Facilitating Creativity in Adult Learners Through Brainstorming and Play

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Abstract

Creativity has become a topic of ever-increasing interest in educational settings. The major findings arrive at two conclusions about creativity: (a) everyone possesses creativity and (b) creativity can be taught and developed. The major focus of creativity research, however, is on children rather than on adults. Thus, the purpose of the study was to examine the effects of brainstorming and play activities on adults' creative performance. Three major findings were found: males outperformed females in creativity; GPA played an important role in affecting creativity performance; and finally brainstorming and play had no effects on creativity in this experiment. Further research possibilities and implications were also discussed.

Key word: Creativity; Adult learners; Adult education; Brainstorming; Play

INTRODUCTION

Imagine that you take someone from the early 1900s and move into the present day. This time-traveler would be awestruck by a world filled with various wonders. This driving force stems from human creativity that contributes to this large-scale transformation. Florida (2002) predicted that in the near future the "creative class" will have a considerable impact on the society. He differentiated between the creative class and the working or service class by the nature of their work. The economic function of the creative class is to "create new ideas, new technology, and/or new creative content" (p. 8).

Creativity *per se* is a complex phenomenon and to date there is no one authoritative theory that could capture its myriad facets (Runco, 1999; Treffinger, 2009). Nevertheless, creativity is typically defined in terms of the manifestations of activity. Two attributes of creativity are widely supported by students of creativity: usefulness and uniqueness (Amabile, 1993; Treffinger, 2004).

Creativity has become a topic of ever-increasing interest in educational settings (Craft, 2003; Feldman & Benjamin, 2006). Several theories and empirical studies have offered various perspectives that illuminate creativity development (Baer & Garrett, 2010; Davis, 2004). The major findings of those studies arrive at two conclusions about creativity: (a) everyone has creativity (e.g., Cohen, 1989) and (b) creativity can be taught and developed (e.g., Basadur, Graen, & Green, 1982). Therefore, teachers serve as an imperative resource in facilitating students' learning experience and unleashing their potential in the classroom (Creme, 2003; Livingston, 2010). A key reason that creativity is an important subject in education is grounded in the belief that "fundamental to living in the conceptual age will be the use of creativity" (Warner & Myers, 2009, p. 29). As a result, one of the key responsibilities of teachers is to plant the creativity seed in students' minds (Baldwin, 2010; Nickerson, 2010). Above all, as Sternberg (2003) noted, "creativity is not just a matter of thinking in a certain way, but rather it is an attitude toward life" (p. 333). An ultimate goal for education is to help students develop their capabilities and in turn maximize their potential for practical use in everyday life.

Why is it necessary to foster creative thought? Why bother for adult learners? In fact, creativity is the driving force that brings the society moving forward (Hodder,

1988). The necessity of learning creative thinking for adult learners is rooted in the developmental issue and learning approach that serve as a useful vehicle for adult learners to polish their abilities (Simonton, 1990; Su, 2009; van der Veen, 2006). In today's postmodern world, change is the only thing that is certain (Shipton, Fay, West, Patterson, & Birdi, 2005). As a result, fostering creative thinking is essential for adult learners (Ross, 1976). How can teachers orchestrate students' creativity? This task might be an important mission in education fields. Teaching students to think creatively is perhaps an efficacious and comprehensive skill necessary to leading change in the future (Harding, 2010; Lee & Seo, 2006). Unlocking the power of imagination to transform creative thoughts into creative actions appears to become a significant part of the educational agenda.

The purpose of this experimental study was to examine the effects of brainstorming and play activities on adults' creative performance. The utilization of brainstorming and play is an attempt to foster creativity in adults. Hence, it is of interest to determine the extent to which the strategy affects the creative performance of adult learners. The main focus of the research is on two aspects of creativity: (a) a cognitive factor for divergent thinking (ideational creativity, Wallach & Kogan, 1965) and (b) an affective factor for imagination (playful mood, Russ, 1993).

1. METHOD

1.1 Research Design

The current research design was a quasi-experiment with a control group and three experimental groups. This study used a 2 x 2 (Brainstorming vs. No Brainstorming x Play vs. No Play) factorial design with two treatment variables (brainstorming and play) to examine simultaneous effects on an outcome (a creative collage).

1.2 Subjects

The participants were 46 adult students (above 25 years old) enrolled in four different classes at a southwest private university. The four classes were randomly assigned to the four conditions of the experiment. Two graduate level courses were included: Adult Learning and Development (eight students) serving as a play group, Practicum in Adult Learning Environments (11 students) serving as a control group. Another two undergraduate adult degree courses were recruited, Teambuilding in Organizations (ten students) serving as a brainstorming group, Human Resource Management (17 subjects) serving as the final group.

A total of 46 adults were recruited to participate in this study, with a mean age of 41.61 years ($SD = 10.01$, two values missing). The number of males ($n = 22$) and females ($n = 24$) are fairly equal. The demographic breakdown is as follows: one Asian, six African Americans, nine Caucasians, 27 Hispanics, and three mixed backgrounds. The majority were undergraduates (27), with a mean GPA of 3.60 ($SD = .33$, 13 values missing).

1.3 Treatments

1.3.1 Brainstorming Intervention

Participants were asked to use their imagination to list possible responses in the answer sheet within ten minutes. The instruction is as follows:

> An adult has a learning problem. The problem is he cannot focus in the classroom. That adult asks you for help to solve the issue. Now, please take a few minutes to think about possible ways to increase learning. You are asked to take ten minutes to list possible strategies for learning. Try to come up with a great number of ideas. Also try to think outside the box to list unusual ways of learning. Remember you have only ten minutes! Good Luck!

The main purpose of this activity is for ideation, which is defined as idea generation without evaluation; this is the divergent aspect of the process (Wallach & Kogan, 1965).

1.3.2 Play Intervention

Participants were asked to perform the "Play with Clay" task. Participants were given air-dry clay and they had 10 minutes to make a clay creation. Johnson, Christie, and Yawkey (1999) pointed out clay is an example of creative play under the category of educational play. They stated that "clay is natural material that is ideally suited for play. It is a workable substance that can be rolled, torn, meshed, pounded, or used with many other items" (p.294). For the purpose of the study, the adult participants were provided only clay as a stimulus for playful mood. The instruction is as follows:

> For this activity, you will be provided air-dry clay. In ten minutes you will be asked to craft your clay and the inspiration is "**Adult Learning**." Use your imagination and creativity for your clay creations and to think of things that no one else will think of. Before you start, there is one important point I should make. The purpose of this activity is to provide you with this experience so you can play with your ideas and have fun.

In terms of ideational strategies, the main idea of this task could serve as a stimulus and help students to elicit new and spontaneous ideational paths (Runco, 1990).

1.4 Measurement

1.4.1 The creative Collage-Making Task

Research has shown the effectiveness of collage on evaluating creativity in adults (Amabile, 1982; Amabile, Hennessey, & Crossman, 1986; Simpson, 2009). In the experimental design, in order to assess appropriately the effects of treatments on creativity, Amabile et al. (1986) suggested that "it is necessary that these activities not depend on special skills that would increase the probability of large individual differences in baseline performance" (p. 16). The collage-making activity could be viewed as a test of artistic creativity but it does not

depend heavily on drawing ability or technical skill.

For the purpose of this study, the adult learners were asked to create a collage for understanding their creative performance. Participants were given a set of pre-cut construction paper shapes with various colors, a bottle of glue, and a blank white paper. The materials each participant receives were identical. The time for this task was 20 minutes. The topic of the collage-making was "An Adult Learner in 2050." The instruction was given to participants as follows:

> You are invited to create a collage. You will be provided a set of pre-cut construction paper shapes in a variety of colors, a bottle of glue, and a blank white paper. You need to tear the paper with your hands and use the glue to complete the collage. The reason is that we want you to play with the material and have fun. The inspiration of the collage is "An Adult Learner in 2050." You will have 20 minutes to create your unique collage. Hope you enjoy this activity!

1.4.2 Assessment of the Creative Collage

The evaluation of the creative collage followed the procedure of Consensual Assessment Technique (CAT; Amabile, 1982, 1996). Kaufman, Lee, Baer, and Lee (2007) supported using the CAT in experimental studies for investigating creativity and declared, "for experimental studies designed to determine the impact of a wide variety of interventions, training, or experimental constraints, CAT ratings have been shown to work quite well" (p. 98).

Kaufman et al. (2007) suggested for evaluating the creativity of collages, judges should be recruited from "artists, art teachers, or art critics" (p. 104). Thus, the collages were rated for creativity by six experts in the domain (three faculties were from the Fashion department, two from the Art department, and the last has art background), all of whom worked independently of one another and with no knowledge of who create the collages. The essence of CAT is grounded in the fact that the definition of creativity will not be provided to panels of actual judges and is solely based on subjective knowledge of creativity in their fields.

The judges were in all cases ignorant of the goal of the study and did not know the participants of the current study. The judges knew that their evaluation was part of the study but were not aware of research questions guiding the research. The topic of collage given to participants was explained to the judges, and they were informed that the participants were all adult students. Three dimensions of products were evaluated: creativity, technical goodness, and aesthetics. The main reason to employ these three dimensions is to demonstrate discriminate validity of evaluating process. The judges were not be asked to explain or defend their ratings but to use their own personal sense of what is creative, technical, and aesthetics in the domain. As Kaufman and Baer (2012) noted, "according to the principles of the CAT . . . one must not . . . in any way train experts to make creativity judgments, or give them rubrics to follow in making such judgments, or in any other way interfere with their unfettered assessments of an artifact's creativity" (p.89). The instruction (adapted from Baer, 1993, p.103) was given to the judges in the grading sheet:

> There is no one criterion in rating these collages in terms of creativity. The topic of the collage is 'An adult learner in 2050.' For the purpose of this study, the researcher will not provide any criteria for you; rather you are asked to rate the collages solely on the basis of your thoughtful-but-subjective opinions of their creative products. You are asked to rate the **creativity, technical goodness, and aesthetic value** for the collage on a 5-point rating scale from 1(the lowest level of the dimension) to 5(the highest level of the dimension). Please circle the number on the grading sheet. Thank you.

1.5 Procedure

Four classes were involved to minimize contamination among subjects. All four classes were randomly assigned to experimental conditions. All experimental sessions were conducted in regular classrooms. Students received the tasks and work individually. There was careful supervision and no talking was allowed among participants. All participants were told that the experimenter was interested in the creative performance of adult learners like themselves, and that the activities they did would help the researcher understand this better. The informed consent form was given to participants before they engaged in the research. This form acknowledges that participants' rights were being protected during data collection. Participants were carefully debriefed after the data were collected.

Before the experiment, the researcher used the informed consent form to explain the purpose of the study and the procedure of the experiment. The researcher also answered any questions related to this study in order to clarify participants' concerns. After participants signed the informed consent form, the experiment started. For each session, the experimenter used salient instructions such as "use your imagination and creativity" to encourage participants to complete the tasks. When subjects finished the collage-making task, they were asked to give their background information. The overall design is shown in table 1.

Table 1
Experimental Design

Group	*n*	Procedure		Time
Experimental group				
Brainstorming	10	X_1	O	30min
Play	8	X_2	O	30min
Brainstorming & Play	17	$X_1 + X_2$	O	40min
Control group				
No treatments	11		O	20min

Note. X_1 = brainstorming treatment (10 min); X_2 = play treatment (10min); O = collage-making (20min) observation.

2. RESULTS

2.1 Correlation Among Variables

2.1.1 Bivariate Correlations

A Pearson correlation coefficient was calculated for the relationship between participants' age, GPA, creativity, technical goodness, and aesthetics. As table 2 shows, age was significantly related only to aesthetics, $r = .330$, $p < .05$. A strong positive correlation was found between GPA, creativity ($r = .397$, $p < .01$) and aesthetics ($r = .338$, $p < .05$). Creativity was significantly correlated with technical goodness, $r = .552$, and aesthetics, $r = .477$. Technical goodness was also significantly related to aesthetics, $r = .718$, $p < .01$.

Table 2
Intercorrelations Among Age, GPA, Creativity, Technical Goodness, and Aesthetics

Variables	1	2	3	4	5
1. Age	--				
2. GPA	.145	--			
3. Creativity	.245	.397**	--		
4. Technical goodness	.277	.276	.552**	--	
5. Aesthetics	.330*	.338*	.477**	.718**	--

* $p < .05$.
** $p < .01$.

2.2 Group Differences

2.2.1 Gender

Independent t-test was calculated to compare two means of creativity, technical goodness, and aesthetics between males and females. On average, as shown in table 3, male students had higher creativity scores ($M = 3.07$, $SD = .78$) than their counterparts ($M = 2.66$, $SD = .12$). This difference was significant, $t (44) = 1.99$, $p = .05$, representing a medium sized effect $d = .77$. In terms of technical goodness and aesthetics, there were no significant differences between males and females.

Table 3
Gender Differences for Creativity, Technical Goodness, and Aesthetics

Variable	Male ($n = 22$)		Female ($n = 24$)		t (44)	p	Cohen's d	95%CI
	M	SD	M	SD				
Creativity	3.07	.78	2.66	.12	1.99	.053	.77	[-.01, -.82]
Technical goodness	2.75	.50	2.83	.71	-.46	.649	.13	[-.45, .28]
Aesthetics	2.81	.44	2.78	.75	.18	.856	.05	[-.33, .40]

2.2.2 Two treatments.

In order to investigate the possible interaction effects of brainstorming and play on creativity, two-way ANOVA was run. As table 4 indicates, there was no significant interaction effect between brainstorming and play on creativity, $F (1, 42) = 0.05$, $p = .819$, $r^2 = .001$. Figure 1 shows this parallel pattern denoting no interaction effect. It also illustrates that non-treatment groups had higher creativity scores than treatment groups. There was a non-significant main effect of brainstorming on creativity, $F (1, 42) = 3.11$, $p = .085$, $r^2 = .069$ and play on creativity, $F (1, 42) = 0.50$, $p = .485$, $r^2 = .012$.

Table 4
**Summary Table for Two-Way Analysis of Variance of the Effects of Brainstorming and Play on Creativity**

Source	df	SS	MS	F	P	η^2	Observed Power
Brainstorming	1	1.56	1.56	3.11	.085	.069	.406
Play	1	0.25	0.25	0.50	.485	.012	.106
Brainstorming × Play	1	0.03	0.03	0.05	.819	.001	.056
Within-cells error	42	21.06	0.50				

*Note*. $R^2 = .092$ (Adjusted $R^2 = .028$).

Because the relationship between GPA and creativity was significant, GPA was treated as a covariate for further analysis. Two-way analysis of covariance, controlling for the effect of GPA, was tested. The results shown in Table 5 indicate that the covariate, GPA, was significantly related to individuals' creativity performance, $F (1, 41) = 4.22$, $p < .05$, $r^2 = .093$. As the GPA increases, so does creativity. However, there was no significant interaction effects (see figure 2) and main effect of brainstorming and play on creativity.
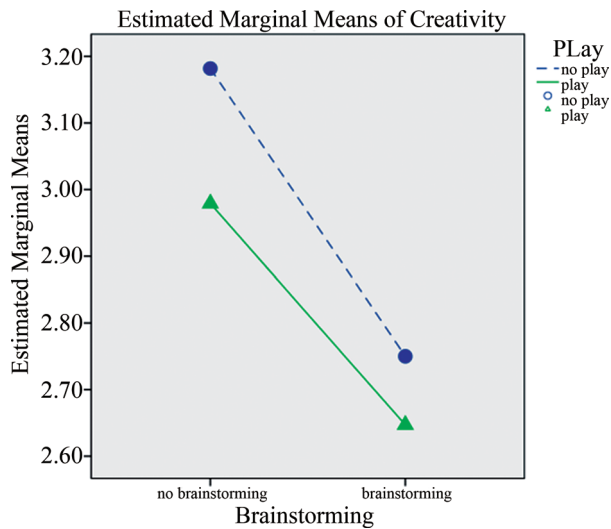
Figure 1
Graphical Displays of Interaction Effects of Brainstorming and Play Across Groups.

Covariates appearing in the model are evaluated at the following values:GPA=3.6098
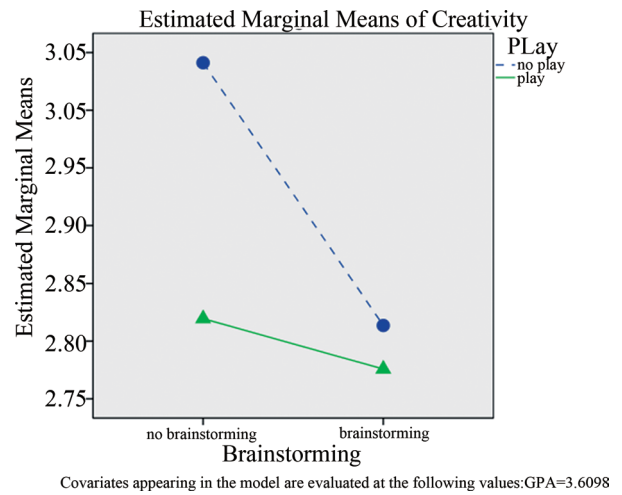
Figure 2
Graphical Displays of Interaction Effects of Brainstorming and Play With GPA As A Covariate.

Table 5
Analysis of Covariance for Two Treatments, With GPA as Covariate

Source	df	SS	MS	F	p	η^2
GPA (covariate)	1	1.96	1.96	4.22	.046	.093
Brainstorming	1	0.15	0.15	0.32	.576	.008
Play	1	0.18	0.18	0.39	.539	.009
Brainstorming × Play	1	0.09	0.09	0.19	.664	.005
Error	41	19.09	0.47			

Note. $R^2 = .117$(Adjusted $R^2 = .097$).

3. DISCUSSION

The current study used a collage-making task as an indicator of creative performance. The main reason for using collage rather than other tasks (e.g., story-telling, poetry, problem-solving) is because the collage is easy to construct. As Butler-Kisber and Poldma (2010) pointed out, "making a collage is not daunting because everyone, whether a novice or veteran, can cut and paste and ultimately gets a sense of satisfaction with the product" (p. 5). In addition, because there were international students involved in this experiment, in order to keep the baseline equal among subjects, the choice of collage minimizes language issues.

This study represents a quantitative investigation of the effects of brainstorming and play on adults' creativity. The main purpose of using the field experiment rather than the laboratory experiment is the belief that context should be taken into consideration while using different approaches to promoting creativity. The outcomes of this analysis support and extend beyond previous studies in uncovering the impact of brainstorming and play on adults' artistic creativity. The present study enhances the previous findings by providing a much more detailed examination of the effects of cognitive and affective perspective on creativity. As Schmidt (2006) wrote, "creativity is not only thinking outside the box but also feeling emotions outside the box" (p. 31). Thus, this study may lead to a better understanding of these two factors on the development of creativity.

The analysis of creativity performance yielded different results for males and females. This study suggests that gender differences using CAT to evaluate creativity in terms of collage do exist. Male adults excelled females in creative performance of collage-making tasks; however, from a technical and aesthetics perspective, there was no difference between the two groups. This finding is not consistent with other studies (Baer & Kaufman, 2008; Kogan, 1974). However, a number of studies show that males outperform females in creativity (e.g., He & Wong, 2011; Stolitzfus, Nibbelink, Vredenburg, & Thyrum, 2011). It is possible that males have a tendency to demonstrate boundary-breaking thinking (He & Wong, 2011), so that when they created a collage, the structure of pictures was more abstract and original. As a result, judges evaluated those collages with higher creative scores. It is speculated that when participants were forced to use their hands instead of a pair of scissors to construct collages, male adults more easily accept the conditions that create imperfect shapes; thus, they could focus on the task itself.

Another major finding is that academic performance and creativity have a positive relationship. Based on analysis of covariance and path analysis, GPA serves as a significant factor in affecting creativity performance.

However, this conclusion is tentative. Because of several missing values in the data, a process of imputation was used to substitute these values. Further, the use of GPA as the sole index of traditional intelligence is problematic in reaching a conclusion.

The results of brainstorming and play are unexpected that neither main nor interaction effects were found in this field experiment. Most importantly, the results indicate that brainstorming has a notable detrimental effect on creativity in regard to collage makings. One explanation for the insignificant difference between groups and no effects of brainstorming and play might be due to insufficient effect size or low statistical power. Small and unbalanced sample sizes per condition (e.g., $n = 8$ in play group) might lead to this result and then affect the identification of true effects of treatments.

This unexpected finding is also consistent with observations of creativity that people vary substantially in their willingness to engage in creative production and they do not conscious commitment in novelty (Litchfield, 2009). This issue may be more difficult when an educator promotes creativity for adult learners, because adult theorists have pointed out that they are more complex than children (Brookfield, 1986; Taylor, Marienau, & Fiddler, 2000). Therefore, greater efforts and more time may be needed to activate creative potential in adults. Torrance and Safter (1990) argued that the fundamental first stage of promoting creative thinking is to heighten anticipation; thus, a warm-up process is necessary to encourage creative behavior and stimulate attention, curiosity, and imagination. It might be beneficial to use warm-up activates before conducting this experiment thereby enhancing creative performance.

The insufficient time of treatments might contribute another factor affecting the result. In fact, creativity training or interventions in numerous empirical studies spanned a timeline from about one hour to one semester (Mansfield, Busse, & Krepelka, 1978; Puccio, Firestien, Coyle, & Masucci, 2006). Brainstorming and play activity in this experiment, as stimuli in the study, lasted only 10 minutes. Participants might need more time to be exposed to this kind of treatment. The last possibility might stem from the nature of the treatments. It is possible that brainstorming and clay may not be reliable and effective interventions to activate artistic creativity. Future studies could investigate alternative interventions to facilitate this kind of creativity.

This study confirms the idea of a holistic picture of creativity; that is, for judges, technical and aesthetic qualities are also important attributes of creativity. In fact, several judges mentioned the importance of these two qualities in their evaluation of creativity. This finding also reflects the widespread agreement of the definition of creativity: novelty and usefulness. It should be noted that for scientific creativity, usefulness might be defined as practicality and effectiveness. However, in artistic creativity technical goodness and aesthetics might be viewed as a perspective of usefulness.

3.1 Implications for Practitioners

Three practical implications of the results of the present study are noteworthy. The most important pedagogical implication is that it is valuable to bring different approaches and stimuli to the classroom. It was observed that adults enjoyed those activities while conducting this experiment. Some requested that one of the instructors to introduce other interesting activities. After debriefing, the majority of participants gave positive feedback regarding their experience with those activities.

Pleasure mood is another spotlight of this study. Air-dry clay is specifically used for the purpose of stimulating subjects' playful mood. This implication indicates that when teachers practice different approaches for encouraging meaningful leaning, cultivating an enjoyable environment should be considered. Beyond the classroom, findings also suggest that managers seeking to bolster creativity in their employees, teachers desiring to elevate creative problem-solving among their students, and parents striving to nurture artistic talents in their children need to harmonize their mood inductions to the ways they frame the tasks their employees, students, and children perform. It is important to shape the task as an enjoyable and interesting activity.

Throughout the analyses the researcher found that school settings serve as a key learning opportunity for adults. This finding has implications for practice, in that it supports the belief that creativity can be increased in proper training and environments. What this study has shown is that practitioners and researchers need to pay more attention to creativity development in the nonformal and informal learning context (Merriam, Caffarella, & Baumgartner, 2007). Perhaps because of the relative ease of access to older adults in formal learning, as Chen, Kim, Moon, and Merriam (2008) found, the majority of adult research focuses on the context of formal learning. By recognizing the potential benefits of creativity for lifelong growth and development, practitioners and researchers could look to these two contexts for ways to promote creativity. As Houtz and Krug (1995) stated, "from the cognitive view, stimulation activities [e.g., creativity training] involve individuals in real-life activities which are complex and meaningful" (p. 294). Adults learning opportunities not only happen in the classroom, but also more frequently occur in nonformal or informal situations. Creativity development could serve as useful stimuli and training for adults coping with serious, meaningful, complex, messy, and real-life problems.

3.2 Conclusion

Although unexpected results were found, the current research makes some contribution to the development of

creativity in adults. Nickerson (1999) acknowledged that "there is no easy, step-wise method that is guaranteed to enhance creativity to a nontrivial degree" (p. 420). The outcome of this experiment cannot be taken as definite proof that brainstorming and play fail to promote creativity. The findings raise at least two important issues for the interpretation of the efficacy of brainstorming and play on creativity, namely: (a) the extent to which stimuli might be powerful enough to foster creativity, and (b) the very brief experimental situation that does not provide enough opportunity or time for individuals to create truly creative collages. It should be stressed that the validity of any experimental study is limited by the scope of the experiment. Thus, the generalization of the results to other populations with different backgrounds may be needed.

The fundamental question in this study is how educators can help adult learners sharpen their creative minds so that they can advance more rapidly and less laboriously. With an increasing population of older adults, "it is becoming crucial to develop the capacities of older people to the fullest, which suggests the significance of maintaining and enhancing the individual's creative interests in adulthood and old age" (Alpaugh, Parham, Cole, & Birren, 1982, p. 114). As a society, we could benefit from the integration of creativity into curricula and learning opportunities through education. Future research may find it profitable to search bona fide creativity training (creative thinking) that is suitable for adults. As Capps's (2012) wrote, it is important to "initiate and sustain the creativity of older adults, as it inspires not only the capacity to see the world as it manifests itself, but also to foresee the world as it may reveal itself in the future" (p. 648).

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