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Effects of a Creativity Training Program on Divergent Thinking Abilities and Self-Concept in Monolingual and Bilingual Classrooms

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ABSTRACT: This study investigated the effects of a creativity training program, New Directions in Creativity, on students' divergent thinking abilities and self-concept in monolingual and bilingual elementary classrooms. The sample included 8 monolingual and 6 bilingual classrooms from a school in New England. The bilingual classrooms consisted of Brazilian students. Descriptive discriminant function analyses were used to investigate differences between treatment and control groups with respect to divergent thinking abilities and self-concept. Qualitative procedures were used to analyze data from interviews with teachers and students who participated in the program. The findings indicated that the creativity program slightly improved the divergent thinking abilities of students in the treatment group. The results also indicated that the effect of the creativity program on the self-concept of students in the treatment group was small, and the control group students experienced a decline in self-concept between pretest and posttest. Placement in monolingual or bilingual classrooms was not related to students' divergent thinking abilities and self-concepts. Qualitative analyses generated 3 core categories that help explain how the creativity training program and the school environment influenced students' divergent thinking abilities and self-concept: (a) the implementation of the creativity training program, (b) the degree of bilingualism of Brazilian students, and (c) cultural issues.

Interest in creativity as an area of educational research began in the second half of the 20th century. Since then, creativity research has had an impact on educational objectives, teaching strategies, and administrative practices (Torrance, 1983). Educators have emphasized the importance of promoting favorable conditions for developing the creative potential of students, and several studies have suggested ways to cultivate creativity in an educational environment (Daniels, 1997; Fleith, 2000; Piirto, 1992; Starko, 1995; Sternberg & Williams, 1996; Timberlake, 1982; Torrance, 1983; Westberg, 1996).

¹ This study was implemented as a doctoral investigation by Denise de Souza Fleith.

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With current advances in the study of creativity, many misconceptions have been dismantled. For example, although creativity was viewed as being based exclusively on internal factors, recent studies (Amabile, 1996; Csikszentmihalyi, 1996) have shown that the environment also has a strong impact on creative production. The notion that creativity is a gift present in some individuals has been effectively called into question by the expansion of several training programs around the world in which the main goal is to enhance creative thinking abilities (Alencar, Fleith, Shimabukuro, & Nobre, 1987; Necka, 1992; Parnes, Noller, & Biondi, 1977; Renzulli, 1973, 1986; Torrance, 1979).

For the past 30 years, educators and psychologists have developed different techniques and instructional materials to facilitate the expression of creativity. As Rose and Lin (1984) said: “All the approaches share a common premise that training, practice, and encouragement in using creative thinking skills can increase the degree of creativity manifested by individuals” (p. 11). Views about the effectiveness of major creativity training programs are presented in Table 1.

The studies suggest that training does affect creativity. Moreover, the results indicate that verbal creativity is affected more by creativity training programs than is figural creativity. According to Rose and Lin (1984), this disparity can be explained by the verbal nature of the programs. In addition, Torrance (1972) highlighted:

The most successful approaches seem to be those that involve both cognitive and emotional functioning, provide adequate structure and motivation, and give opportunities for involvement, practice, and interaction with teachers and other children. (pp. 132–133)

These findings reinforce the idea that the curriculum developed in the schools should include training in a variety of creative thinking tasks. Improving students’ creative thinking and problem-solving abilities, cultivating an awareness of creativity, and molding creative attitudes are both important and viable educational goals (Davis, 1992; Treffinger, 1986).

It is also posited that the creativity construct includes cognitive and affective components (Arieti, 1976; Davis, 1992; Houtz, Jambor, Cifone, & Lewis, 1989; Martindale, 1989; Russ, 1996, 2000–2001; Starko, 1995; Tardif & Sternberg, 1988; Vernon, 1989). However, clear empirical evidence is not available about the relationship between creativity and affective variables, especially with respect to self-concept (Dowd, 1989; Gilbert, 1991; Schubert & Biondi, 1977; Sexton, 1984; Williams, Poole, & Lett, 1977).

The relationship between self-concept and creativity has been the focus of many studies. In the 1950s, investigations about the characteristics of creative individuals indicated that highly creative individuals had stronger self-concept than their less creative peers (Barron, 1969; Getzels & Jackson, 1962; MacKinnon, 1962). However, although some studies have pointed out that there is a strong, positive relationship between self-concept and creative behavior (Felker & Treffinger, 1971; Sears, 1963; Smith & Tegano, 1992), different findings have also been reported (Deo & Mohan, 1972; Fabrizi & Pollio, 1987; Sexton, 1984; Williams et al., 1977).

Table 1. Summary of Research on the Effectiveness of Major Creativity Training Programs

Program	Study	Findings
Creative Problem-Solving Program (CPS)	Torrance (1972)	Twenty-two studies using combinations of techniques based on CPS indicate that this program achieved some degree of success in enhancing creative abilities.
	Rose & Lin (1984)	CPS has a consistent impact on creative thinking abilities (effect size $SD = .629$). The most powerful effect of CPS seemed to be on verbal creativity.
	Mansfield, Busse, & Krepelka (1978)	The results of studies on CPS have been favorable due to massive sample attrition and exclusive use of CPS investigations with high school and college students rather than across the full range of young students and adults.
The Productive Thinking Program	Treffinger & Ripple (1971), Torrance (1972)	The analysis of the results of six studies did not offer support for the effectiveness of the program. The findings of seven studies indicated that the program was effective, especially when teachers were actively involved in the program.
	Rose & Lin (1984)	The program accounts for only 1% of the variance in scores of creative thinking abilities.
	Mansfield, Busse, & Krepelka (1978)	The analysis of the results of six studies did not offer support for the effectiveness of the program.
The Purdue Creative Thinking Program	Feldhusen, Treffinger, & Bahlke (1970)	The findings supported the effectiveness of the program, indicating that children who received the instructional materials made highly significant gains on creative abilities when compared to children in the control group.
	Alencar (1974)	Fourth- and fifth-grade Brazilian students who received training obtained significantly higher scores on figural and verbal fluency, flexibility, and figural originality than students who did not receive training.
	Torrance (1972)	Positive effects of this program were found on divergent thinking scores as reported in seven studies involving elementary grade students.
	Rose & Lin (1984)	The practical significance of the program is low (effect size $SD = .329$).
	Mansfield, Busse, & Krepelka (1978)	The program has limited effectiveness. Methodological problems in studies using this program, such as inadequate unit of analysis, lack of randomization, and lack of control group, were pointed out.
New Directions in Creativity	Callahan (1973)	The program has an overall effect on students' creative thinking, but this effect is modified by their teachers and classroom environments.
	Ford & Renzulli (1976)	Significant differences were found between the experimental and control groups.
	Lowery (1982)	Results indicated that students trained on this program scored lower on creative thinking tests than students trained on guided fantasy trips with music.

Many studies have evaluated the impact of creativity or enrichment programs on self-concept and the creativity of students. The results have shown an improvement in creative abilities but no significant changes related to self-concept (Blankenship, 1975; Camp, 1994; Kolloff & Feldhusen, 1984; Meador, 1994). Bennett (1982) obtained interesting results with respect to the influence of a creative experience in drama on the creativity and self-concept of fifth- and sixth-grade students. In this study, the treatment group had a significant gain in creativity, whereas the control group experienced a decline. However, both treatment and control groups experienced significant gains in self-concept. Fults (1980) investigated the effectiveness of an instructional program for developing creative thinking, positive self-concept, and leadership among intellectually and academically gifted students in Grades 4, 5, and 6. The intervention process included stimulation of individual interest, provision of enriched experiences, and emphasis on the development of cognitive and affective skills. The treatment group improved with respect to creativity, whereas the control group showed gains in self-concept. Finally, Olenchak (1995) investigated the effects of a highly structured, personally tailored enrichment program on self-concept and creative productivity of fourth-, fifth-, and sixth-grade gifted and learning disabled students. Results suggested that yearlong participation in the program had a significant positive impact on self-concept and creative production of the students sampled in this study.

It is clear that further research is necessary to investigate the extent to which self-concept and creativity are related to better advise teachers with respect to educational strategies that can enhance both creativity and self-concept of students. Despite recognition of the importance for fostering students' creative potential, teachers often give priority to the development of logical thinking that emphasizes knowledge, recall, and reproduction (Fryer & Collings, 1991; Furman, 1998; Westby, 1997; Westby & Dawson, 1995). In this regard, it is important for teachers to learn how to implement educational strategies that promote the development and expression of students' creative abilities.

In addition, few attempts have been made to investigate the effects of a creativity training program on individuals from different linguistic and cultural backgrounds (Jellen & Urban, 1988; Torrance, 1973, 1979). According to Hunsaker and Frasier (1999), research on creativity among culturally diverse populations was based exclusively on status variables such as economic deprivation, geographic isolation, and linguistic and ethnic differences. On the other hand, little attention has been given to variables such as language proficiency, degree of acculturation, or contextual differences among cultures in their responses to changing conditions in the environment. As pointed by Raina (1993), most of the studies in creativity do not provide insights

as to how creative development is affected by sociocultural conditions and how creativity has fostered the cultural change process and how creativity has been facilitated by such changes . . . it will be interesting to explore whether the interface between two or more cultures has the potential for emergence of creativity. (p. 450)

Language, as a vehicle of culture, can shape creativity (Lubart, 1999). In this regard, many studies have evaluated the relationship between bilingualism and creativity (Carringer, 1974; Corbett, 1990; Jacobs & Pierce, 1966; Janssen, 1969; Kessler & Quinn, 1987; Konaka,

1997; Landry, 1968; Martorell, 1991; Okoh, 1980; Ricciardelli, 1992; Stone, 1992; Torrance, Gowan, Wu, & Aliotti, 1979; Wang, 1982). The majority of these investigations have reported that bilingual people have higher performance on divergent thinking measures when compared to monolingual people, suggesting a positive relationship between bilingualism and creativity. According to Lubart (1999), bilingual people may have a more flexible approach to the world, a greater diversity of associations to the same concept, tolerance for ambiguity, and diverse ways to encode and access knowledge when compared to monolingual people. In addition, they usually participate in activities involving two cultural groups, as opposed to monolinguals. However, it is important to note that significant differences were not obtained on all creative ability measures (e.g., verbal and figural fluency, flexibility, originality, and elaboration). A specific pattern was not identified that could characterize the superior performance of bilingual people. The individuals in the studies listed earlier could be grouped in two categories: (a) immigrants who speak a second language and (b) children who learn a foreign language in their own country. Because of this, cultural background should be considered when examining research about bilingualism and creativity.

Research Questions

In an effort to address some of the unanswered questions about the development of creativity and its relation with self-concept and bilingualism, a study was designed to compare performance in various types of treatment groups with the performance of the control group. The following questions served as the focal points for this research.

- To what extent can differences between treatment groups (i.e., treatment and control) be explained by variations in divergent thinking abilities and type of classroom (i.e., monolingual or bilingual), after adjusting for initial differences in divergent thinking abilities?
- To what extent can differences between treatment groups (i.e., treatment and control) be explained by variations in self-concept and type of classroom (i.e., monolingual or bilingual), after adjusting for initial differences in self-concept?
- What aspects of the creativity training program appear to influence students' divergent thinking abilities and self-concept?

Therefore, the purpose of this study was to investigate the effects of a creativity training program, developed by Renzulli (1973, 1986), on divergent thinking abilities and self-concept in monolingual and bilingual classrooms. This study assessed changes in divergent thinking abilities and self-concept of students in monolingual and bilingual classrooms after teachers received staff development training on classroom creativity strategies and conducted creative thinking activities in their classrooms.

Methods and Procedures

Participants

A pretest–posttest control group design (Gall, Borg, & Gall, 1996) using a sample of intact groups was used in this study. Qualitative methods were used to address the third research

question. The sample included 69 third graders, 72 fourth graders, and 76 fifth graders distributed in 14 classrooms from a suburban elementary school in New England. Almost half of the sample ($n = 90$) were bilingual students—Brazilian immigrants who spoke both English and Portuguese (their native language). Brazilian students in this school were placed in bilingual education classrooms. When classroom teachers determined that students' English was adequate, students were placed in monolingual classrooms in which the population is primarily students who speak English only. Prior to this study, 5 Brazilian students from Grades 3 through 5 were mainstreamed into English-only classrooms, and 2 were moved from bilingual to monolingual classrooms during the course of this study (February to May 1998). The school had 2 bilingual classes each for Grades 3, 4, and 5. The school also had three 3rd-, two 4th-, and three 5th- grade monolingual classes. The academic content was the same in all classes.

The sample consisted of 121 boys and 96 girls ranging in age from 8 to 12 years old. Most students in the monolingual classrooms had been enrolled in this school since kindergarten, but the entrance date for Brazilian students varied from kindergarten to Grade 5 because of the continuous immigration process of the Brazilian population.

According to the principal, most students in the school lived in upper-middle-class neighborhoods; however, the Brazilian children's socioeconomic status was considered in transition. For example, the vast majority of the Brazilian children were in the federal free lunch program (65% to 70%), whereas only a few of the non-Brazilian children participated in this program (10%).

Students from 6 bilingual ($n = 90$) and 8 monolingual ($n = 127$) classrooms participated in this study. Three bilingual and 3 monolingual classrooms (1 classroom per grade) constituted the treatment group. The remaining classrooms, 3 bilingual and 5 monolingual (including two 3rd-, one 4th-, and two 5th-grade classrooms), constituted the control group. Classroom teachers were randomly assigned to treatment and control groups. Classroom teachers in the treatment group from a nonbilingual and a bilingual class in each grade received instructions on how to implement the creativity program ($n = 6$). The remaining classes constituted the control group. The creativity program package was available to the control group classroom teachers after the completion of the study.

Treatment

The training was conducted over a 15-week period. During the first 3 weeks, teachers received instruction on how to implement the program in the classroom. The researcher met with each teacher individually to introduce the rationale, purposes, principles, activities, and procedures for implementing the activities developed by Renzulli (1973, 1986). Forty activities (verbal and figural) from the *Mark I* and *Mark II* volumes of this program were used because they were appropriate for the sample grade levels. The teachers of bilingual classrooms received the activities in both English and Portuguese. All participating teachers were provided with instructions for each activity, as well as activity pages for their students. The program was designed to help teachers develop students' creative thinking abilities (fluency, flexibility, originality, and elaboration). The theoretical background of the program is based on Guilford's Structure of the Intellect Model (1967) and focuses on the divergent thinking section of the

model. According to Renzulli (1986), “The New Directions in Creativity program deals mainly with the divergent production operation of the Structure of Intellect Model” (p. 19). In the 9 subsequent weeks, teachers implemented the creativity program in their classrooms. The average number of activities implemented in the classrooms was 25 (62.5%), and an average of 3 activities were implemented each week. The amount of regular curriculum to be covered, achievement testing (practice and administration), and many extra classroom events were among the factors that contributed to the reduction in the number of activities implemented.

The researcher observed each classroom and met with teachers every 2 weeks to ensure that the program was being implemented as planned. Classes in the control group proceeded with regular classroom activities during the treatment period. Pretest measures were administered during the first 3 weeks of the staff development training. Posttest measures were administered to the treatment groups immediately after the classroom training was finished and were administered 1 week earlier to the control groups.

Measures

Three verbal and three figural subtests of Torrance Tests of Creative Thinking (TTCT; Torrance, 1974) were used to assess the following divergent thinking abilities: (a) fluency, the number of different responses the students gave to the stimulus situation; (b) flexibility, the number of different categories of responses to a problem; and (c) originality, unique responses that were statistically infrequent. Form A of TTCT was used as the pretest, and the parallel Form B was used as the posttest.

Because of the high intercorrelation among verbal and figural creativity scores, detected by low tolerance values for the predictors, a total creativity score was obtained by adding both scores. The test–retest reliability evidence of TTCT ranges from .60 to .93 (Torrance, 1974). Many studies (Cropley, 1972; Cropley & Clapson, 1971; Matthews-Morgan & Cramond, 1998; Torrance, 1972) have found support for the predictive validity of TTCT. Torrance (1974) reported studies that provide evidence for the construct validity of these tests, although the TTCT are not without criticism. A number of studies have found that correlations of divergent thinking measures, including TTCT, with other measures of creativity have been inconsistent (Harvey, Hoffmeister, Coates, & White, 1970; Hocesvar, 1981; Wodtke, 1964). Low reliability evidence of the TTCT led researchers to suggest that it be used for research situations only (Wodtke, 1964). The TTCT were selected for this study because they have more technical support than other creativity measures, they are appropriate for the grade levels in this study, and they have been used worldwide (Alencar, 1974; Beaudot, 1971; Fleith, 1990; Konaka, 1997; Madaus, 1967; Mar’i, 1971; Raina, 1971; Sikka, 1991; Torrance, 1973, 1979).

Three scales of the Self-Perception Profile for Children (Harter, 1985) were administered to the sample: (a) scholastic competence (child’s perception of his or her competence or ability within the realm of scholastic performance), (b) social acceptance (degree to which the child was accepted by peers or felt popular), and (c) global self-worth (the extent to which the child liked oneself as a person). Each scale contained six items. Each item included two opposite sentences describing characteristics of a child (e.g., some kids often forget what they learn, but other kids can remember things easily). The child was asked to decide what kind of kid was most like him

or her and was then asked whether this was sort of true or really true for him or her. Each item was scored on a scale from 1 (*low perceived competence*) to 4 (*high perceived competence*). The internal consistency reliability for the three scales ranged from .75 to .84 (Harter, 1985; Kenny, Archambault, & Hallmark, 1995). Marsh and Gouvernet (1989) provided support for the construct validity of Harter's instrument. This instrument was selected because it has been used with culturally different samples (Asendorpf & Van-Aken, 1993; Pedrabissi, Santinello, & Scarpazza, 1988; Peixoto & Mata, 1993). The same scales were administered prior to treatment and after treatment. To combat multicollinearity, a total score of self-concept was obtained by adding the scores of the three scales (Stevens, 1996). Instructions to bilingual classroom students were provided in both English and Portuguese for both Torrance's and Harter's instruments.

The Massachusetts English Language Assessment–Oral (MELA–O; Massachusetts Department of Education, 1994) was used to assess the level of proficiency in English language of Brazilian students. This assessment produces a rich description of a student's progress toward full English proficiency through naturalistic observations in classroom situations, and classroom teachers conduct it twice a year. It provides information about the student's English speaking and listening development. The bilingual education district office provides training for administering the assessment. The student is rated on six levels of proficiency, ranging from 0 (*no demonstrated ability in that proficiency category*) to 5 (*a level of ability that is equivalent to that of a native English speaker of the same age*). The classroom teacher is also asked to describe the student's level of English comprehension and production. The director of the bilingual education program in the school district made the quantitative data from the assessments conducted in the fall of 1997 and the spring of 1998 available to the researcher.

To obtain biographical data about the sample, students were asked to complete a survey. Students placed in bilingual classrooms were also asked about their language background. In addition, semistructured interviews were conducted with teachers who implemented the program in the classroom and with a subsample of bilingual and monolingual students to identify aspects of the creativity program that may have influenced students' creative thinking abilities and self-concept. Personal interviews were also conducted with the school principal and the school psychologist who determined the placement of Brazilian students. The interviews were conducted when the treatment was being implemented.

Data Analyses

The Statistical Package for Social Sciences (SPSS; 1998) was used for the initial screening data and the subsequent analyses. Descriptive hierarchical discriminant function analysis was used to address the first two research questions. The grouping variables were the groups (i.e., treatment group and control group). The predictor variables for the first research question were pretest creative thinking abilities scores and the type of classroom (i.e., monolingual or bilingual were dummy coded 0 and 1), which were entered as covariates, and posttest creative thinking abilities scores. The predictor variables for the second research question were pretest self-concept scores and the type of classroom (i.e., monolingual or bilingual), which were entered as covariates, and posttest self-concept scores.

Because the treatment in this study involved interaction among students, the classroom was used as the unit of analysis. As Kromrey and Dickinson (1996) explained,

If data are gathered from classrooms in which treatments are delivered to groups of students (conditions in which may reasonably be assumed that outcomes within classrooms are not independent of each other), we should assume that intraclass correlation is present and base our test of treatment effects on class means as the unit of analysis. This is the only approach that provided adequate control of Type I error rate regardless of the actual intraclass correlation and research designs investigated. (p. 230)

As a consequence, the sample size was small, and statistical power was low. Thus, effect sizes (practical significance) are the focus of the results from this study, rather than statistical significance. Many researchers suggest focusing on the effect size, because statistical probability values do not reflect the importance or magnitude of an effect (American Psychological Association, 1994; Daniel, 1977; Slakter, Wu, & Suzuki-Slakter, 1991; Smith, 1983; Thompson, 1996). Assumptions of normality, skewness, linearity, and homogeneity of variance were found to be satisfactory. No outliers were identified.

To address the third research question, qualitative procedures were used to analyze data from classroom observations and interviews. Responses were coded and categorized according to techniques suggested by Strauss and Corbin (1990) and analyzed for patterns and themes. This included the use of a coding paradigm that resulted in the formulation of core categories of findings after using three levels of coding. These levels are open coding, a process during which the researcher examines, breaks down, compares, conceptualizes, and categorizes the data; axial coding, a process that involves the examination of each category whereby relationships between the categories emerge; and selective coding, a process during which the core categories are selected from categories that emerged in the data collection and analyses. In addition, informal observation in the classrooms where the creativity program was implemented was used as another source of data. To enhance the trustworthiness of this study, the following techniques were used (Marshall & Rossman, 1995): checking and rechecking the data, value-free note taking, triangulating sources of data, and keeping a researcher's journal.

Results

Quantitative Analysis

The assessment of Brazilian students' level of English proficiency was obtained through MELA-O. Students' ability to comprehend and produce English was assessed by the classroom teacher in the fall of 1997 and the spring of 1998. The variables, comprehension and production, were reflected and log transformed to adjust for negative skewness. Paired sample *t* tests with a Bonferroni adjustment ($\alpha = .025$) were performed to determine whether there were differences with respect to comprehension and production in English of bilingual classroom students between fall and spring semesters. The SPSS was used to perform the analyses, and student was the unit of analysis. Data from 82 students on both variables were available. Significant differences were obtained, as reported in Table 2. These findings suggest that the level of oral

English proficiency of students who had been in the bilingual program for at least 1 year improved. The comprehension ability improved more than the production ability in English.

Table 2. Comprehension and Production in English: Means and Standard Deviations Without Transformations by Semester and *t* Values^a

	Fall 1997		Spring 1998		<i>df</i>	<i>t</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Comprehension	3.26	1.39	4.05	1.11	81	11.515*
Production	2.67	1.44	3.35	1.23	81	10.564*

Note: The MELA–O scale ranges from 0 (*no proficiency*) to 5 (*proficiency equivalent to a native English speaker*).

^a*N* = 82 students.

**p* < .0005.

Neither the full model with the three predictor variables (pretest divergent thinking score, type of classroom, and posttest divergent thinking score; $F[3, 10] = .47, p = .71$) nor the block of covariates (pretest divergent thinking and type of classroom; $F[2, 11] = .73, p = .50$) was statistically significant. As expected, because of the small sample size of this study ($N = 14$ classrooms), the statistical power was low. Thus, to investigate the magnitude of the effect of the creativity training program on students' divergent thinking abilities, effect sizes (practical significance) were examined. As paraphrased by Slakter et al. (1991), statistical significance does not guarantee practical significance, and the magnitude of the *p* value is not a guide to practical significance. In addition, Smith (1983) said, "The significance test itself does not necessarily tell anything about the size of the difference between the means nor how strongly one can believe these results" (p. 317). In this regard, Carver (1993) recommended that "attention [should] be paid to the size of the effect, whether it is statistically significant or not" (p. 288). Shaver (1993) also stated that "it should be made clear that, with effect sizes specified, power analysis is not relevant" (p. 311).

Multivariate effect sizes were based on the multiple correlation squared ($R^2 = 1 - \Delta$). The effect size of the covariate, type of classroom, was very small ($\Delta = .984; R^2 = .016$), suggesting that this predictor did not contribute to explaining differences in the pretest scores. When the divergent thinking abilities scores were entered in the model, the explained variance (R^2) for the full model increased .108. The effect size (or practical significance) for the full model was .124 ($\Delta = .876$), which is considered to be small to medium for a multivariate analysis, according to Cohen (1988). Because multivariate effect sizes indicated differences between the groups, univariate effect sizes were also examined to describe how the groups differed (Tabachnick & Fidell, 1996). The inspection of the univariate means indicated that both treatment and control groups had higher scores on the posttest divergent thinking abilities when compared to their scores on the pretest. However, the difference between pretest and posttest divergent thinking abilities mean scores of the treatment group was greater than the difference between mean scores of the control group. For the treatment group, the univariate effect size was medium ($SD = .50$), and for the control group, the univariate effect size was extremely small ($SD = .09$; Table 3).

Table 3. Mean Scores and Standard Deviations for the Pretest and Posttest, and Univariate Effect Sizes on Creative Thinking Abilities^a

	<i>n</i>	Pretest		Posttest		<i>ES</i>
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Treatment Group	6	129.11	25.73	142.81	29.49	.50 SD ^c
Control Group	8	144.68	28.44	147.54	37.82	.09 SD ^b

^a*N* = 14 classrooms. ^bSmall effect size. ^cMedium effect size.

The jackknife classification procedure for the full model correctly classified 71.4% of original grouped cases. Also, the model predicted treatment group membership better (83.3%) than control group membership (62.5%). According to the results described, the creativity training program slightly improved the divergent thinking abilities of classroom students in the treatment group. The students' placement in monolingual or bilingual classrooms appeared not to influence the development of their divergent thinking abilities.

With respect to the second research question, neither the full model with the three predictors, $F(3, 10) = .31, p = .82$, nor the block of covariates, pretest self-concept, and type of classroom, $F(2, 11) = .38, p = .70$, was statistically significant, which was anticipated because of the small sample size of this study ($N = 14$ classrooms) and low statistical power. Thus, to investigate the magnitude of the effect of the creativity training program on students' self-concept, effect sizes (practical significance) were calculated in this study, as recommended by Carver (1993) and Shaver (1993). As with the previous analysis, multivariate effect sizes were based on the multiple correlation squared ($R^2 = 1 - \Lambda$). The effect size for the full model was found to be small ($\Lambda = .914; R^2 = .086$) for a multivariate analysis, according to Cohen's (1988) guidelines for interpretation of practical significance. The effect size of the type of classroom, a covariate, was very small ($\Lambda = .984; R^2 = .016$), suggesting that this predictor did not contribute to explaining differences in the model. Likewise, the pretest self-concept score, when forced into the model, did not improve the explained variation ($\Lambda = .984$). However, when the posttest self-concept score was entered in the model, the explained variance for the full model increased slightly (increment of $R^2 = .07$). Because multivariate effect sizes indicated differences between the groups, univariate effect sizes were also examined to describe how the groups differed (Tabachnick & Fidell, 1996). The inspection of the univariate means indicated that both treatment and control groups had lower scores on the posttest self-concept when compared to their scores on the pretest. Curiously, the univariate effect size for the control group on self-concept scores was greater than the univariate effect size for the treatment group. For the treatment group, the univariate effect size would be considered to be extremely small ($SD = .06$), and for the control group, the univariate effect size would be considered to be small to medium ($SD = .44$; Table 4). The jackknife classification procedure for the full model correctly classified 64.3% of original grouped cases. The model correctly predicted 66.7% of the treatment group membership and 62.5% of the control group membership. The results described earlier indicate that the effect of the creativity training program was negligible on the self-concept of students in the treatment group. On the other hand, the findings may suggest that not being exposed to the creativity training program was associated with a decline in the self-concept of students in the control group. The implementation of the creativity training program in the classrooms may have

moderated the decline of students' self-concept. The decline in the self-concept of students in the control group between pretest and posttest may also be a result of threats to the internal validity of the study, such as testing and statistical regression. In addition, the condition of being placed in monolingual or bilingual classrooms was not found to influence students' self-concept.

Table 4. Mean Scores and Standard Deviations for the Pretest and Posttest, and Univariate Effect Sizes on Self-Concept

	<i>n</i>	Pretest		Posttest		<i>ES</i>
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Treatment Group	6	55.67	3.57	55.49	2.89	.06 SD ^b
Control Group	8	56.32	3.05	55.09	2.59	.44 SD ^c

^a*N* = 14 classrooms. ^bSmall effect size. ^cSmall to medium effect size.

Qualitative Analysis

The qualitative findings provided further insight about aspects related to the creativity training program, as well as characteristics of the school environment, that influenced students' divergent thinking abilities and self-concept. Data analyses generated three core categories: (a) the implementation of the creativity training program, (b) the degree of bilingualism of Brazilian students, and (c) cultural issues. It appeared that the implementation of the creativity program was related to the development of students' divergent thinking abilities and self-concept. The opportunity for students to share ideas, engage in their favorite activities (usually figural activities), express themselves, and become aware of their potential (especially in the case of less academically able students) were positive outcomes associated with the creativity training program. Teachers' responsiveness to different students' working styles (bilingual classroom students reported that they preferred to work in pairs or in small groups, whereas monolingual classroom students said that they preferred to work individually on most creativity activities) and the degree of difficulty for some activities were also factors that contributed to the success of the program. The teachers also mentioned the need to implement the program throughout an academic semester, rather than over a short period, which occurred in this study.

The data also suggests that students placed in bilingual classrooms should not be considered bilingual to the same degree, because their level of proficiency in English and Portuguese languages varied considerably, according to the teachers. Cross-cultural factors also appeared to play a role in the development of students' creativity and self-concept: (a) differences between bilingual and monolingual students with respect to socioemotional characteristics (students placed in bilingual classrooms were characterized as group oriented, able to demonstrate their emotions, extroverted, and in need of attention, whereas students placed in monolingual classrooms were more individualistic oriented, independent, and reserved in showing their emotions); (b) differences between the Brazilian and American educational system structures (Brazilian classrooms are very structured, and the teacher is in charge of providing rules and limits for students, whereas in the American educational system, students' independence is fostered and students are coresponsible for their learning process); (c) limited parental support (the Brazilian parents did not seem to have enough time to spend with their

children, supervise homework, or participate in school activities because they had two or three jobs); and (d) attitudes of prejudice and discrimination toward the Brazilian community. According to bilingual classroom teachers, the principal, and the school psychologist, limited knowledge and interest about Brazilian values and traditions seemed to be another challenge faced by staff members in this school.

Discussion

The results of this study indicate that training has some impact on creativity, as measured by TTCT, supporting other research findings that indicate it is possible to improve people's creative thinking behaviors (Pyryt, 1997; Rose & Lin, 1984; Torrance, 1972). The qualitative findings indicate that the manner in which the creativity training program was implemented seems to have influenced the students' divergent thinking. The positive outcomes associated with the creativity training program included the opportunity for students to share ideas, to engage in their favorite activities (i.e., figural activities), to express themselves, and to become aware of their potential (especially in the case of less academically able students), as well as the responsiveness of teachers to different students' working styles. A supportive classroom climate seemed to play an important role in the successful implementation of the creativity training program. According to Torrance (1972),

the most successful approaches seem to be those that involve both cognitive and emotional functioning, provide adequate structure and motivation, and give opportunities for involvement, practice, and interaction with teachers and other children. (pp. 132–133)

The creativity lessons, combined with a supportive and encouraging classroom climate, seemed to contribute to the success of the program. Amabile (1996), Csikszentmihalyi (1996), and Sternberg and Williams (1996) believe that a comprehensive view of creativity takes into consideration the interchange between the individual and the environment in the creative process, the psychological meaning of the creation situation for the individual, and the power of the environment in establishing conditions for the development of the creativity.

Although studies have suggested that bilingual elementary students have higher performance on divergent thinking measures when compared to monolingual students, the findings of this study did not support these studies. The wide range in the degree of bilingualism in the Brazilian students may provide a possible explanation for this result. Qualitative findings indicated that although the Brazilian students were placed in bilingual classrooms, they could not be considered bilingual in terms of proficiency in two languages. The students were exposed to two languages. The attendees at the same school included children who had just arrived in the United States and spoke no English, as well as children who had been in the American school system since kindergarten or first grade and could understand, read, and write English. Brazilian students were generally placed in the transitional bilingual education program, in which most of the instruction was offered in their native language. According to the philosophy of the school, it is necessary for students to be well grounded in their native language to transfer to English.

The findings of this study do not support the idea that a creativity training program enhances children's self-concept, which corroborates what other researchers have found

(Blakenship, 1975; Camp, 1994; Kolloff & Feldhusen, 1984; Meador, 1994). According to Hattie and Marsh (1996), meta-analyses of intervention studies have provided limited evidence of the success of self-concept intervention programs, suggesting that it is not easy to enhance self-concept. Adults' self-concept is much more malleable than children's self-concept. Moreover, students in this study were preadolescents, and according to Byrne (1996) and Hattie (1987, 1992), self-concept is much more difficult to change at that age level. The cognitive skills of young children are concrete, and the cognitive skills of adults are more abstract and complex. "The effects of most educational interventions are much smaller than effects derived from psychotherapy and out-of-classroom settings" (Hattie & Marsh, 1996, p. 439). Therefore, it would be difficult to produce substantial changes in self-concepts of children in this study, considering their age, the educational nature of the intervention, and the short length of the program implementation. As suggested by the qualitative findings, the limited Brazilian parental support and prejudicial attitudes of the school community toward Brazilian students should also be considered factors that may have influenced the development of students' self-concept.

In addition, the limitations related to the self-concept scale used in this study, Self-Perception Profile for Children (Harter, 1985), may contribute to an explanation of the results of the effects of the creativity training program on students' self-concept. Although Harter's instrument is considered a multidimensional scale, the scores of the three subscales used in this study, scholastic competence, social acceptance, and global self-worth, were combined to prevent multi-collinearity, generating a total score and, therefore, a unidimensional score of self-concept. The unidimensional perspective in this study may have masked gains in specific domains of students' self-concept.

Although the quantitative results indicated that the creativity training program did not affect the self-concept of trained students as a whole group (considering the classroom as a unit of analysis), the classroom teachers who were interviewed said it did have a positive impact on less academically able students. The teachers indicated that the program gave these students opportunities to express themselves, become aware of their potential in other areas, and develop a more positive self-image.

Limited knowledge and interest about Brazilian values and traditions seemed to be another challenge faced by staff members in this school. Limited information about the Brazilian educational system, as well as Brazilian students' characteristics, needs, and working styles, appeared to create prejudicial and discriminatory attitudes toward these students, which may have affected the development of a positive self-concept. Many studies have pointed to the need to change preconceived attitudes toward culturally and linguistically diverse students (Kloosterman, 1997) and the importance of celebrating and discussing multiculturalism in American schools (Banks, 1993; Weil, 1993).

In conclusion, the results of this study suggest that creativity training might have an impact on students' divergent thinking abilities, and a nourishing classroom climate seems to play a vital role in the process of developing children's creativity. Cross-cultural factors also appeared to play a role in the development of students' creativity and self-concept. The results suggest that it is important to consider students' cognitive, social, and emotional characteristics, as well as their linguistic and cultural backgrounds, when implementing a divergent thinking program.

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