

Placebo Creativity. Implications in Education

Ioan Susnea¹, Simona-Mirela Susnea²

¹(Department of Computer and Information Technology, University "Dunarea de Jos" of Galati, Romania)

²(Center for Educational Resources and Support, CJRAE Galati, Romania)

Abstract:

Background: Though not fully understood, the placebo effect has been successfully used to reduce the symptomatology of certain medical conditions, or to enhance sportive and even cognitive performances. Here, we explore the possibility to use placebo for stimulating the creativity of the students in an educational environment.

Materials and Methods: Subjects (n=68) were asked to solve a sequence of three creativity tests, from which the second in sequence was a sham test indicating that they have a higher than average creativity. This acted as a placebo procedure. The first and last test were an adapted version of the Remote Associates Test (RAT) aimed to measure the creativity of the group before and after the placebo procedure.

Results: The experimental results, analysed with a paired samples t-test showed that the creativity of the subjects – as measured by the RAT test – significantly improved after the placebo procedure ($t(68)=4.692, p=0$).

Conclusion: Our experiment indicates that a simple placebo, disguised as a common assessment procedure, is capable to produce a measurable improvement of the creativity of the students. This suggests that other common assessment procedures may have a bigger than expected impact on the actual academic performances of the students.

Key Word: Placebo creativity; Education; Assessment; Creativity; Placebo effect.

Date of Submission: 28-10-2020

Date of Acceptance: 09-11-2020

I. Introduction

Creativity is now widely considered an important element of the social capital¹, linked to innovation², economic performance and growth. This implies the need for a systematic effort to foster creativity through education. While most researchers agree that creativity can be taught³, there are relatively few initiatives that go beyond theoretical considerations and attempt to develop educational content designed to improve the creativity of the students⁴.

In this paper, we address one of the simplest and least explored ways to stimulate the creativity: the placebo effect. Defined⁵ as “a genuine psychological or physiological effect, [...] which is attributable to receiving a substance or undergoing a procedure, but is not due to the inherent powers of that substance or procedure”, the placebo effect has been proven able to reduce pain⁶, and to improve physical⁷ and cognitive performances⁸.

The idea of a possible link between creativity and placebo came to us following a serendipitous event. Back in 2015, while working on a software instrument for automatic scoring a creativity assessment scale, a software bug made the application to erroneously report extreme values for the creativity quotient (CQ). We later noticed that the students who passed the biased test and received the maximum possible value for CQ (100 – corresponding to an exceptional, genius level, creativity) obtained higher scores at other – unbiased – creative thinking tests. It seemed a typical placebo effect applied to creativity. We searched the literature for similar reports, but, at that time, we found none. Therefore we concluded that our observation was coincidental, and suspended any further research on this topic.

It was only in 2020 that we stumbled upon an article¹⁰ of Rozenkrantz et al. (published in 2017) that describes an experiment specifically designed to demonstrate that placebo can enhance certain cognitive processes associated with creativity. In this experiment, the participants, randomly assigned to a control group and to a “placebo group”, were asked to smell and rate the pleasantness of an odorant. The participants in the placebo group were also told that the respective odorant is known to promote creative thinking. Then, all the participants completed three creativity tests, to which the placebo group obtained better scores. The authors concluded that placebo can improve the creativity, mainly in what concerns the originality of the solutions.

Encouraged by these findings, we designed an experiment aimed to be more easily applicable in the educational environment, wherein the placebo was administered by means of a sham creativity test.

Methods

Participants: The participants were 71 students (19 females and 52 males), aged 20-24 years (mean 21.8 years) in the fifth semester of study at the Department of Computer and Information Technology of the University “Dunarea de Jos” of Galati, Romania. They were all volunteers and no specific reward was offered for the participation in the study, except the promise that they will be able to find out more about their own creativity. Of these, 3 participants were removed before the actual data analysis: one seemed to have answered randomly to the tests, and two others were obvious outliers.

Study Design: All the communication between the experimenter and the participants took place online using the MS Teams platform. This was due to the restrictions imposed by the SARS-CoV-2 pandemic. The participants received three MS Excel sheets in the following order:

The first sheet contained 10 items of a Romanian version of the Remote Associates Test (RAT¹¹). Each item of this test consists in a series of three words, linked by a fourth word, which the user is prompted to find (e.g. the three words from the series: “cottage, french, cake” are linked by the word “cheese”). See also this study¹² for details on certain particularities of the Romanian version of RAT. Participants were instructed to write the linking word and to return the sheet within the time limit of 10 minutes. Each correct answer accounted for 1 evaluation point. The 10 items of RAT1 test are listed in Table 1.

Table no 1: Items of the RAT1 test sheet

Word series (Romanian)	Word series (English)	Accepted answers (Romanian)	Accepted answers (English)
Computer, amintiri, autobiografie	Computer, memories, autobiography	memorie	memory
Bautura energizanta, Zodiac, Toreador	Energy drink, zodiac, Toreador	taur	bull
Inger, Avion, Red Bull	Angel, plane, Red Bull	aripi	wings
Sanie, rosu, cadouri	Sleigh, red, gifts	Mos Craciun	Santa Claus
Plesuv, zbor, stema	Bald, flight, emblem	vultur	eagle
Acid, digestie, burduf	Acid, digestion, bellows	stomac	stomach
Palarie, matura, mantie	hat, broom, cloak	vrajitoare	witch
Placinta, burduf, mare	pie, bellows, big	branza	cheese
Adeziv, izolator, infractori	adhesive, insulating, law breakers	banda	band
Fantana, somn, apa	well, sleep, water	adanc	deep

The second sheet contained a sham creativity test with 10 items, each item consisting in a relatively well known quote or saying (e.g. the Murphy’s law). The participants were asked to indicate to what extent they agree with the respective statements, and the responses were collected by means of a 5-point Likert scale (1- totally disagree, 2 – disagree, 3 – neither agree nor disagree, 4 agree, 5 – totally agree). The list of items of the sham test are listed in Table 2.

Table no 2: Items of the sham creativity test

Alice: “How long is forever?” White Rabbit: “Sometimes, just one second.”
If anything can go wrong, it will.
A bit of adrenaline is always welcome. Life would boring without it.
The main cause of the divorce is marriage.
A subject interesting to the teacher will bore students
You can observe a lot by just watching
If you don’t know where you are going, you might wind up someplace else
My advice is to never listen to any advice, not even this one.
Life is tough, then you die.
A man's gotta do what he's gotta do

Note that the statements in Table 2 were selected so that most people tend to agree with them. The MS Excel sheet containing them automatically calculated and visibly displayed a score between 20 and 100 based on the users’ answers along with a highlighted text saying that scores above 50 indicate a very good creativity. The average score obtained by the experimental group was 68. The time allocated for this task was 10 minutes. Finally, the third sheet contained another set of 10 items of a Romanian version of the RAT test. They are listed in Table 3. The time allocated to this task was 10 minutes, so that the total duration of the experiment was 30 minutes.

Table no 3: Items of the RAT2 test sheet

Word series (Romanian)	Word series (English)	Accepted answers (Romanian)	Accepted answers (English)
Rotund, lumina,stralucire	round, light, radiance	soare, luna, bec	Sun, moon, light bulb
Amar, digestie,pietre	bitter, digestion, stones	bila, fiere	gall
Medicament, Infectie, Ac	medicine, infection, needle	injectie	injection
Dulce, Sfintit, lichid	sweet, holly, liquid	apa, vin	water, wine
Arome, duminica, sos	spices, Sunday, sauce	gratar	BBQ
Noroc, copii, video	luck, children, video	joc	game
Girafa, lantisor, teapan	giraffe, chain, stiff	gat	neck
Iubire, protectie, bucatarie	love, protection, kitchen	mama, familie, parinti	mother, family, parents
Sfarsit, Coasa, Negru	end, scythe, black	moarte	death
Rulment, Biliard, Loto	bearing, billiards, lotto	bile	balls

Basically, the experiment was intended to measure the creativity of the participants before and after the placebo was administered, so that the research hypothesis was that a placebo is capable to produce measurable improvement of the creativity as reflected by the RAT test.

Statistical analysis: A paired samples t-test was conducted (with SPSS) to compare the scores obtained by the participants before (RAT1) and after (RAT2) the placebo. The difference was significant $t(68)=4.692, p=0$. As expected, there was no significant correlation between the scores of the sham creativity test and the scores of RAT2.

II. Results

The scores of the RAT tests for the entire group of participants are presented in figure 1, along with basic statistics in Table 4.

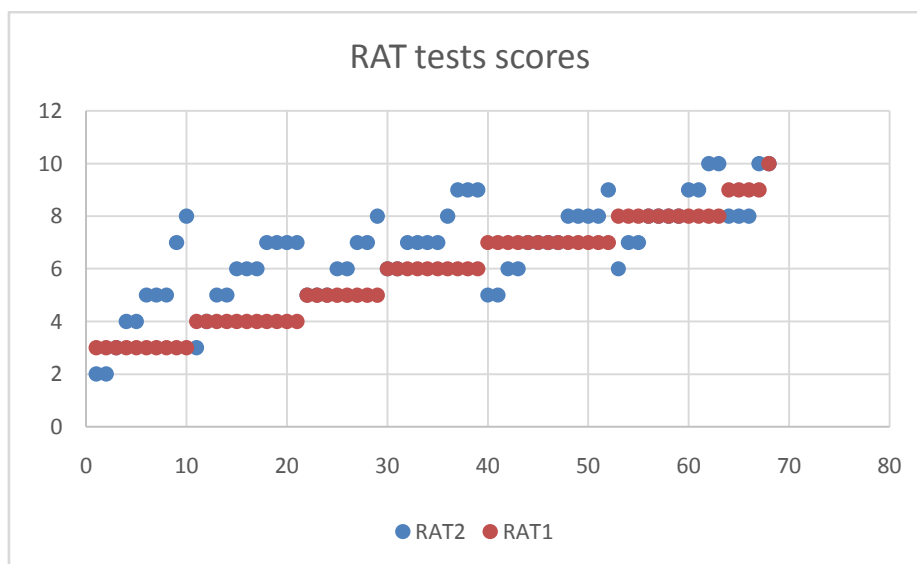


Figure 1: Results recorded at RAT tests (RAT1 before placebo, RAT2 – after placebo)

Table no 4: RAT1-RAT2 -Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	RAT2	6.7059	68	1.83709	.22278
	RAT1	5.8529	68	1.95673	.23729

The result of the paired samples t-test is shown in Table 5.

Table no 5: Result of the paired-samples t-test

		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	RAT2 - RAT1	.8529	1.49890	.18177	.4901	1.2158	4.692	67	.000

It appears that the research hypothesis is confirmed, and simple placebo procedures may produce measurable effects on the creativity of the subjects.

III. Discussion

Although neither creativity¹³, nor the placebo effect¹⁴ are fully understood, the idea that a procedure as simple as a sham creativity test may actually improve the creativity of the subjects is of particular interest for educators. They should be aware that there is also a dark facet of the placebo effect – the nocebo¹⁵ – a term that describes situations when the expectation of a negative outcome may aggravate a symptomatology. Our study suggests that the traditional system of educational assessment based on grades, which is seldom entirely objective, may have a higher than expected impact on the performance of the students. Maybe it should be replaced with new methods of monitoring and evaluation of the students' progress¹⁶, at least for some key disciplines.

We should also note two limitations of our study:

- Though widely used to measure creativity, the Remote Associates Test (RAT) is considered by some researchers¹⁷ more like a measure of intelligence and linguistic proficiency than of creativity. Moreover, the Romanian version of RAT has not been rigorously validated.
- We don't know how long the effect of the placebo on creativity is lasting. A follow-up experiment on the same group of subjects after several weeks will probably clarify this aspect.

IV. Conclusion

The experiment described in this work indicates that a simple placebo, disguised as a common assessment procedure, is capable to produce a measurable improvement of the creativity of the students. This suggests that other common assessment procedures may have a bigger than desired impact on the actual evolution of the students.

Further research is needed to estimate the duration of the placebo effect on creativity. We plan to replicate this study using other creativity assessment tools for a better understanding of the phenomenon.

References

- [1]. Westlund, H., Andersson, M., & Karlsson, C. (2014). Creativity as an integral element of social capital and its role in economic performance. In *Handbook of research on entrepreneurship and creativity*. Edward Elgar Publishing
- [2]. Amabile T.M., Conti, R., Coon, H., Lazenby, J., and Herron, M. (1996), 'Assessing the work environment for creativity', *Academy of Management Journal*, 39, 1154–1184.
- [3]. McWilliam, E. (2007). Is creativity teachable? Conceptualising the creativity/pedagogy relationship in higher education. In *Proceedings of the 30th HERDSA Annual Conference*: (pp. 1-8). Higher Education Research and Development Society of Australasia Inc
- [4]. Susnea, I., Pecheanu, E., & Tudorie, C. (2015). Initiatives towards an education for creativity. *Procedia-Social and Behavioral Sciences*, 180, 1520-1526.
- [5]. Stewart-Williams, S., & Podd, J. (2004). The Placebo Effect: Dissolving the Expectancy versus Conditioning Debate. *Psychological Bulletin*, 130(2), 324–340. <https://doi.org/10.1037/0033-2909.130.2.324>
- [6]. Price, D. D., Finniss, D. G., & Benedetti, F. (2008). A Comprehensive Review of the Placebo Effect: Recent Advances and Current Thought. *Annual Review of Psychology*, 59(1), 565–590. <https://doi.org/10.1146/annurev.psych.59.113006.095941>
- [7]. Beedie, C. J., & Foad, A. J. (2009). The Placebo Effect in Sports Performance: A Brief Review. *Sports Medicine*, 39(4), 313–329. <https://doi.org/10.2165/00007256-200939040-00004>
- [8]. Draganich, C., & Erdal, K. (2014). Placebo sleep affects cognitive functioning. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 40(3), 857–864. <https://doi.org/10.1037/a0035546>
- [9]. Susnea, I., & Vasiliu, G. (2016). A Fuzzy Logic Software Instrument and a New Scale for the Assessment of Creativity. *International Journal of Computers Communications & Control*, 11(3), 441. <https://doi.org/10.15837/ijccc.2016.3.2192>
- [10]. Rozenkrantz, L., Mayo, A. E., Ilan, T., Hart, Y., Noy, L., & Alon, U. (2017). Placebo can enhance creativity. *PLOS ONE*, 12(9), <https://doi.org/10.1371/journal.pone.0182466>
- [11]. Mednick, S. A. (1962). The associative basis of the creative process. *Psychological Review*, 69, 220–232. doi:10.1037/h0048850
- [12]. Oltețeanu, A.-M., Taranu, M., & Ionescu, T. (2019). Normative Data for 111 Compound Remote Associates Test Problems in Romanian. *Frontiers in Psychology*, 10. <https://doi.org/10.3389/fpsyg.2019.01859>
- [13]. Runco, M. A. (2008). Commentary: Divergent thinking is not synonymous with creativity. *Psychology of Aesthetics, Creativity, and the Arts*, 2(2), 93–96. <https://doi.org/10.1037/1931-3896.2.2.93>
- [14]. Murray, D., & Stoessl, A. J. (2013). Mechanisms and therapeutic implications of the placebo effect in neurological and psychiatric conditions. *Pharmacology & Therapeutics*, 140(3), 306–318. <https://doi.org/10.1016/j.pharmthera.2013.07.009>
- [15]. Benedetti, F., Lanotte, M., Lopiano, L., & Colloca, L. (2007). When words are painful: Unraveling the mechanisms of the nocebo effect. *Neuroscience*, 147(2), 260–271. <https://doi.org/10.1016/j.neuroscience.2007.02.020>
- [16]. Taras, M. (2002). Using Assessment for Learning and Learning from Assessment. *Assessment & Evaluation in Higher Education*, 27(6), 501–510. <https://doi.org/10.1080/0260293022000020273>
- [17]. Lee, C. S., Huggins, A. C., & Theriault, D. J. (2014). A measure of creativity or intelligence? Examining internal and external structure validity evidence of the Remote Associates Test. *Psychology of Aesthetics, Creativity, and the Arts*, 8(4), 446–460. <https://doi.org/10.1037/a0036773>