

Imaging Capability, Absorption, Anxiety, Positive and Negative Affect: A Guided Imagery Intervention

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Abstract The purpose of this study was to examine the relationship between Absorption, the factors of imaging capability, i.e., Vividness of Visual Imagery and Visual Imagery Control, Trait anxiety and the differences in State Anxiety, State Positive Affect and State Negative Affect after the provision of a Guided Imagery intervention. The study was conducted on 30 female final year undergraduates, and an intervention based research model was implemented. The Vividness of Visual Imagery Questionnaire (Marks in Br J Psychol 64:17–24, 1973), Test of Visual Imagery Control (Gordon in Br J Psychol Gen Sect 39(3):156–167, 1949) and Tellegen Absorption Scale (Tellegen and Atkinson in J Abnorm Psychol 83(3):268, 1974) were administered to the participants to assess their imaging capability and their tendency towards absorption. A guided imagery track from the Academy of Guided Imagery was utilised for the intervention. The State-Trait Anxiety Inventory (Spielberger and Gorsuch in State-trait anxiety inventory for adults: manual, instrument, and scoring guide. Mind Garden, Incorporated, 1983) and The Positive and Negative Affect Schedule (Watson et al., in J Abnorm Psychol 97(3):346, 1988) were also employed.

Keywords Visual imagery · Absorption · Guided imagery · Anxiety

1 Introduction

College life is characterised by inevitable stress. Students face a combination of anxiety-inducing factors such as making difficult career choices, peer and parental pressure, feelings of incompetence and the lack of motivation to learn. These factors

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impact them and can lead to consequences such as depression, anxiety, stress, risky sexual behaviour, substance abuse, physical illness and in extreme cases, suicidal ideation.

Studies conducted in the United Kingdom showed that the prevalence of mental illnesses or psychological problems within the student population is as high as 40% with the most common problems being depression or anxiety. Research in other parts of the world has also recognised a significant amount of stress among undergraduate students (Ibrahim, Dania, Lamis, Ahd, & Asali, 2013; Teh, Ngo, bintiZulkiffii, Vellasamy, & Suresh, 2015). A study conducted by Mohan (2015) concentrates on the environmental sources of stress in students' lives and has revealed that high expectations from teachers and pressure from parents are the biggest sources of stress followed by family factors such as lack of parental support and financial factors like insufficient funds to pay for higher education. Studies which have compared gender and stress showed significant differences in the level of stress in both genders, with females exhibiting higher stress levels when compared to males (Baum & Grunberg, 1991; Waghachavare, Dhumale, Kadam, & Gore, 2013). Females are also more likely to view their stress negatively than men (Brazelton, Greene, & Gynther, 1996) and are more prone to reporting their stress as unacceptable (Campbell, Svenson, & Jarvis, 1992). In studies which investigated the interaction between gender and STAI scores, females scored significantly higher in terms of anxiety (Bekker & van Mens-Verhulst, 2007; Hishinuma, Miyamoto, Nishimura, & Nahulu, 2000; Misra & McKean, 2000). To get a wholesome understanding of the features of stress in undergraduate students, it is essential to study the behavioural responses or the coping strategies used by students to deal with anxiety. Three general strategies or styles of coping with stressful situations have been identified by Kohn, Hay, & Legere (1994), which are: (a) problem-focused coping, directed at remedying a threatening or harmful external situation; (b) emotion-focused coping including ventilating, managing, or relieving one's emotional response to such a situation; and (c) avoidance-focused coping which involves attempts to remove oneself mentally or even physically from threatening or damaging situations. Avoidance focused coping has been shown to be positively correlated with higher frequency and a higher degree of stress. There is, however, no significant correlation between emotion-focused coping, problem-focused coping and higher levels and frequency of stress (Dwyer & Cummings, 2001). To help students in effectively managing the enormous amount of stress that they have to face in their life, interventions like yoga, meditation, guided imagery, etc., can be provided as they will improve mood and will reduce tendencies of avoidance-focused coping. Guided imagery, one of the recently invented methods of relaxation is a beneficial technique used to alleviate stress. It is a mind-body intervention which helps concentrate the mind on positive images in an attempt to reduce pain and anxiety. It has a plethora of benefits which include reduced stress, lower levels of blood pressure and increased relaxation. It is also used to help students achieve their goals by helping them visualise their plans. However, the effectiveness of a guided imagery intervention varies from one individual to another, and the factors on which its success is dependent have not yet

been ascertained. To ensure that the receiver of the intervention derives maximum benefits from the intervention, these factors have to be determined.

Richardson (2013) states that mental imagery refers to “(1) all those quasi-sensory or quasi-perceptual experiences of which we are self-consciously aware, and which exist for us in the absence of those stimulus conditions that are known to produce their genuine sensory or perceptual counterparts, and which (4) may be expected to have different consequences from their sensory or perceptual counterparts.” The ability to successfully generate mental imagery depends on the factors of vividness of visual imagery and visual imagery control. Vividness of visual imagery is defined as a construct expressing the self-rated degree of richness, amount of detail (resolution), and clarity of a mental image, as compared to the experience of actual seeing (D’Angiulli & Reeves, 2007). There have been studies which have already established an association between vividness of visual imagery and relaxation during guided imagery interventions (Walker et al., 1999; Watanabe, Fukuda, & Shirakawa, 2005; Watanabe, Fukuda, Hara, & Maeda, 2006). These studies have showcased that there is a significant difference in the degree of reduction of stress in people who experience vivid imagery and those who don’t, with people having higher vividness of visual imagery ability showing higher rates of relaxation after the provision of the intervention. However, the capacity to visualise vivid images is not the sole factor of imaging ability, and therefore the role of visual imagery control in the process of relaxation through guided imagery techniques must be considered. This view can be further supported by Richardson’s (1977) stance that research on imagery must always study both aspects of imaging ability. Childers, Houston, & Heckler, (1985) defined imagery control as the individual’s ability to self-generate a mental image and to perform certain manipulations, such as mental rotation. Many personality characteristics are studied in relation with controllability. For example, Gordon (1949) distinguished participants by their imaging style which may be either autonomous imagery or controlled imagery.

Other factors such as a person’s disposition and motivation towards participation in guided imagery interventions also play a significant role in the degree of relaxation that they experience after the intervention. Techniques like guided imagery require experiential involvement and the ability to be “immersed” in activities, “captured” by feelings, “absorbed” in imagery and dreams, “riveted” by interactions with others, and so on. The participant should be motivated and capable of engaging in images constructed during the intervention so that it can lead to complex psychological states. In the absence of such a trait, the participant will not be able to benefit from the intervention fully. High rates of absorption evince such an ability. Absorption is defined as an “openness to absorbing and self-altering experiences” (Tellegen & Atkinson, 1974). Individuals with low absorption capabilities find it difficult to break away from structure through imaginal strategies and to indulge in creatively demanding activities. In contrast, people with high-absorption capabilities tend to adopt an experiential mode of functioning, characterized by the readiness to experience attentional objects for their own sake and to fully elaborate their meaning outside the context of instrumental plans, goals

and performance calibration (Wild, Kuiken, & Schopffiocher, 1995) and therefore are better at immersing in imaginal processes. This theory can be further proven by a study conducted by Glisky, Tataryn, Tobias, Kihlstrom, & McConkey (1991) in which it was indicated that the scores on the Tellegen absorption scale were most closely associated with the subscales of the Coan and McCrae-Costa's openness measures that related to aesthetic sensitivity, unusual perceptions and associations, fantasy and dreams, unconventional views of reality, and awareness of inner feelings. Absorption and imaging ability may, therefore, be regarded as conducive to relaxation during guided imagery interventions.

Previous studies on relaxation techniques like progressive muscle relaxation, spontaneous cognitive strategies and mindfulness (Chaves & Brown, 1987; Mascioli, 2014; Rasid & Parish, 1998) have utilised state anxiety measures to observe immediate changes in anxiety levels after the provision of an intervention session because of their sensitivity to differences in stress. State anxiety has been defined as an unpleasant emotional response while coping with threatening or dangerous situations (Spielberger & Gorsuch, 1983), which includes cognitive appraisal of threat as a precursor for its appearance (Lazarus, 1991). Spielberger, Sydeman, Owen, & Marsh (1999) characterized trait anxiety as a general disposition to experience transient states of anxiety. State anxiety was chosen as a variable in this study because of its potential to assess anxiety at any given point of time. Trait anxiety was included, to examine the prevalence of anxiety as a disposition in students and also to investigate its impact on state anxiety levels.

Along with aiding in anxiety reduction, guided imagery is also used as a mood enhancing technique and therefore the measurement of affect is essential. The two dominant dimensions of emotional experience are positive and negative affect. positive affect reflects the extent to which a person feels enthusiastic, active, and alert. High positive affect is a state of high energy, full concentration, and pleasurable engagement, whereas low positive affect is characterized by sadness and lethargy (Jorm, 2001). A study conducted on 254 undergraduate students indicated a significant positive correlation between grit, positive affect, happiness and life satisfaction (Singh & Jha, 2008). Positive affect has also been identified as negatively correlated with depression (Watson, Clark, & Carey, 1988a). In contrast, negative affect is a general dimension of subjective distress and unpleasurable engagement that subsumes a variety of aversive mood states, including anger, contempt, disgust, guilt, fear, and nervousness, with low negative affect being a state of calmness and serenity (Watson, Clark, & Tellegen, 1988b). Previous research has indicated that negative affect broadly correlates with depression and anxiety and acts as a general predictor of psychiatric disorders (Watson & Clark, 1984; Watson et al., 1988a, b). With regard to the relationship between positive affect and negative affect, it has been proven that there is a significant negative

correlation between state positive affect and state negative affect but zero correlation between trait positive affect and trait negative affect (Diener, Larsen, & Emmons, 1984; Schmukle, Egloff, & Burns, 2002; Watson & Clark, 1997; Watson et al., 1988a, b).

The present study thus aims to discern the relationship between imaging capabilities, absorption and the alleviation of state anxiety and negative affect and the boost in positive affect after a guided imagery intervention. This assumption can be supported by previously conducted investigations according to which vividness of visual imagery has a significant influence on the relaxation experienced by the participants after the provision of guided imagery interventions (Watanabe et al., 2006). The existence of significant levels of positive correlation between vividness of visual imagery and visual imagery control may indicate the latter's relationship with the relaxation experienced by participants in the guided imagery intervention. Absorption has been used to study the relationship between people's personality and dispositions and relaxation experienced in therapeutic interventions. State anxiety, state positive affect and state negative affect have been used in previous research because of their sensitivity to even the slightest changes in anxiety, positive and negative affect (Chaves & Brown, 1987; Mascioli, 2014; Rasid & Parish, 1998) and thus the combination of these three will indicate the success of the intervention.

1.1 Research Questions

1. Is there any difference in the levels of state anxiety, state positive affect and state negative affect after the provision of the guided imagery intervention?
2. Is there any relationship between vividness of visual imagery, visual imagery control, absorption and the differences in state anxiety, state positive affect and state negative affect pre and post intervention?

1.2 Objectives

1. To examine whether guided imagery reduces levels of state anxiety and state negative affect and improves state positive affect post intervention.
2. To investigate if there is a relationship between vividness of visual imagery, visual imagery control, absorption and the differences in state anxiety, state positive affect and state negative affect pre and post intervention.

1.3 Hypotheses

- H1. There will be a significant decrease in state anxiety after the provision of the guided imagery intervention.

- H2. There will be a significant increase in state positive affect after the provision of the guided imagery intervention.
- H3. There will be a significant decrease in state negative affect after the provision of the guided imagery intervention.
- H4. There will exist a significant correlation between vividness of visual imagery and difference in state anxiety pre and post the intervention.
- H5. There will exist a significant correlation between vividness of visual imagery and difference in state positive affect pre and post the intervention.
- H6. There will exist a significant correlation between vividness of visual imagery and difference in state negative affect pre and post the intervention.
- H7. There will exist a significant correlation between visual imagery control and difference in state anxiety pre and post the intervention.
- H8. There will exist a significant correlation between visual imagery control and difference in state positive affect pre and post the intervention.
- H9. There will exist a significant correlation between visual imagery control and difference in state negative affect pre and post the intervention.
- H10. There will exist a significant correlation between absorption and difference in state anxiety pre and post the intervention.
- H11. There will exist a significant correlation between absorption and difference in state positive affect pre and post the intervention.
- H12. There will exist a significant correlation between absorption and difference in state negative affect pre and post the intervention.
- H13. There will be a significant correlation between vividness of visual imagery and visual imagery control.
- H14. There will be a significant correlation between Vividness of visual imagery and absorption.
- H15. There will be a significant correlation between visual imagery control and absorption.
- H16. There will exist a significant correlation between trait anxiety and difference in state anxiety pre and post the intervention.
- H17. There will exist a significant correlation between trait anxiety and difference in positive affect pre and post the intervention.
- H18. There will exist a significant correlation between trait anxiety and difference in negative affect pre and post the intervention.
- H19. There will exist a significant correlation between vividness of visual imagery and trait anxiety.
- H20. There will exist a significant correlation between visual imagery control and trait anxiety.
- H21. There will exist a significant correlation between absorption and trait anxiety.
- H22. There will exist a significant correlation between the differences of the pre and post intervention scores of state anxiety and state positive affect.

H23. There will exist a significant correlation between the differences of the pre and post intervention scores of state anxiety and state negative affect.

H24. There will exist a significant correlation between the differences of the pre and post intervention scores of state positive affect and state negative affect.

2 Method

2.1 Research Design

The present study is a quantitative study which has employed absorption and the factors of imaging capability, i.e., vividness of visual imagery and visual imagery control, and trait anxiety as its independent variables and state anxiety, state positive affect and state negative affect as its dependent variables. It adopted a pre-test, post-test quasi experimental design and a correlational design. A within group design was implemented to observe the changes in the anxiety, positive affect and negative affect levels before and after the conduction of the intervention. The statistical procedures that were utilized for data analysis include paired *t*-test and correlation. Paired *t*-test was used to compute the differences in state anxiety, positive affect and negative affect pre and post the intervention and correlation helped ascertain the relationship between the variables.

2.2 Sample

Thirty female final year undergraduate students from St. Francis College for Women, Hyderabad were selected to be a part of the sample.

- **Inclusion Criteria:**

- Age range of the subjects: 19–22 years
- Educational Qualifications: Pursuing final year of under graduation
- Gender: Female

- **Exclusion Criteria:**

- Students lacking proficiency in English
- Students who were unwilling to participate in all the three sessions.

2.3 Instruments

- **Information Schedule**

The participants were required to sign an informed consent form and provide certain personal information including age, residence, religion, family related details (family type, family size and living arrangements), physical health status

of the respondent and her family members, mental health status of the respondent and her family members and a checklist of adverse experiences that the respondent might have undergone.

- **Vividness of Visual Imagery Questionnaire (VVIQ):**

Constructed by David Marks, this self-report inventory was published in 1973 and was designed to assess the participant's ability to visualise images vividly. It is a valid and reliable psychometric measure with a mean alpha coefficient of $r = 0.89$ as reviewed by McKelvie (1995). The VVIQ consists of 16 items which are divided into four groups consisting of four items each. The participant is asked to visualise the images either with eyes closed/opened and has to rate the vividness of the visual images on a 5 point Likert scale with a score of 1 indicating a 'Perfectly clear image which is as vivid as real seeing' and a score of 5 indicating "No image at all".

- **Test of Visual Imagery Control (TVIC):**

The Test of Visual Imagery Control is used to evaluate an individual's capability to control and manipulate a visual image. It was originally developed by Gordon in 1949. This measure has been widely used in research studies and has a test-retest coefficient of $r = 0.84$ over a three-week interval (McKelvie & Gingras, 1974) and internal consistency estimates of $r = 0.77$ to $r = 0.84$ (Hiscock, 1978). Initially, the test consisted of 11 items and was administered orally. Richardson in 1969 added a 12th item to the instrument and suggested the use of written rather than oral instructions. The 5 point Likert scale version of the scale was used in this study with a score of 1 indicating that it is "Very Easy" to manipulate the images and a score of 5 indicating that it is "Very Hard" to manipulate the images.

- **Tellegen Absorption Scale:**

The Tellegen Absorption Scale is a paper-and-pencil test which was devised by the American psychologist Auke Tellegen along with Gilbert Atkinson in 1974. It measures the personality trait of Absorption which refers to a person's disposition to get absorbed in their mental imagery, particularly fantasy. The scale has high levels of internal reliability ($r = 0.88$) and also high test-retest reliability ($r = 0.91$). One's absorption ability is measured by 34 true/false self-report items by assigning a value of 1 to all the "True" items and a value of 0 to all the "False" items.

- **State-Trait Anxiety Inventory (Form Y) (STAI):**

It is a commonly used measure of anxiety which was created by Charles Spielberger, R. L. Gorsuch, and R. E. Lushene in 1983 based on the state-trait distinction proposed by Raymond Cattell in 1961. The form Y version of the scale was used in this study. Considerable evidence supports the strength of the psychometric properties of the scale. Its internal consistency is reported to range from 0.86 to 0.95 and the test-retest reliability coefficients have ranged from 0.65 to 0.75 over a 2-month interval. The scale consists of 20 state anxiety items and 20 trait anxiety items. The state anxiety items are measured on the basis of a 4-point Likert scale with a value of 1 indicating "Not at all" and a value of 4

indicating “Very much so”. 10 of the 20 items are anxiety present items and are reverse scored and the rest are anxiety absent items which are direct scored. The trait anxiety scale of STAI also consists of 20 items with 11 anxiety present items which are directly scored and 9 anxiety absent items which are reverse scored. The items, like the state anxiety scale are assessed on a 4-point Likert scale with a score of 1 representing “Almost Never” and a score of 4 representing “Almost Always”.

- **Positive and Negative Affect Schedule (PANAS):**

The PANAS is a test of general affective states. It was constructed by Dr. David Watson and Dr. Lee Anna Clark in 1988. The measure comprises of two mood scales i.e., Positive affect and Negative affect. It can be used to ascertain both the state and trait positive and negative affect. For the purposes of this study, the instrument was used to compute the state positive and state negative affect of the participants. The PANAS consists of a total of 20 items, each affect scale containing 10 items. The scores of both the scales are measured with the help of a 5-point Likert scale. A value of 1 represents “Not at all” or “Very Slightly” and a value of 5 represents “Extremely”.

- **Guided Imagery Tracks:**

Two tracks from a Guided Imagery Audio CD titled “Stress free Moments” were used to conduct the intervention. The Audio was created and narrated by Dr. David Bresler from the Academy of Guided Imagery. The first track called “Release Worries” focused on creating an imaginary, magic trash can which could collect all of the mind’s fears, concerns, anxieties and worries and either de-juice (the emotional aspect of the worries is removed so that the person can address his worries but not get emotionally affected), filter (all the worries and fears are filtered so that only those worries which are significant are retained) or freeze (pause the worries till such time when the person gathers enough emotional strength to address them again) them. The second track called “The Sanctuary” concentrated on creating a safe place in the participants’ minds which is devoid of distress and which they can visit whenever they feel the slightest amount of anxiety. The duration of both the tracks put together was 20 min.

3 Procedure

The self-report inventories and the tracks that had to be utilized for the intervention were identified and chosen according to the requirements of the study after which preparations were made for data collection. Two sets of questionnaires were prepared. The first set included the informed consent form, the information schedule, Tellegen’s absorption scale, the vividness of visual imagery questionnaire, the trait anxiety questionnaire and the test of visual imagery control. The second set contained the state anxiety questionnaire and the positive affect and negative affect schedule. Final year undergraduate students from St. Francis College for Women

were contacted and were informed about the study. They were made aware of the fact that they had to take part in 3 sessions of an intervention with each session lasting for a period of 45 min. Students who agreed to participate were given the first set of questionnaires. The very next day, after the collection of the 1st set of questionnaires, the intervention process was initiated. The students were given the second set of questionnaires which included the state anxiety questionnaire and the positive and negative affect schedule and were asked to fill it. 10 min were given to fill both the forms. After all the students completed the questionnaires, the students were urged to pay attention to and follow the instructions given by the narrator of the track. Upon ensuring that the participants understood the procedure, the tracks were played. The duration of the tracks was 20 min after which the students were given another set of the same questionnaires i.e., the State anxiety questionnaire and positive and negative affect schedule. This process was repeated for two consecutive sessions and the collected data was analyzed.

4 Intervention Procedure

The students were called into a quiet room for the intervention and a rapport was established with them so that they could feel comfortable. The State anxiety questionnaire and the state version of the positive and negative affect schedule (PANAS) were administered to them which took them about 15 min to complete. The students were then asked to listen to an audio track and follow the instructions given by the narrator. The guided imagery track lasted for a period of 20 min after which the state anxiety questionnaire and the PANAS were re-administered. This process was repeated for two more sessions, with each session lasting for a period of 45 min. The sessions were scheduled onto three consecutive days.

5 Statistical Analysis of the Data

The means of the pre and post intervention scores were computed and a paired—*t* test was conducted on them to check if there is a significant difference in the anxiety, positive affect and negative affect levels, before and after the intervention. Pearson's product moment correlation was also conducted to study the relationship between the variables.

6 Results

The results exhibited by Table 1 show that there exist significant differences in the levels of state anxiety, state positive affect and state negative affect pre and post the intervention ($p < 0.001$). There is a considerable reduction in the levels of state anxiety and state negative affect after the provision of the guided imagery intervention. There is also a marked improvement in state positive affect post the intervention.

The results in Table 2 show that there is a significant positive correlation between vividness of visual imagery and visual imagery control ($r = 0.75$, $p < 0.01$), vividness of visual imagery and absorption ($r = 0.43$, $p < 0.05$) and visual imagery control and absorption ($r = 0.40$, $p < 0.05$). There exists significant negative correlation between increase in positive affect and vividness of visual imagery ($r = -0.39$, $p < 0.05$) which would mean that participants with higher ability to vividly visualise mental imagery experienced lesser increase in positive affect post the intervention. A significant positive correlation was found between trait anxiety and decrease in negative affect ($r = 0.63$, $p < 0.01$) which would mean that there was a greater decrease in negative affect after the provision of the intervention in participants exhibiting higher levels of trait anxiety. Decrease in state anxiety post intervention significantly and positively correlates with increase in positive affect ($r = 0.39$, $p < 0.05$) and also with decrease in negative affect ($r = 0.64$, $p < 0.01$). This indicates that participants who experienced greater decrease in state anxiety after the intervention also experienced greater decrease in negative affect and a greater increase in positive affect.

Table 1 Showing results of the paired samples *t*-test of the pre and post intervention scores of state anxiety, state positive affect and state negative affect

	Pre-intervention mean	Post-intervention mean	Difference of means	Standard deviation	<i>t</i> -value
Difference in pre and post-intervention scores of state anxiety	39.89	28.09	11.800	4.334	14.912***
Difference in pre and post-intervention scores of state positive affect	34.06	37.44	3.389	4.532	4.096***
Difference in pre and post-intervention scores of state negative affect	14.91	12.11	2.800	3.312	4.630***

*** $p < 0.001$

Table 2 Showing results of the correlation between vividness of visual imagery, visual imagery control, absorption, trait anxiety and the differences in means of state anxiety, state positive affect and state negative affect

	Vividness of visual imagery	Visual imagery control	Absorption	Trait anxiety	Difference in state anxiety	Difference in positive affect	Difference in negative affect
Vividness of visual imagery	–	0.75**	0.43*	–0.19	0.03	–0.39*	0.09
Visual imagery control		–	0.40*	–0.02	0.22	–0.28	0.31
Absorption			–	–0.23	0.26	–0.14	0.14
Trait anxiety				–	0.21	0.26	0.63**
Difference in state anxietyz					–	0.39*	0.64**
Difference in positive affect						–	0.21
Difference in negative affect							–

* $p < 0.05$

** $p < 0.01$

The results of the first session in Table 3 show that there exists a significant negative correlation between trait anxiety and decrease in state anxiety ($r = -0.43$, $p < 0.05$), a significant negative correlation between vividness of visual imagery and increase in positive affect ($r = -0.53$, $p < 0.01$) and a significant positive correlation between trait anxiety and decrease in negative affect ($r = 0.51$, $p < 0.01$). The results of the second session indicate a positive correlation between trait anxiety and decrease in state anxiety ($r = 0.47$, $p < 0.01$) and trait anxiety and decrease in negative affect ($r = 0.50$, $p < 0.01$). The results of the third session do not display any significant correlation.

Figure 1 shows that there was a significant decrease in state anxiety after the provision of the guided imagery intervention during all the three sessions. The pre-intervention score for state anxiety during the first session was 46.83 which was reduced to 27.67. During the second session, the pre-intervention score was 37.4 and the post-intervention score was 27.93. The participants experienced a mean pre-intervention score of 35.43 during the first session and a mean post-intervention score of 28.67.

Figure 2 shows that there was a significant improvement in state positive affect after the provision of the guided imagery intervention during all the three sessions. The participants received a mean pre-intervention score of 35.5 which increased to 38.9 after the intervention. During the second session, the pre-intervention score

Table 3 Showing results of the correlation between vividness of visual imagery, visual imagery control, absorption, trait anxiety and the differences in state anxiety, state positive affect and state negative affect for all three sessions

	Differences		Vividness of visual imagery	Visual imagery control	Absorption	Trait anxiety
1st session	State anxiety	Pearson's correlation coefficient	-0.05	0.00	0.15	-0.43*
	Positive affect	Pearson's correlation coefficient	-0.53**	-0.29	-0.21	0.16
	Negative affect	Pearson's correlation coefficient	0.18	0.18	-0.24	0.51**
2nd session	State anxiety	Pearson's correlation coefficient	0.04	0.19	0.19	0.47**
	Positive affect	Pearson's correlation coefficient	-0.26	-0.27	0.05	0.20
	Negative affect	Pearson's correlation coefficient	0.19	0.27	0.32	0.5**
3rd session	State anxiety	Pearson's correlation coefficient	0.07	0.12	-0.1	0.30
	Positive affect	Pearson's correlation coefficient	0.01	-0.01	-0.13	0.22
	Negative affect	Pearson's correlation coefficient	0.17	0.20	0.19	0.31

* $p < 0.05$ ** $p < 0.01$

was 33.13 and the post-intervention score was 36.47. The pre-intervention score for the third session was 33.53 and the post-intervention score was 36.97.

Figure 3 shows that there was a significant decrease in state negative affect after the provision of the guided imagery intervention during all the three sessions. During the first session, the participants experienced a mean pre-intervention score of 15.67 which reduced to a post-intervention score of 12.1. The participants received a mean score of 15.13 before the provision of the intervention during the second session. Their post-intervention score during the same session was 12.23. The pre-intervention score for the third session was 13.93 which was reduced to 12 after the intervention.

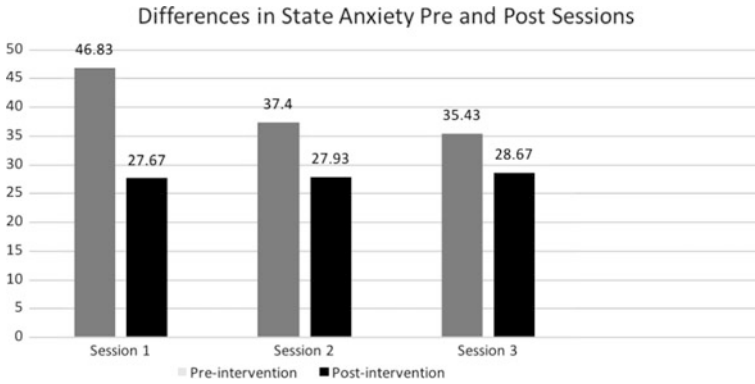


Fig. 1 Showing the differences in state anxiety pre and post the three sessions

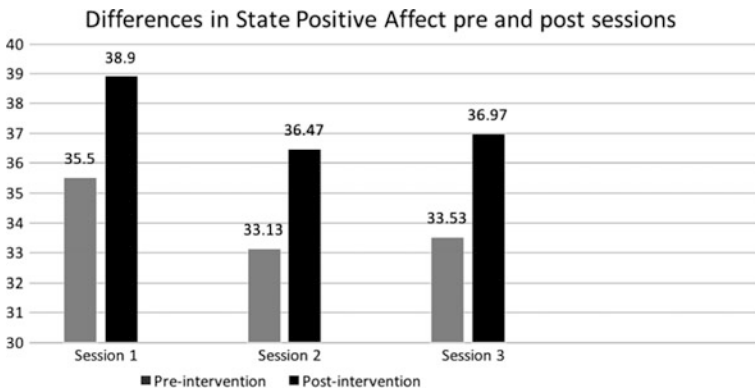


Fig. 2 Showing the differences in state positive affect pre and post the three sessions

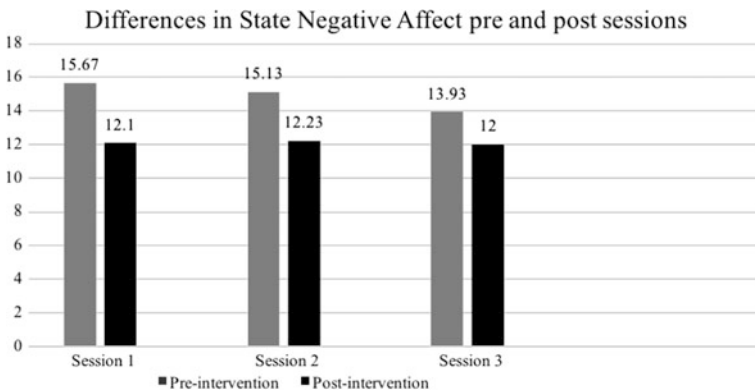


Fig. 3 Showing the differences in state negative affect pre and post the three sessions

7 Discussion

The present study demonstrates significant differences in the levels of state anxiety, state positive affect and state negative affect pre and post intervention. State anxiety levels before the intervention ($M = 39.89$) were significantly higher than the state anxiety levels after the intervention ($M = 28.09$). The pre-intervention positive affect scores of the participants were significantly lower ($M = 34.06$) than the post-intervention positive affect scores ($M = 37.44$). There was also a marked reduction in the negative affect scores with the pre-intervention scores ($M = 14.91$) being significantly higher than the post-intervention scores ($M = 12.11$). An investigation into the differences in the levels of state anxiety, state positive affect and state negative affect in each of the three sessions also exhibit a marked reduction in state anxiety and state negative affect and an increase in state positive affect in all the three sessions. This would mean that the guided imagery intervention was successful in alleviating state anxiety and state negative affect and in boosting state positive affect. These findings can be further supported by earlier studies which have used guided imagery as a means of relaxation (Walker et al., 1999; Watanabe et al., 2005). The analysis has also revealed that the means of post-intervention state anxiety, state positive affect and state negative affect have remained relatively consistent over the course of all three sessions suggesting that these post-intervention means indicate a stable level of relaxation which the participants experience after undergoing the guided imagery intervention.

A highly significant positive correlation between vividness of visual imagery and visual imagery control has been observed in this study. This would mean that there is a substantial possibility that participants with higher vividness of visual imagery also possess a higher capability to control and manipulate visual images. With respect to the relationship between vividness of visual imagery and control of visual imagery, Switras (1976) observed that controllability is the first stage of imagery production and is, therefore, a stepping stone to vividness of visual imagery. Only if a person can produce a target image, an ability which is assessed by image controllability, will he/she be able to focus on the vividness of the image. There is no possibility of vividly visualising an image when an individual lacks the ability to generate an image considering that he or she will not have an image to work with. Therefore, this finding can be corroborated by the fact that controllability of mental imagery is a pre-requisite for vividness of visual imagery. This can be further supported by previous research (Anderson, 1983; Pratt, Cooper, & Hackmann, 2004; Switras, 1976). Tellegen and Atkinson (1974) explained absorption as a form of attentiveness that causes individuals to use all their cognitive faculties to create representations of the attentional objects. It is due to this reason that individuals scoring high on absorption can easily construct mental representations. The findings of this study indicate a significant positive correlation between absorption and vividness of visual imagery thus suggesting that participants with the personality trait of absorption were more likely to produce vivid visual imagery during the intervention. These results thus support the

aforementioned theory. Absorption also correlates significantly and positively with visual imagery control. This relationship evinced by the current study can be explained by the fact that vividness of visual imagery and visual imagery control are corresponding concepts and therefore a significant relationship between vividness of visual imagery and absorption predicts a strong correlation between visual imagery control and absorption. Contrary to previous research (Nelis, Vanbrabant, Holmes, & Raes, 2012), the present study indicates a negative correlation between positive affect and vividness of visual imagery which would mean that participants with a higher vividness of visual imagery ability experienced lesser improvement in positive affect when compared to their counterparts. Studies conducted earlier either reported an improvement in positive affect or the absence of significant change after the provision of the intervention. According to the results of the current study, there exists a positive correlation between trait anxiety and difference in state negative affect. According to Watson and Clark (1984), individuals experiencing high negative affect are more likely to experience discomfort at all times and across all situations as they are more introspective and dwell on the negative side of themselves and the world. These results can be further supported by a study conducted by Ladd and Gabrieli (2015). The results also suggest that individuals who suffer from higher levels of trait anxiety experience greater alleviation of negative affect after the provision of the intervention. The above-mentioned study by Ladd and Gabrieli (2015) also examined the relationship between state anxiety and state positive and negative affect. The results showed that greater state anxiety correlated significantly with higher negative affect scores on the PANAS and with lesser positive affect scores on the PANAS. The results obtained in the current study are consistent with these findings. An interesting finding to note is that the correlation between state anxiety and state negative affect is significantly higher than the correlation between state anxiety and state positive affect. Tellegen (1985) factor analysed measures of anxiety, depression, negative affect and positive affect. The depression and anxiety measures had significant loadings on both positive affect and negative affect. However, the anxiety scale loaded more strongly on the negative affect factor whereas the depression scale was a much better marker of low positive affect. Vividness of visual imagery, visual imagery control and absorption have not had much influence on the reduction of state anxiety, state negative affect and the improvement of state positive affect. This might be attributed to the effectiveness of guided imagery interventions in universally inducing relaxation. The present study, therefore, suggests that imaging capabilities and absorption are not pre-requisites for the potential of guided imagery interventions to reduce anxiety and negative affect and improve positive affect. These findings are in contradiction with previously conducted research (Walker et al., 1999; Watanabe et al., 2005, 2006). An analysis of the correlation between vividness of visual imagery, visual imagery control, absorption, trait anxiety and the differences in state anxiety, state positive affect and state negative affect for each session was carried out to further verify the non-existence of significant relationships between the independent and dependent variables. The results suggest that participants who exhibit higher levels of trait anxiety experienced a significantly lower reduction in state anxiety

during the first session. This may be due to the fact that trait anxiety is a measure of general disposition and therefore might have acted as an obstacle to the participants' ability to relax. According to Hodges (1968), there exists a strong relationship between trait anxiety and state anxiety only in situations wherein there is a danger to the individual's self-esteem. The fact that the participants were unaware of the task that they would have to perform prior to the first session might have had an impact on their decreased ability to relax. Fear of underperformance in the unknown task might have grossly increased the impact of trait anxiety on state anxiety thus resulting in the decreased ability of individuals having trait anxiety to experience reduction in state anxiety. In stark contrast, the same participants experienced a significantly high level of reduction in state anxiety after the conduction of the first session. While referring to Hodges (1968) theory, one might say that since the participants were aware of the task during the second session, this might've changed the equation between trait anxiety and state anxiety and therefore must have significantly contributed to the relaxation experienced by the participants. In correspondence with the results mentioned in Table 2, the difference in positive affect is negatively correlated with vividness of visual imagery. Extroverts usually exhibit heightened emotional reactivity to positive mood induction when compared to introverts (Larsen & Ketelaar, 1991). In contrast, vividness of visual imagery as a trait is usually possessed by introverts (Wagele, 2009). This disparity might have been the basis for the results reported in the current study. As reported by Ladd and Gabrieli (2015) state negative affect has a very significant positive correlation with state anxiety. The strength of this correlation can be ascertained from the fact that there is consistency in the correlation results in the first session and the second session. There are no significant correlations in the third session which suggests that all the participants irrespective of the levels of vividness of visual imagery, visual imagery control, absorption and trait anxiety experienced relaxation. This might have been a result of the participants' desensitisation to the audio track.

7.1 Limitations

A between group study with vivid and non-vivid imagers and high absorption and low absorption individuals has not been conducted to fully ensure that imaging capabilities and absorption are not imperative for guided imagery. Future research can adopt this method to understand better the influence of these factors on the amount of relaxation experienced by individuals.

7.2 Implications

The results of the *t*-test indicate that Guided imagery can be used as a relaxation technique for students considering the significant decrease in anxiety, negative affect and the improvement in positive affect after the provision of the intervention.

The current study also suggests that vividness of visual imagery, visual imagery control and absorption are not pre-requisites for guided imagery and that the intervention can be conducted on vivid and non-vivid imagers and individuals with high and low absorption levels to induce relaxation.

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