A CONTINUIST APPROACH TO PROMOTING CREATIVITY: GENERATING NOVEL METAPHORICAL EXPRESSIONS THROUGH VARYING CONCEPTUAL METAPHORS

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ABSTRACT

We carried out an experiment in which participants were asked to generate creative titles for essays. While the experimental group was trained in two heuristics consisting in the extension and reinstatement of conceptual metaphors (Lakoff & Turner, 1989), the control group had to generate creative titles using their natural resources. The titles generated via these heuristics were more creative than those generated by other means. It was also found that the explicit use of these heuristics produced more creative titles than their implicit use. We discuss the implications of these findings for the design of interventions aimed at stimulating creativity.

INTRODUCTION

Creativity is a psychological quality that every person possesses to a greater or lesser extent (Ward, Smith, & Finke, 1999). There is general agreement on the fact that creativity consists of the ability to generate products that are at the same time appropriate (i.e., useful, adaptive, concerning tasks constraints) and original (Amabile, 1996; Lubart, 1994). These products range from coming up with a joke to developing a scientific theory. As creativity is an individually and socially desired quality, many organizations and institutions search for methods to stimulate it (Sternberg & Lubart, 1995). Some approaches have considered that creativity involves thinking processes different from ordinary reasoning (e.g., processes of unconscious incubation, characterized by free association of ideas, restructuring processes leading to insight, divergent or lateral thinking, etc.; see Weisberg, 2006, for a review). These extraordinary processes are supposed to break away from traditional ways of problem solving and previous knowledge of the domain to which the problem pertains.

Different attempts at promoting creativity follow this approach (e.g., brainstorming,
lateral thinking techniques, synectics, for a review, see Nickerson, 1999; Weisberg, 1986). For example, the brainstorming technique supposes that the production of a significant amount of extravagant ideas, with no inhibition from critical judgment, is beneficial for creative thinking. This procedure favors the generation of original ideas that—with the necessary convergent adjustments—can yield creative results (Larey & Paulus, 1999). In general, these techniques presuppose that a way of stimulating creativity consists of breaking away from traditional problem solving strategies and certain domain specific knowledge that could be associated to fixations.

The idea that creativity implies the use of extraordinary thinking processes and the departure from dominant problem solving strategies and stored knowledge has been criticized by authors like Newell and Simon (1972), Perkins (1981), Weisberg (1986) and Ward (1994). Hofstadter (1985) and, more recently, Weisberg (2006), have supported the idea that creative products are the result of little and accumulative rational variations over well-oriented and accepted previous ideas.

As far as we know, there are no techniques or interventions aimed at stimulating creativity based on the idea of introducing adjustments to well established previous ideas. In this study we adopted this “continuist” approach to stimulating creativity and tested its usefulness in the domain of verbal production. After describing the content of an undergraduate psychology student essay, we asked participants (psychology students at university) to generate creative titles for it. For example, one of the essays depicted a discussion held by cognitive and psychoanalytic therapists at a conference. The discussion, which revolved around the efficacy of their techniques, had a clearly favorable outcome for the cognitive therapists. Participants had to entitle the essay emphasizing the success of the cognitive therapists. While an experimental group was trained in heuristics to generate metaphorical titles for the essays, a control group had to employ their natural skills to generate them. The heuristics used to train participants in the experimental group have been described by Lakoff and Johnson’s (1980, 1999) theory of conceptual metaphor (CM). They consist of deriving new metaphorical expressions (MEs) by performing variations on conventional CMs. We were interested in evaluating if those heuristics can be trained, and if they are useful to generate more creative titles than those naturally employed by people. For example, the article previously described could have been entitled with novel MEs like The psychoanalysts are recovering at the hospital or Cognitive chemical weapons destroyed psychoanalytic therapists. These expressions could be seen as new instances of a Spanish family of MEs, in which words corresponding to the domain of war are employed to talk about discussing (e.g., Mary won the discussion; Her arguments lost ground in the discussion, etc.). Such a cluster can be taken as a proof for the existence of a CM in Spanish speakers’ minds, that is, an analogy between the concepts of war (the base domain) and discussion (the target domain). A huge body of research demonstrates that there are a large number of such clusters and CMs, documented in many languages (Lakoff & Johnson, 1980; Gibbs, 2006). Some of the MEs previously presented are conventional (the later ones) while others are novel (the former ones). Lakoff and cols. (Lakoff & Johnson, 1980; Lakoff & Turner, 1989) have described two heuristics used by both experts and laypeople to generate novel MEs: extension and reinstatiation of CMs.

Normally, a CM supposes transferring only some of the aspects from the base domain to the target domain, while others are left aside (Lakoff & Johnson, 1980). In this way, in the DISCUSSION IS WAR CM, ideas such as that there are two confronted sides, and that they use weapons to defeat one another, are transferred from the base to the target domain. The usual transference is associated with conventional MEs, such as Mary used diverse weapons to win the discussion. There are certain
aspects of the base domain that are not usually transferred to the target, for example, the treatment received by wounded people. These *extensions* of the analogical mapping give rise to novel MEs such as *The psychoanalysts are recovering at the hospital*.

Lakoff and Turner (1989) postulate that the base domains have a generic structure that admits diverse specifications, some of them more typical than others. For example, in the DISCUSSION IS WAR CM the kind of war is not specified, supposedly being the war on land the most typical one. In this way, searching for new exemplars of war, such as naval war, guerrilla war, nuclear war, etc., could renovate the general CM and thus give place to new associated MEs. For example, a novel reinstatement of the source domain such as biological war may give rise to a novel ME like *Cognitive chemical weapons destroyed psychoanalytic therapists*.

For Lakoff and Johnson (1980), metaphor is primarily a conceptual and thinking phenomenon and only secondarily a linguistic one. In this sense, the generation of a verbal expression such as *The psychoanalysts are recovering at the hospital* should be viewed as a derivation of a creative analogical conceptualization act—a new way of viewing people that had lost a discussion derived from the DISCUSSION IS WAR CM—and not merely as a creative linguist production. In the same vein, the heuristics above described should be considered as “pushing an analogy” thinking mechanisms of creativity. For example, the mechanism of extension giving place to this ME could perhaps be considered as a case of analogical projection of candidates inferences, one of the multiple mechanisms implicated in analogical creativity (cf., e.g., Gentner, Brem, Ferguson, Wolff, Markman & Forbus, 1997). These mechanisms could give place to new MEs but also to other kind of products (e.g., drawings based on extended CMs). Although the role of analogy in creative science, design, art, etc., has received great attention (cf., e.g., Holyoak & Thagard, 1995; Weisberg, 2006), we know no studies about its role in creative verbal production.

As we previously stated, the main characteristics of a creative product are its originality and its adequacy. It would be desirable for a creative heuristic or technique to promote the generation of products that satisfy both aspects. Ward (1994) has shown that when confronted with the task of creating extraterrestrial creatures, professional science fiction writers invented characters that—although original in various aspects—maintained a high level of similarity with terrestrial animals. Ward (1999) considers this fact important in terms of its adequacy, since it allows the readers to relate new situations or products to those that are relatively familiar. In a similar way, the generation of MEs derived from a culturally shared CM can be a means to achieve novelty without sacrificing familiarity (the MEs that belong to a known CM are easy to comprehend since they are derived from a familiar and well-established CM). Gentner et al. (1997), sharing Ward’s point of view, state that at least some kinds of creativity heavily rely on prior structures and that “analogy is an engine of creativity because it provides a fair degree of structure while inviting some alteration” (p. 450; italics in the original). Maybe this is one of the reasons why, as some authors analyze (Gibbs, 1994; Lakoff & Turner, 1989; Turner, 1985), professional writers regularly employ these heuristics in their literary work. Achieving this balance between novelty and adequacy could also be important for a group of people exposed to a creativity task with which they have no prior experience. Actually, the explicit demand of coming up with creative ideas can become quite perplexing when no means or restrictions are specified.

In the experimental group we promoted the awareness of the extension and reinstatement heuristics, and we trained participants in their use. Afterwards, this group had to employ these heuristics in the title generation tasks. Participants in the control group had to carry out the same task using their natural abilities.
In the first place, we wanted to test if an intervention to stimulate the use of the heuristics would lead to a more frequent use of them. In the second place, we hypothesized that the titles generated using the heuristics would be more creative than those generated via other means.

The above heuristics are spontaneously employed by laypeople (Lakoff & Johnson, 1980, 1999; Lakoff & Turner, 1989). However, explicit training would promote a more conscious and controlled use of the mechanisms implied in extending and reinstating CMs. Many authors have suggested that making a procedure explicit can facilitate a better use of its creative potential, since it allows for better manipulation and metacognitive control (e.g., Karmiloff-Smith, 1990; Peterson, 2002). Opposed to this view, some authors like Hofstadter (1985) have suggested that the conscious and controlled use of a procedure can be detrimental, since the creative process consists of the flow of ideas at a subcognitive level. The second objective of our experiment was to determine if the titles generated by the controlled use of these heuristics were more creative than those produced via their spontaneous use.

METHOD

Participants and design

Thirty undergraduate students at Santa Fe Catholic University participated in the experience for course credits. They were randomly assigned to one of the two groups of the experiment. The independent variable was the kind of training that they received (training in the heuristics of extension and reinstatement of CMs, and no training). The dependent variable was the creativity of the titles that they produced.

Procedure and materials

The procedure was divided into three phases: training, practice, and application.

Training. After receiving a definition of the concept of metaphor, participants in the experimental group were presented with the main ideas of CM theory: The concept of systems of MEs, the concept of CM, the idea that only some of the base elements are mapped onto the target domain, and the schematic character of the base domains. Then, the above-mentioned heuristics for generating novel MEs were explained and exemplified. Subsequently, participants performed two training tasks where they had to identify MEs and point out the CM from which they were derived. Correct answers were provided. These tasks lasted approximately 60 min. After a break, participants were given four events (e.g., Peter and Mary's marriage does not make any progress) and were asked to generate four novel MEs for each one of them. This training session lasted 90 min. Two of those MEs had to be generated using the reinstatement heuristic and two using the extension heuristic. The CMs were given by the experimenter (e.g., LOVE IS A JOURNEY) along with three examples of conventional MEs for each CM. The necessary steps to apply the heuristics were presented in flowcharts that participants could consult at any moment. Although the training sessions were carried out in groups of three, participants worked individually. After completion of each task, the trainer provided feedback on the comprehension and use of the heuristics. The CMs used for this training session were different from the ones used in the first exercise and different from the ones used in subsequent phases. During the second day participants were trained in looking for CMs for target domains. Participants had to come up with at least 20 expressions about four topics (e.g., comprehension), point out those considered as metaphorical and identify its corresponding CM (in case there was one). As before, this was done in groups of three.
participants working individually. They received feedback about their comprehension of the concepts involved (i.e., CM, ME, etc.) and their performance. Participants in the control group received theoretical instruction and training about some creativity techniques to write short stories (none of those techniques stimulated or instructed about the use of metaphorical language or other verbal mechanisms that could be used to generate titles for essays). The way in which the training sessions were implemented and the time and distribution along the three days was exactly the same as in the experimental group.

Practice. When the training was completed, participants in both groups received, after a break, four entitling practice tasks. For each one of these tasks they read an abstract describing the salient aspects of a psychology essay written by an undergraduate student, and they had 10 min to generate as many titles as possible. Participants in both groups were asked to generate “creative titles”. However, participants in the experimental group were also asked to “use the heuristics of extension and reinstatement of CMs”. The titles had to be 10 words maximum. They were told the aspect of the text that should be highlighted by the title. In two of the tasks, participants in the experimental group were presented with the CMs out of which they should derive the metaphorical titles. In the other two tasks they had to identify the CM themselves, analyzing conventional MEs about the target domain. At the beginning of the third day, participants in both groups completed a multiple choice test on the instruction they had received during the first two days. The goal of this test was to discard from the analysis those participants who had not comprehended the concepts taught during the instruction. Since all the participants correctly answered more than 90% of the test, none of them was discarded from further analysis.

Application. Participants were presented with three titling tasks having the same structure as the ones presented in the practice sessions. Participants did not receive the CMs in any of the three tasks, that is, they had to identify them by their own means. The order of presentation of the three tasks was counterbalanced.

Data analysis

Two psychologists who knew in detail Lakoff and Johnson’s theory and were well aware of the dominant CMs of our culture—but did not know the purpose of the experiment—served as independent judges. They were instructed to classify the titles as follows: 1) literal titles (e.g., Cognitive therapists were better), 2) metaphorical titles not derived from a CM (e.g., Cognitive therapists robbed psychoanalysts), 3) conventional metaphorical titles derived from a CM (e.g., Psychoanalysts gave up the battle—DISCUSSION IS WAR CM), and 4) novel metaphorical titles derived from a CM (e.g., Psychoanalysts pulled out the white flag—DISCUSSION IS WAR CM). They classified the titles independently and they agreed in 79% of the cases. The disagreements were resolved by open discussion. To score the creativity of the titles three judges (people with a degree in Literature) worked independently. They were not told in which conditions participants had generated the titles. They received the same abstracts of the essays that were given to students and the aspect that participants should highlight in the title. The instruction was to evaluate the creativity of the titles using as reference the production of the sample and not general parameters of creativity (i.e., they were asked not to evaluate the titles comparing them to titles produced by experts). Thus, before starting the evaluation, they were presented with a sample of 20 randomly chosen titles to let them form an idea of the ability of the participants. To evaluate the creativity of the titles they used a 5 point Likert scale (1 = not creative, 5 = very creative). The instruction received by the judges was as follows: “You have to establish the degree of creativity of each title, using your
own subjective criteria of creativity”. The order of presentation of the titles was counter-balanced. The results of Cronbach alpha coefficient applied to the analysis of reliability between judges was 0.81.

RESULTS AND DISCUSSION

Our hypothesis was that, since participants were novice in verbal creativity, the awareness and training on creativity heuristics would be beneficial. We then predicted that the titles generated using these heuristics would be more creative than those (metaphorical or not) generated through other mechanisms. Considering each group separately, we analyzed if the novel metaphorical titles derived from a CM had been evaluated as more creative than those generated by other means. For the control group (see Figure 1), a one way ANOVA, with independent measures for the title type (literal, metaphorical titles not derived from a CM, conventional metaphorical titles derived from a CM, novel metaphorical titles derived from a CM) revealed a significant difference in the degree of creativity of the different types of titles, $F(3) = 4.21, p < .001$, $MSE = .408$.

The mean creativity score for novel metaphorical titles derived from a CM ($M = 3.28, DE = .59$) was higher than that of literal titles ($M = 2.74, DE = .66$), $t(126) = 3.44, p < .01$; higher than that of metaphorical titles not derived from a CM ($M = 2.89, DE = .61$), $t(47) = 2.28, p < .05$; and higher than that of conventional metaphorical titles derived from a CM ($M = 2.81, DE = .63$), $t(160) = 3.14, p < .01$.

In the experimental group (see Figure 2) a one way ANOVA showed a significant difference in creativity among the different kinds of titles, $F(3) = 18.19, p < .001$, $MSE = 0.481$. The mean creativity score for the novel metaphorical titles derived from a CM ($M = 3.66; DE = .69$) was higher than the mean score for the literal titles ($M = 2.80, DE = .78$), $t(92) = 4.81, p < .001$; and higher than the mean score for conventional metaphorical titles derived from a CM ($M = 2.93, DE = 0.70$), $t(175) = 6.94, p < 0.001$. However it was not significantly higher than the mean creativity score for metaphorical titles not derived from a CM ($M = 3.17, DE = 0.41$), $t(78) = 1.72, p = 0.08$ (although there was a trend).

In general, the data showed that the titles generated through mechanisms of extension and reinstatement of CMs were more creative than the titles generated by other mechanisms. Thus, we can conclude that when people are trained to generate novel verbal products via introducing variations on known cognitive structures (i.e., CMs), they can produce more
creative outcomes than the ones that would have been generated via their own natural means.

The manipulation of the independent variable consisted in making explicit the mechanisms of extension and reinstatement of CMs, as well as in training those procedures. Therefore, we were interested in finding out if participants in the experimental group had used those heuristics in a greater proportion than participants in the control group. The results showed that the percentage of novel metaphorical titles derived from a CM was higher in the experimental group (36.45%) than in the control group (6.69%), $\chi^2 (1, N = 502) = 68.44, p < .001$. The training sessions, which lasted only three and a half hours, can be considered a successful intervention, that could be improved with more practice and feedback.

The second goal of this study was to determine if the controlled use of the heuristics would result in titles that were more creative than those generated by the spontaneous (not trained) use of such mechanisms. We analyzed all the novel metaphorical titles derived from a CM, and compared those generated by the experimental group against those generated by participants in the control group. The titles generated by the experimental group ($M = 3.66, SD = .69$) were more creative than the titles generated by the control group ($M = 3.28, SD = .59$), $t(92) = 2.22, p < .05$. These results indicate that the metaphorical titles generated by participants who explicitly used the heuristics were more creative than those generated through an implicit use of those same mechanisms. As opposed to what has been proposed by authors such as Hofstadter (1985), our results seem to indicate that the conscious and controlled use of creativity mechanisms does not always have a negative effect on the generation of creative products. On the contrary, the data support the idea that the conscious and explicit use of those mechanisms can increase their creative power (Karmiloff-Smith, 1990; Peterson, 2002). Hence, we can conclude that the training fostered not only a more frequent use of the mechanisms of extension and reinstatement of CMs but also a better use of them.

A long tradition in creativity research defends the idea that creative products are the outcome of extraordinary thought processes. Creativity techniques associated to this conception were often directed to break away from known solutions within a domain, in favor of alternative possibilities (cf. Weisberg, 1996, 2006). Since Newell and Simon (1972), several theorists have resisted the extraordinary processes theory of creativity (e.g., Perkins, 1981; Weisberg, 2006), suggesting that creativity entails processes not different from those we use when solving everyday problems. Hofstadter (1985) and Weisberg (1996) advanced the thesis that creativity consists in applying minimal, accumulative and reasoned variations on previous ideas. In this experiment we tested the effectiveness of an intervention designed to enhance creativity based on this continuist perspective. Participants in the experimental group were trained in the generation of novel MEs through applying minimal variations to highly standardized cognitive structures in our culture (i.e, CMs). Products generated via this strategy were judged as more creative than those generated through other mechanisms. Furthermore, the products generated via the controlled and explicit use of this heuristic were judged as more creative than those arising from its spontaneous use. The results obtained seem promising regarding the possibility of training creativity from the continuist approach. Future studies should attempt to extend this perspective to new tasks and domains. Regarding the relationship between analogy and creativity, our results have shown that stretching pre-established analogies can be a useful means of generating creative verbal products. Further research would be needed to show the adequacy of this strategy for the generation of other kinds of products as well.
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REFERENCES


