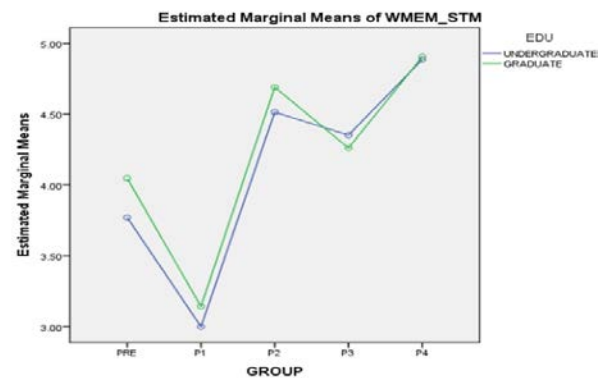


Figure 6. Mean differences between pre time line, timeline1, (Depressive Condition), time line 2 (Laughter Condition), time line 3 (Neutral Condition), and time line 4 (Laughter Condition), on attention concentration and working memory of graduate and undergraduate students (N=77).

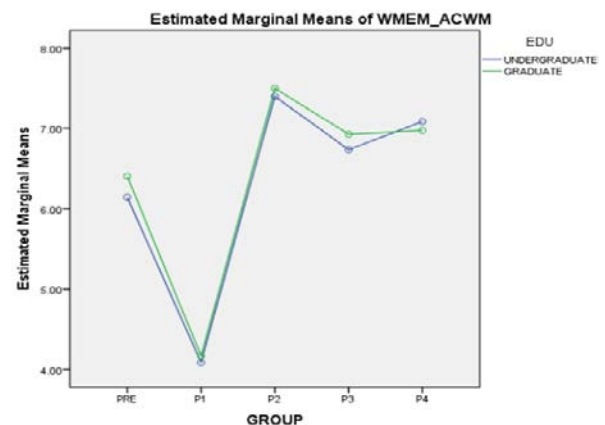


Figure 7. Mean differences between pre time line, timeline1, (Depressive Condition), time line 2 (Laughter Condition), time line 3 (Neutral Condition), and time line 4 (Laughter Condition), on temporal spatial orientation of graduate and undergraduate students (N=77).

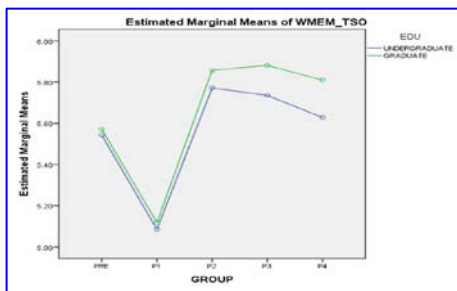


Figure 8. Mean differences between pre time line, timeline1, (Depressive Condition), time line 2 (Laughter Condition), time line 3 (Neutral Condition), and time line 4 (Laughter Condition), on mood swings of graduate and undergraduate students (N=77).

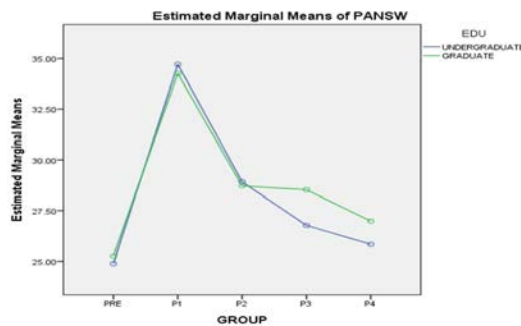


Figure 9. Mean differences between pre time line, timeline1, (Depressive Condition), time line 2 (Laughter Condition), time line 3 (Neutral Condition), and time line 4 (Laughter Condition), on positive mood swings of graduate and undergraduate students (N=77).

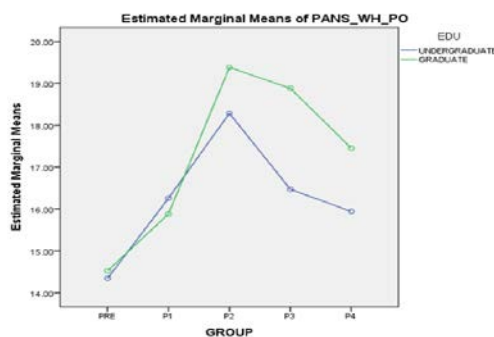
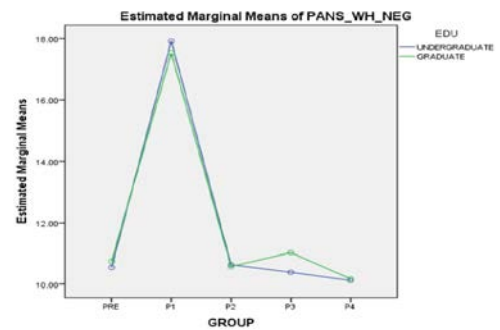


Figure 10. Mean differences between pre time line, timeline1, (Depressive Condition), time line 2 (Laughter Condition), time line 3 (Neutral Condition), and time line 4 (Laughter Condition), on negative mood swings of graduate and undergraduate students (N=77).



When laughter was induced again in the neutral participants at the fourth time point (T-4, endpoint) to balance the previous vulnerable conditions, the results showed significant improvement in positive affect and cognitive abilities, both in undergraduates ($M = 30.65$, $SD = 1.53$) and graduates ($M = 30.90$, $SD = 1.41$) across its domains (executive functioning, language, visual spatial, short-term memory). Spatial orientation in table 3) and showed an extreme decline in negative mood swings. In all the conditions induced in the group of participants, the undergrad group showed more drastic changes in their mood and cognitive abilities, whether positive or negative changes in mood swings and cognition, as compared to the grad group of students. The findings overall showed that the undergraduate students were found to be a little bit more sensitive with respect to above-changing situations than the graduate students. Moreover, further scoring demonstrated a significant difference in groups ($f = 235.56$, $p = .000$, $2 = .71$), but there is a non-significant difference in education (graduate, undergraduate) ($f = 5.214$, $p = .023$, $2 = .014$).

Discussion

Emotional experiences are a worldwide spectacle; living with negative emotional states, such as depression and anxiety, is a disease. The illness is associated with an impaired ability to function on a daily basis (Bitta et al., 2017) imposing a greater burden on public well-being and the country's overall financial state (Malik et al., 2019). Pakistan, like other countries around the world, has a higher prevalence rate of emotional and mental health-related problems as a result of the current social situation. As a result, there is an urgent need to comprehend the profound implications of emotion and cognition (Tully et al., 2009).

There is, thus, a great need for systematic studies on the prevalence of emotion and its consequences on people's cognitive functioning. The current study sought to highlight the impact of emotions on cognitive processing across its domain, as well as the effectiveness of laughter on cognitive abilities in graduate and undergraduate students. In a preview of various said literatures, the following main objectives for this study were outlined: The first objective of the present study was to investigate the effect of different emotions (happy, sad, and neutral) on cognition and on different domains of the cognitive process in graduate and undergrad university students. Another main objective of the study was to study the effectiveness of laughter on mood and cognitive processes in graduate and undergraduate university students.

The current study's findings suggested that emotion had a significant impact on not only a person's current mental repertoire but also the volume of their cognitive performance. According to the research by Proyer (2018), it was determined that day-to-day variations in emotional affect are associated with daily fluctuations in the mental property of a person. The above study analysis appears to be consistent with previous research of the same type, which demonstrated that emotions have a significant impact on a person's cognition. In line with this finding by Valentini (2021), which states that negative affect may arrest the attention, demotivate the person,

and reduce the availability of resources required for a task, numerous other studies' findings are also aligned with the current conclusions, which suggest that emotion has a strong influence on cognition. Moreover, a study by Vanderveren et al. (2020) indicates that sadness has been linked to impairments in working memory performance. In addition, there is extensive literature relating negative emotional mood to impaired cognitive processes like executive functioning. A study by Souza and colleagues, (2007) stated that moods place demands on cognitive resources and interfere with executive performance. Previous studies' results have confirmed a similar trend of cognitive decline in clinical and normal populations that mostly experience negative affect. The current study's findings also revealed that inducing a sad mood, as opposed to a neutral mood, resulted in greater deterioration in cognitive functioning such as attention, concentration, and working memory, among other things, which is consistent with previous studies (Mohammed & Lyusin, 2022). The present study reveals that the effect of sadness constrains visual-spatial attention dispensation and cognitive discrepancies, including executive function, memory problems, and attention (Jung et al., 2014).

The result further revealed that sad induction, as compared to neutral induction, causes more decline in every domain of mental process, such as executive function, short-term memory, attention, visual-spatial ability, and language, as well as in the emotional system. Depressive moods have a more negative effect on executive functioning than neutral moods (Zachary et al., 2018; Seli et al., 2016). The result also supported the study's second objective, and the score is completely consistent with previous literature, which suggests that laughter has a significantly positive effect on not only mood and mental processes but all domains of cognition. Previous studies suggest that laughter promotes people's health and wellbeing by reducing depression, anxiety, stress, and pain. (Sim, 2015).

Furthermore, research has shown that humor improves and strengthens cognition. Humor treatments' impacts on the cognitive process should therefore be desired and promoted (Gibson, 2017). The results are consistent with those of prior studies by Yagolkovskiy and Medvedev (2019), which found that laughing at humorous material significantly reduced mood instabilities and increased the therapeutic effect of cognition and thought to promote positivity that influences emotional regulation and aids in lowering the painful reactions to stress (Kim et al., 2015). Additionally, research further demonstrated that laughing improves people's health and wellbeing by reducing stress, anxiety, despair, and pain. Increases the level of exhilaration, which in turn encourages a positive outlook and mental focus as well as visual spatial memory (Sim, 2015).

Limitations

Concerns have been raised about the current study's generalization that the effect of mood on cognitive processes is the same for all age groups. There is a need and recommendation for the future researcher to study the effect of mood on every age group, and data will be collected from different universities so the results can be generalized. Furthermore, only female participants were included in the current study, so the results regarding mood and cognition could not be generalized to both genders.

Implications

The current research can be used to educate people about both the advantages and disadvantages of their mood on their general and mental health. Additionally, the findings of studies can in fact help all students, clinicians, and scholars comprehend how strongly a student's mood affects their ability to think clearly. The findings will also highlight the fact that the humor intervention has

a greater impact on students' cognition in neutral moods as well as on students who are depressed. This study will also make it easier for psychologists and counsellors to treat psychological problems more effectively by incorporating laughter therapy into their practices.

Conclusion

The purpose of the current research was to examine how various mood states affected graduate and undergrad students at public universities' diverse cognitive abilities. The study's findings offered convincing empirical evidence that depressive mood had a negative impact on students' cognitive abilities, both graduates and undergrads. Additionally, research has demonstrated that laughter can greatly and profoundly improve one's mood and cognitive functioning. The results also showed that laughter can be the most beneficial strategy for efficiently enhancing pupils' emotions. The study's findings can also help psychologists and counsellors treat psychological problems more effectively by using humor as therapy.

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Ethical Consideration

The study was approved by Department of Psychology, Foundation University School of Science and Technology, Pakistan. Consent Form was taken before taking data and participants were asked to take voluntary participation.

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Availability of data and materials

The data sets used and analyzed during the current study are available from the corresponding author on reasonable request.

Authors' contributions/Author details

Hafiza Abida performed this study under supervision of Muhammad Aqeel. Aqsa Chaman, & Abdul Basit Qureshi wrote the article under the guidelines of Nature-Nurture Journal of Psychology.

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Ethics declarations

Ethics approval and consent to participate

This study was approved by the Institutional Review Board of the Department of Psychology, Foundation University School of Science and Technology, Pakistan. A written informed consent was obtained from all participants.

Consent for publication

Not applicable.

Competing interests

The authors declare to have no competing interests.

Additional Information

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