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The Effect of Induced Positive and Negative Mood on Creativity

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Mood has a significant effect on interpersonal and intrapersonal output. Among the intrapersonal outputs, creativity can be mentioned. Presently, one of the principle purposes of educational systems is to enhance and promote creativity in people. The aim of this study is to examine the effect of inducing positive and negative moods on the creativity of university students. A sample including 20 female participants was randomly chosen from Semnan University using the simple random sampling method. A combination of vignette and music were used for mood induction. Each participant was evaluated in three stages: induction of neutral mood, induction of positive mood, and, finally, induction of negative mood. To control the effect of intervention transfer, the order of interventions was counterbalanced. For manipulation, checking the mood of PANAS was used. To assess creativity, the TORRENCE scale (Form B) was used. Multivariate analysis of variance with repeated measures was utilized for data analysis. The results showed that positive mood induction has a significant effect on creativity components that involve flexibility, elaboration, fluency, and originality. The results of this research were consistent with other findings, demonstrating that inducing a positive mood had an effect on creativity. These findings were explained with a consideration of theatrical and empirical basics.

***Keywords**:* induced mood, positive mood, negative mood, creativity.

Man, as a socio-emotional being, is constantly adapting himself to the environment. In this respect, interpersonal emotions are very important in social perception and generating interpersonal relationships (Dalgleish & Power, 1999). Mood can be divided into two positive and negative categories. A positive mood involves states such as happiness and joy; a negative mood, on the other hand, involves anger and fear (Langley, 2011). In terms of performance, it is said that sadness and grief increase stress and anxiety levels in people and the pressure of that stress can reduce performance level (Robinson, Overstreet, Letkiewicz & Grillon, 2012). Furthermore, it has been mentioned that a positive mood enhances an individual's adaptability, cognitive processing, and problem-solving capacities (Langley, 2011).

Mood has a significant effect on intrapersonal outputs such as creativity and decision-making (Dalgleish & Power, 1999). The improvement of the mood of a student can increase the creativity and flexibility of a student (Biss, Hasher & Thomas, 2010; Biss & Hasher, 2010). When a person’s attention level is low, positive mood can affect a wide range of cognitive processes, such as creativity, talent, problem-solving, and language skills (Biss & Hasher, 2010). Positive mood avoids processing redundant cognitive materials and increases cognitive flexibility, which leads to the increase of novelty and originality (Baas, Dreu & Nijstad, 2008; Davis, 2009). Different forms of creativity have been proposed in recent years (Colton, Charnley & Pease, 2011). For certain people, creativity involves producing something novel (Andreasen, 2011), which has a mental value, such as a joke, a painting, or a music composition (Biss, Hasher & Thomas, 2010; Biss & Hasher, 2010). Others consider creativity as a skill to solve

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problems in the most novel very possible (Williamson, 2011). The concept of creativity demonstrates the differences that people show while providing new solutions from older solutions (Hennessey & Amabile, 2010).

Creativity in knowledge is the way to solve problems and generate new and novel solutions (Newton & Donkin, 2011). The concept of creativity focuses on the three following aspects: 1) process, 2) unique characteristics, and 3) the product (Babalisa, Xanthakoub, Kailac & Stavroud, 2012). To grasp the concept of creativity, we should have a better understanding of the cognitive processes involved in creative thinking (Silvia, Wigert, Reiter-Palmon, James & Kaufman, 2012). Creativity enables people to solve difficult problems in various fields and to generate new and novel solutions. Characteristics such as mental flexibility, curiosity, broad imagination, interest in finding solutions, creating metaphors, and goal-based thinking lead to development of creative thinking (Aizikovitsh-Udi & Amit, 2011).

Numerous methods are used for enhancing creativity. For instance, in one method, students were challenged to find and resolve problems. The prerequisite for the growth of creativity in individuals is that they both have the motivation and the ability for executing new ideas (Byrge & Hanson, 2009). When knowledge and ability are low, there is a negative correlation between creativity and execution. The relationship between creativity, ideas, and executing ideas may be lower than the relationship between the quality of ideas and their execution (Baer, 2012).

Developing an individual's ability to create new ideas, such as towards an educational goal, is extremely important. The results of studies showed that creativity could be taught at any age (Shore, Birlean, Walker, Ritchie, LaBanca & Aulls, 2009). It

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seems that creativity is connected with mood. Slight negative feelings can increase creativity by producing powerful thinking and building up perseverance (Baas et al., 2008). Even within a short span of time, mood affects both cognitive and emotional creativity. It has been mentioned that negative mood leads to an improvement in creative thinking and originality. On the other hand, positive mood enhances creative thinking by enhancing cognitive flexibility (Daviesa, Jindal-Snapeb, Collier, Digbya, Haya & Howea, 2013).

Furthermore, it has been shown that happy music, by inducing a positive mood, leads to increased cognitive capacity (Langley, 2011). In learning environments, mood can help one creatively solve problems (Norman, 2003). Developing an individual's capability to generate new ideas has an important role in education (Daviesa et al. 2013). In addition, it is obvious that learning environments (including schools, institutions, and universities) are places where a wide range of emotions are experienced.

Method

The research design of this study was located within the subject with repeated measures. The population of the current study focused on female students from Semnan University. Twenty students were selected with the simple random sampling method by using the registration list of the second semester of 2013–2014 academic year. The entries were checked for not possessing mood and psychotic disorders. The sample size was determined by the G. power software using a power of .75, medium-effect size, and alpha level (.05).

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Instrument

Inducing Positive and Negative Mood

For inducing mood, a combination of two mood-induction methods, the guided imagery based on vignette and music, were used for positive and negative mood induction. The combination of imagery and music practices is the most effective method for inducing mood. In order to induce any mood state, participants either read the positive or negative events described in the vignette while they listen to music and imagine themselves experiencing the events described. This method was previously applied by Rafieinia, Azadfallah, Fathi-Ashtiani & Rasoulzade-Tabaei (2007). Two examples of vignettes that were used are as follows:

- Joyful text with Joyful Music (You will win 50 million in a lottery and take a wonderful trip).
- Sad text with Sad Music (Doctors have diagnosed one of your close relatives with cancer and said that she/he will live for a short time).

Rafieinia et al. (2007) explain that in order to produce the desired musical pieces, first, certain happy and sad pieces of Iranian music were selected, and then, 10 students evaluated the emotional content of the pieces of music; then, both the happy and sad pieces of music which had the highest assessments were selected.

Torrance Test for Creative Thinking (TTCT-B)

The Torrance test for creative thinking (Form B) was used for measuring the creativity of students. This test is widely used for evaluating creative thinking (Kerr & Gagliardi, 2006). The Torrance test for creative thinking has three different tasks and each task takes 10 minutes. Research obtained test reliability

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between .75 and .80 through the test-retest method (Pear-khaefe, Burj-ali, Delavar & Eskandari, 2011).

Positive and Negative Affect Scale (PANAS)

For the manipulation check, the moods of the participants were measured before and after the test by the Positive and Negative Affect Scale. The scale consists of 10 items related to positive mood and 10 items related to negative mood. A significant difference between the moods of participants was found by comparing the scores of after and before intervention. Watson, Clark, and Tellegen (1988) reported the validity and reliability of the scale as .90 for positive affect and .84 for negative effect. In the research of Rafeienia et al. (2007), Cronbach's alpha was reported as .93 for positive affect and .95 for negative affect. The results of manipulation-checking are presented in Table 1.

Table1

Results of Manipulation-Checking

Before Mood Induction	After Mood Induction	Mean Difference	sig
Negative	Negative mood after negative induction	-8.15	.014
Positive	Positive mood after negative induction	9.15	.041
Negative	Negative mood after positive induction	2.22	.0001
Positive	Positive mood after positive induction	-3.92	.002

The dependent T-Test was used to assure mood manipulation. As Table 1 shows, the differences in moods (before and after manipulation) are significant.

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Procedure

The participants were invited to the Psychology Department lab and while explaining the process of the experiment, informed consent was obtained. Initially, the participants took a pre-test, involving the PANAS and the Torrance scale for assessing their creativity. After a day, the second stage was executed. In this stage, with the use of the counterbalancing method for controlling the intervention transmission effect, positive mood was induced in 10 participants and negative mood was induced in 10 other participants. Then, while the participants were listening to music, the Torrance scale and PANAS measurements were taken. The next stage was executed after a day; in this stage, positive mood was induced in the participants, who were previously induced with a negative mood. A negative mood was induced in the participants that were previously induced with a positive mood. Then, while participants were listening to music, the Torrance scale and PANAS measurements were taken. To analyse the data, descriptive and inferential statistics (MANOVA with repeated measures) were used.

Results

The descriptive results, including the mean and standard deviation of the research variables, are presented in Table 2.

As presented in Table 2, positive- and negative-mood inductions have affected creativity components.

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Table 2

Descriptive Results of the Research Variables

Stages of the Experiment	Components	Mean	Standard Deviation
Pre-test	Flexibility	68.25	25.13
	Elaboration	96.25	16.35
	Fluency	52.25	10.44
	Originality	80.30	19.33
Negative Mood Induction	Flexibility	83.85	24.18
	Elaboration	101.75	26.52
	Fluency	57.85	14.32
	Originality	86.90	28.56
Positive Mood Induction	Flexibility	90.25	15.76
	Elaboration	112.80	16.20
	Fluency	63.50	14.33
	Originality	98.75	14.40

Table 3

Mauchly's Test for Assessing the Assumption of the Equality of the Covariance Matrix

Within Subjects Effect	Components	Mauchley's W	Chi-squared Test	df	Sig
Mood	Flexibility	.72	5.73	2	.57
	Elaboration	.85	4.61	2	.51
	Fluency	.89	2.06	2	.35
	Originality	.60	5.17	2	.50

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As indicated in Table 3, the assumption of the equality of the covariance matrix is validated.

Table 4

Multivariate Analysis of Variance for Assessing the Effect of Mood Induction on Creativity

Effect	Test	Value	F	Sig	Partial Eta Square	Power
Within subjects	Pillai's trace	.86	9.80	.0001	.86	.99

As indicated in Table 4, the F-value is significant at the p<.0001 level. This fact demonstrates the effects of positive- and negative-mood induction on creativity processes. Considering Eta square, mood induction explains 86 percent of variance between creativity processes.

As presented in Table 5, the F-value of each of the creativity components, including flexibility, elaboration, fluency, and originality is significant for univariate tests. Thus, positive and negative mood induction had a significant effect.

As Table 6 shows, inducing a positive mood in a state where the mood was neutral, increases creativity in the components of flexibility (p<.003), elaboration (p<.0001), fluency (p<.003), and originality (p<.001).

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Table 5

Univariate Analysis of Variance for Assessing the Effect of Mood Induction on Creativity

Subscale	Test	Sum of Squares	df	Mean of Squares	F	Sig
Flexibility	Sphericity	5112.13	2	2561.06	8.12	.001
	Greenhouse-Geizzer	5122.13	1.57	3259.94	8.12	.003
	Huynd-feldt	5122.13	1.68	3033.93	8.12	.002
	Left limit	5122.13	1	5122.13	8.12	.010
Elaboration	Sphericity	2841.7	2	1420.85	6.227	.005
	Greenhouse-Geizzer	2841.7	1.32	2150.77	6.227	.031
	Huynd-feldt	2841.7	1.38	2056.82	6.227	.012
	Left limit	2841.7	1	2841.70	6.227	.022
Fluency	Sphericity	1265.63	2	632.81	5.428	.008
	Greenhouse-Geizzer	1265.63	1.80	701.50	5.428	.011
	Huynd-feldt	1265.63	1.98	638.53	5.428	.009
	Left limit	1265.63	1	1265.63	5.428	.031
Originality	Sphericity	3495.90	2	1747.95	5.212	.01
	Greenhouse-Geizzer	3495.90	1.33	2614.92	5.212	.023
	Huynd-feldt	3495.90	1.40	2496.094	5.212	.021
	Left limit	3495.90	1	3495.90	5.212	.034

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Table 6

Pair-wise Comparisons of Creativity Processes in Neutral, Positive, and Negative Moods

Components	Mood	Comparing to Mood	Mean Difference	Sig.
Flexibility	Neutral	Negative	-15.60	.09
	Neutral	Positive	-22.00	.003
	Negative	Positive	-6.40	.39
Elaboration	Neutral	Negative	-5.500	1.000
	Neutral	Positive	-16.55	.0001
	Negative	Positive	-11.050	.136
Fluency	Neutral	Negative	-5.600	.358
	Neutral	Positive	-11.250	.003
	Negative	Positive	-5.650	.480
Originality	Neutral	Negative	-18.450	1.000
	Neutral	Positive	-18.450	.001
	Negative	Positive	-11.850	.092

Discussion

The current study results show that positive mood has a significant effect on the components of creativity, involving elaboration, flexibility, fluency, and originality. In this context, Newton (2012); Lewis, Havilland & Barrett (2013); Davis (2009); Norman (2003); and Daviesa et al. (2013) can be mentioned as study results that are coordinated with the findings of this study. In the work of Hutton & Sundar (2010), it was

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determined that music can enhance creative abilities by generating special mental states and cognitive abilities.

Positive mood can lead to the generation of greater motivation, attention, and new ideas. Positive moods also lead to the production of creative solutions and these creative solutions help a person by using useful strategies for learning (Van Kleef, De Dreu & Manstead, 2010; Van Kleef, Homan, Beersma, van Knippenberg, van Knippenberg, Damen, 2009). Positive mood leads to rationality and generates pleasant feeling in calling for challenges and problems with initiatives in hand; through the creativity that it induces, positive mood provides the necessary qualifications for the deployment of issues (Baas et al., 2008). As mentioned earlier, positive mood leads to growth in creative thinking through increased mental flexibility (Biss & Hasher, 2010). In addition to creativity, positive mood also facilitates problem-solving (Zenasni & Lubart, 2008; Rowe, Hirsh & Anderson, 2007).

Positive mood also facilitates divergent thinking. Divergent thinking causes enhancement and development of creativity components, such as flexibility and originality, and prepares circumstances for more creativity and generating new ideas. The development of divergent thinking is needed for the development of creativity. Positive mood causes individuals to have a joyful mood and feel less disappointed; as a result, they exhibit flexibility in judgment and decision-making (Sa´nchez-Ruiz, Herna´ndez-Torrano, Pe´rez-Gonza´lez, Batey & Petrides, 2011).

Positive moods cause people to show pattern of thinking that are unusual, flexible, and creative. They also cause the expansion of think-act resources, and the expansion of thinking and acting ranges that come to mind. Positive mood can also facilitate information transportation, novel-thinking, and flexible

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reasoning. It also can promote an individual's ability for gathering innovative ideas and make the individual to look at the different aspects of a problem to come to a proper solution (Hutton & Sundar, 2010). A positive mood is effective in nurturing creative thinking. A positive mood adds motivation through the alternation of mental aspects; as a result, it releases the mind and thinking from problems and deficits, and leads to novel and original thinking as well as finding new solutions (Newton & Donkin, 2011). The results show that negative mood does not have a significant effect on creativity components. Although it improves performance, this improvement is not significant.

Norman (2005) mentioned that joy and peace lead to an increase in creativity, imagination, thinking vastness, and seeking diversity. It should be noted that a positive mood leads to cognitive flexibility; those who feel happy can make more associations between their thoughts and observe different relations existing between different stimuli in comparison to periods when they feel neutral (Mahon, Yarcheski & Yarcheski, 2005). Individuals that have a positive experience of moods can have access to more details and investigate the different aspects of various topics as well as establish more associations related to those topics (Van Kleef & De Dreu, 2010).

It should be noted that this study was conducted only on female students. For a wider perspective, it is suggested that this research be conducted on men as well as on different age groups to compare the impact of creativity on a wider range of participants.

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