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## Improving the Graphic Creativity Levels of Latin American High School Students Currently Living in Spain by Means of a Mindfulness Program

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### Abstract

In this study we will analyze the impact of a mindfulness program upon the graphic creativity levels of a group of Latin American teenagers currently living in Spain. To do so, we analyzed an experimental group of Latin American teenagers who took part in the mindfulness training program, and a control group who did not take part in it. The levels of graphic creativity of both groups were evaluated by means of the Torrance Thinking Test of the Graphic Battery. The statistical study showed how the levels of fluency and originality have significantly increased if compared with the levels of the control group. The results of this research prove the usefulness of mindfulness techniques as useful and effective strategies for graphic creativity improvement, and may become an empiric support so as to incorporate and use them within the educational environment.

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## 1. Introduction

During the last decades, the concept of creativity has been the target of a number of studies, being such interest related to the need of individuals who were able to adapt to and to be flexible with the environment they were developing. Such need of creative individuals may be due to, among different reasons, that such individuals look for new ideas and are able to find efficient solutions to the problems they are facing, as well as showing a fuller development of their skills, achieving a greater degree of personal satisfaction and development (Gadner, 1999).

In relation to this approach, Rogers (1991) pointed out the need of developing, within the educational system, an environment which would favor the personal growth, an environment in which the creative skills of all participants would be encouraged and shown instead of being stifled, as thank to this, the student might have the chance of achieving the highest experiential effort in their personal quest towards perfection, which would mean to consider creativity as a fundamental part in the comprehensive development of an individual, as the results of creativity enrich culture and, at the same time, indirectly improve the quality of life (Cerdá, 2002). It is evident, at the same time, that such ability to make our lives more interesting, productive and creative, can be learnt and developed through the appropriate training and stimulation (Muglia, 2009).

Miskiman (1976) proved that the electrical pattern of brain activity which is more beneficial for the process of learning and creation is the brain coherence, and as established Haynes et al. (1979), the most efficient techniques for increasing the brain coherence are mindfulness techniques, as they consist in the ability to keep our attention focused on a specific content of the experience, both internally and externally.

Travis (1979) performed a research using a mindfulness program for a five years period, achieving a significant improvement in a number of the tested creativity values (graphic originality, fluency and verbal flexibility), thus checking that by affecting the brain functioning and the different levels of consciousness under which the brain works, we can also affect how reality is perceived. In this regard, De Bono (1994) states that in cognitive skills (intelligence and creativity), the basic function that intervenes, as there are conceptual changes, is consciousness. In this sense, there are different researches, including the one undertaken by Schmidt, Alexander and Swanson (1996), showing that the use of mindfulness techniques is a fundamental technique for the development of consciousness, as through its practice we look for a higher dimension, aiming to avoid being stuck in a one-sided perspective of things and events.

Therefore, the objective of this research is to check the influence of a mindfulness program would have upon the levels of graphic creativity of a group of Bachillerato students. The hypothesis leading this research would be that those students which participate in the mindfulness technique learning program would experience a significant increase of their graphic creativity levels (fluency, flexibility and originality), if compared to those students which do not take part in the already mention program

## 2. Method

### 2.1. Participants

Forty-nine students took part in this research, all being Latin American immigrants attending first year of Bachillerato in different public High Schools. Fifty-one percent of them were girls and 49% were boys, all being from 16 to 18 years old (Average=16.45; Standard deviation=0.78). There were 25 subjects in the control group (55% girls and 45% boys), while the remaining 24 subjects were in the experimental group (47% girls y 53% boys). Although all subjects were randomly assigned to one of the groups, gender was a control variable, so that it would not have any influence upon the results of the research.

### 2.2. Design

So as to analyze the influence of the mindfulness program (independent variable) upon the levels of fluency, flexibility and graphic originality (dependant variables), an experimental design was used for a pretest-posttest comparison, considering an experimental group and a control group.

### 2.3. Tools

For evaluating the levels of graphic creativity, we used the Torrance Test of Creative Thinking Graphic Battery (1974). Such battery includes three tasks (picture construction task, incomplete figure task and parallel lines task), either in its A version (pretest stage) and its B version (posttest stage). Those three activities allow us to evaluate a number of creative thinking fundamental characteristics:

- Fluency: It is related to the number of different answers given to the required task. Each relevant answer would be considered as one point.
- Flexibility: It evaluates the “thinking” movement, the skill of moving from one category to another. It is related to the number of different used categories. Each different category would be considered as one point.
- Originality: It is related to the newness of the answers, and it is evaluated depending on the frequency of the answers in relation with the total given in the evaluated group.
- Such test would have an Inter-Judged reliability coefficient of .90 (Ferrando, 2006).

### 2.4. Procedure

First, through a selection process, it was decided which subjects would participate in the research. So as to do so, it was agreed with the Headmasters of the participant schools that an extracurricular activity would be offered, named “Learning and practicing mindfulness in the educational environment”, aimed for Latin American students currently attending First Year of Bachillerato. Of the 53 registered students, 49 became part of the research, as those who had previous experience with any relaxation activity, meditation, yoga, tai chi, etc. were not considered.

Once the control group and experimental group were ready, the pretest evaluation of the starting graphic creativity levels of each group, by means of the Torrance Test of Creative Thinking Graphic Battery in its A version.

Once such measuring is obtained, the intervention program was applied to the experimental group, consisting of learning a mindfulness technique, while the members of the control group were told that they will start the program in the third trimester of the academic year, as the person in charge of it was ill.

The applied intervention program lasted 10 weeks (the second semester of the academic year), with an hour and a half (1.5) session each week. The program applied to the experimental group consisted of learning and putting into practice for 30 minutes daily a mindfulness technique called Flow Meditation (Franco, 2009), whose main aim is not trying to control, modify and change thoughts, but on the contrary, to set them free, thus accepting any thought that might spontaneously appear. By means of this technique we do not aim to stop thinking and producing thoughts, but to develop a degree of attention and full consciousness towards such mental activity, being conscious of its transience and impermanence. Thanks to that, what would be essential would be not thoughts by themselves, but the fact that we are aware of them, without evaluating them, judging them or analyzing them, merely watching how they appear and disappear, while they happen.

After finishing the psychoeducational mindfulness program, the graphic creativity levels of the control and experimental group subjects were analyzed once again, by means of applying the B version of the Torrance Test of Creative Thinking Graphic Battery, so as to check if there were significant changes in the variables that were analyzed.

At the end of the research, all the subjects who took part in the research were informed of the objective of such research, as well as asking them their written consent so as to be able to use the gathered data, being the confidentiality and anonymity guaranteed. Once we finished the research, the group control also received the mindfulness program.

### 3. Results

So as to analyze the gathered data of the research, we used the statistical package SPSS v.19.0.

Table 1. Pretest and posttest average and standard corresponding to the control and experimental groups regarding fluency, flexibility and graphic originality variables

Variable	Pretest				Posttest			
	Control		Experimental		Control		Experimental	
	M	DT	M	DT	M	DT	M	DT
Fluency	22.62	5.56	20.97	6.16	24.11	5.09	30.03	5.09
Flexibility	19.49	4.98	20.65	5.26	20.24	5.29	23.16	5.76
Originality	14.89	3.56	13.24	3.23	15.34	4.02	20.82	4.53

In order to check the existence of statistically significant differences between the average scoring of the control group and the experimental group in each of the stages of the research, we used the non-parametric U test of Man-Whitney for independent samples, since the data did not matched the normal distribution of probabilities. After the statistical analysis for the pretest scoring, we can see how there are no starting significant differences in the research variables between the ones obtained by the control group and the ones obtained by the experimental group. However, there were significant statistical differences between the control group and the experimental group after checking the difference of average in their posttest scoring under the fluency variable ( $z=2.87$ ;  $p<0.005$ ), and originality ( $z=3.15$ ;  $p=0.001$ ) (see Table 2).

Table 2. Man-Whitney’s U test for independent samples of the pretest and posttest differences between the control group and the experimental group for fluency, flexibility and graphic originality

Variable	Pretest		Posttest	
	z	p	z	p
Fluency	.93	.341	2.97	.002**
Flexibility	.52	.581	1.16	.123
Originality	1.04	.163	3.15	.001*

Note: \*\* $p<.005$ ; \* $p<.01$

Afterwards, in order to check the existence of statistically significant differences between the measured pretest-posttest scoring for the variables fluency, flexibility and graphic originality both in the control group and the experimental group, we used Wilcoxon non-parametric test. Thanks to this analysis applied to the experimental group scoring, we obtained significant differences when comparing their pretest-posttest scoring in the fluency variable ( $z=4.51$ ;  $p<0.001$ ), the flexibility variable ( $z=2.04$ ;  $p<0.05$ ) and the originality variable ( $z=4.79$ ;  $p<0.001$ ). However, we did not see significant differences in the variables of the research when comparing the average pretest-posttest scoring of the control group (see Table 3).

Table 3. Wilcoxon test for related samples of the pretest-posttest differences in the control group and the experimental group

Variable	Control		Experimental	
	Z	p	z	p
Fluency	.91	.319	4.51	.000**
Flexibility	.36	.767	2.04	.039*
Originality	.73	.429	4.79	.000**

Note: \*\* $p<.001$ ; \*  $p<.05$

In order to measure the significance of the change occurred in the experimental group once the intervention program is finished, we used Cohen *d* (1988). Those values higher than 1.5 will show very significant changes, values between 1.5 and 1 will show significant changes, values between 1 and 0.5 will show medium changes, and values lower than 0.5 will show weak changes.

In Table 4, Cohen *d* scoring in the average pretest-posttest scoring in the experimental group shows the existence of very significant changes in the originality variable ( $d=1.92$ ), the fluency variable ( $d=1.60$ ); while there are weak changes in the flexibility variable ( $d=.46$ ) (see Table 4).

Finally, we calculated the change percentage of the pretest-posttest scoring in the experimental group, noticing how the originality variable increases 57%, fluency increases 43% and flexibility increases 12% (see Table 4).

Table 4. Cohen *d* and change percentage in the experimental group for fluency, flexibility and graphic originality variables

Variable	D	%
Fluency	1.60	43.2
Flexibility	.46	12.1
Originality	1.92	57.2

#### 4. Conclusions

After analyzing the results of the research, we can state that the initial hypothesis is confirmed, since the subjects of the experimental group have experienced a greater increase in the different evaluated levels of graphic creativity (fluency, flexibility and originality) if compared to the subjects of the control group.

There would be concordance between the obtained data and the data obtained by Travis (1979), who conducted a pioneering research, showing the existing relationship between mindfulness and creativity, through the application of a transcendental meditation program which led to significant improvement of the levels of fluency and flexibility of the participant subjects. There would be concordance also with various researches, subsequent to Travis', where the influence of mindfulness techniques upon the development of creativity can be observed (Dillbeck, 1982; Jedrczak, Beresford, & Clements, 1985; Orme-Johnson & Haynes, 1981).

Therefore, we can state that mindfulness techniques, and more specifically, Flow Meditation, is a technique whose continuous practice can lead to increase and improve the levels of creativity of those who practice it. This is because one of the results achieved through mindfulness techniques practices is to cease the constant, disorganized and chaotic stream of thoughts, which distracts us, making it difficult for us to pay attention and concentrate. Thus, when we focus our attention on something concrete, our level of creativity rises significantly, no matter which activity or task we are doing.

Besides, mindfulness techniques practice allows us to receive internal answers to any challenge or question that may appear, as we achieve a better development of attention to those mental processes which are used in a given activity.

In this research we have proved that the development of consciousness and attention, which we aim to achieve through mindfulness practice, is related to the creative skills of the individual, to our awareness, to being conscious and giving useful and satisfactory answers which rise from those and attention processes. Additionally, by means of the already mentioned practice, we train those mental activity and processes, strengthening all the cognitive skills through mental awareness training (Travis y Orme-Johnson, 1990). In this way, mindfulness is a technique which allows introspective and perceptual awareness, encouraging the awareness towards our psychological processes and habits. It increases the interhemispheric communication, which is typical of creativity states, since the individual who meditates is able to perceive more and more subtle details of the stream of consciousness and the mental processes.

In spite of being this research data quite positive and encouraging, we must analyze them cautiously. First of all, because the sample is relatively small, so we would need to confirm such results analyzing a bigger simple.

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